Confirmatory Factor Analysis of the COPE Questionnaire on Community Drinkers and an Alcohol-Dependent Sample

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ABSTRACT. *Objective*: The COPE questionnaire has often been used as an efficient method of assessing a range of coping dimensions in many areas, including alcohol research. To date, however, this questionnaire has not been validated for use in community drinkers or alcohol-dependent samples. This study aimed to rectify this shortcoming in the literature. *Method*: Confirmatory factor analyses (CFA) were performed for 600 Australians (315 men, 285 women; 300 community drinkers and 300 individuals dependent on alcohol), in an attempt to confirm the 14 primary factors and the higher-order factor structure of the COPE. *Re-* *sults*: The results of the CFA showed that, whereas a 14-factor primary structure and the popular 3-factor higher-order structure were confirmed in the sample of community drinkers, the 4-factor model (COPE) was not confirmed. No support for any factor solution was found in the alcohol-dependent sample. *Conclusions*: It was concluded that the COPE has good psychometric properties when assessing community drinkers, but it is not an adequate tool for assessing dimensions of coping in an alcohol-dependent sample and should be used with extreme caution. (*J. Stud. Alcohol* **63**: 631-640, 2002)

R ESEARCHERS INCREASINGLY have expressed an interest in ways people respond to stress and in the coping strategies they use to overcome it. One area receiving increased attention is the relationship of coping to alcohol use, with many people questioning how coping resources are involved in the decision to drink alcohol (Fromme and Rivet, 1994; Williams and Clark, 1998; Windle and Windle, 1996). In addition, researchers are beginning to suggest coping is important not only in theoretical models of drinking behavior, but in the treatment of alcohol dependence as well (Chung et al., 2001; Larimer et al., 1999; Longabaugh and Morgenstern, 1999; Spangenberg and Campbell, 1999).

As a consequence, many attempts have been made to determine the underlying factors of coping and to construct a reliable and valid questionnaire to assess these factors. One questionnaire that is often used to assess coping is the COPE (Carver et al., 1989), a multidimensional scale designed to assess ways people respond to stress. This scale was developed based on theoretical models and validated in student samples. Since its development, it has been used as a research tool in many areas, including sport-related stress (Eklund et al., 1998), acquired brain injury (Finset and Andersson, 2000), breast cancer (Carver et al., 1993), coping in adolescents (Recklitis and Noam, 1999) and coping with drug addiction (Belding et al., 1996).

The COPE has also been used to assess coping in relation to drinking behavior in adolescents (Fromme and Rivet,

1994; Laurent et al., 1997; Williams and Clark, 1998). To date, however, the majority of research conducted on alcohol-dependent samples has restricted the range of coping strategies to active versus avoidant coping (Chung et al., 2001), rather than examining multiple facets of coping. This reliance on dichotomous classifications of coping may mask important differences in coping styles within those broad dimensions.

A more complete understanding of how coping is related to alcohol consumption requires an investigation of various styles of coping in alcohol-dependent samples. As this is the group that would benefit most from research investigating variables that predict alcohol consumption, it is imperative that research includes an alcohol-dependent group. Identifying a pattern of specific coping strategies in an alcohol-dependent sample may reveal a coping style unique to this clinical group, which can then be addressed in rehabilitation situations.

The general consensus appears to support the role of coping in drinking behavior, although there are many inconsistencies in the research. One potential reason for this may be the lack of specific measures of coping in the alcohol-dependent population. The common practice of applying existing coping questionnaires to this field, without first validating their utility in this sample is one methodological oversight that may help explain some of the confusion surrounding the coping literature.

Despite the use of the COPE in developing models of drinking behavior, a review of the literature indicates it has not been validated for use in samples of community drinkers or in alcohol-dependent samples. Given that people

dependent on alcohol may have a different set of coping strategies than do community drinkers (e.g., relying on alcohol to cope with problems) (Cooper et al., 1995; Holahan et al., 2001), this seems to be a major oversight in the literature to date. In addition, given that adolescent and community samples are also of interest, validation of the measures in these groups is necessary. If the COPE is to be considered a reliable and valid means of assessing the role of coping in drinking behavior, the factor structure of the questionnaire must be validated in samples of both dependent drinkers and community drinkers.

This investigation is even more crucial because previous attempts to replicate the factor structure of the COPE in other samples have often failed. Carver et al. (1989) originally reported 14 primary coping strategies and a higher-order factor structure comprising four conceptually distinct factors: task, cognitive, emotional and avoidance coping. The majority of researchers support three underlying coping factors reflected in the COPE (task, emotion and avoidance). Carver et al.'s (1989) four higher-order factors do, however, reflect those often reported in the literature (e.g., Cook and Heppner, 1997; Ingledew et al., 1996; Kallasmaa and Pulver, 2000; Parker and Endler, 1992; Roger et al., 1993), although, despite reflecting the same basic styles of coping, these factors appear to be somewhat unstable in this questionnaire.

In 1996, Belding et al. attempted a replication of the factor structure of the COPE for use in a sample dependent on methadone. A structural model of the factor solution proposed by Carver et al. (1989) failed to reach significance, as did the replication of the higher-order factor analysis. After examining the results, Belding et al. (1996) chose to reduce the number of factors from 14 to 8 due to high intercorrelation among factors and low factor loadings. A higher-order factor analysis on these eight factors was attempted, failing to replicate the structure reported by Carver et al. (1989). It is worth noting that Belding et al. (1996) did report a factor structure for a methadone-dependent sample, although this was greatly modified from Carver et al.'s (1989) original factor structure.

In their investigation of health behaviors as coping strategies, Ingeldew et al. (1996) also attempted a replication of Carver et al.'s (1989) higher-order factors and failed to confirm the factor structure. Three distinct factors emerged, reflecting problem-focused coping, avoidance and emotion-focused coping. In an effort to replicate the 4-factor solution proposed by Carver et al. (1989), the authors attempted to force a 4-factor solution. Although a solution was obtained, it added only 2.3% variance to the solution and was not able to be interpreted meaningfully.

In perhaps the most comprehensive revision of the COPE questionnaire, Lyne and Roger (2000) attempted to confirm the factor solution by analyzing the original items on the questionnaire, rather than relying on the factor structure provided by Carver et al. (1989). This attempt also failed. Forcing a 4-factor solution for the higher-order factors resulted in turning to religion, one of the primary factors described by Carver et al. (1989), forming a higher-order factor in itself and a pattern of double loadings on many other factors. Lyne and Roger (2000) reported a 3-factor solution, reflecting rational or active coping, emotion coping and avoidance, to be the most reliable factor structure.

Most attempts at replicating the factor structure of the COPE appear to have failed, and because there is a vast range in the items actually included in the analyses, it is difficult to compare individual studies (Lyne and Roger, 2000). Researchers have often removed or merged factors together, due to high intercorrelations, low factor loadings or on theoretical grounds, resulting in few conclusions actually reporting results on the same items. Despite such methodological problems, and the failure of most studies to exactly replicate the original factor structure of the COPE proposed by Carver et al. (1989), the questionnaire is still considered a valuable research tool when assessing coping.

Therefore, it is important to establish the most reliable factor structure for the questionnaire and the key dimensions of coping it assesses. Furthermore, given the apparent instability of the factor structure in other samples, a confirmation of this factor structure in community drinkers and an alcohol-dependent sample is imperative if the COPE is to be considered a reliable and valid means of assessing coping in relation to alcohol use and dependence. Such analysis will aid in validating the use of the COPE for use as a research tool when assessing coping in populations that use and misuse alcohol.

This study aims to achieve two previously unattempted goals. First, we aim to determine whether this factor structure holds for community drinkers. Second, as an alcohol-dependent sample is likely to have a different coping style than does that of community drinkers, we aim to confirm the factor structure of the COPE in a sample dependent on alcohol. It is expected that the trend for a 3-factor solution, reflecting task-focused coping, emotion-focused coping and avoidance, will be replicated in the community sample. As validation has not previously been performed on an alcohol-dependent sample, it is difficult to hypothesize the outcome of confirmatory analyses in this sample. Given the inherent differences between the two samples, however, and the reliance on using alcohol to cope in the sample of dependent drinkers, it would not be surprising for a different factor structure to emerge for this group.

Method

Participants

Participants in this study consisted of 300 community drinkers and 300 individuals dependent on alcohol. Exclusion criteria were epilepsy, major depression, schizophrenia,

obsessive compulsive disorder and demonstrated organic neurological damage according to a medical doctor. All participants were between 18 (the legal drinking age in Australia) and 60 years of age.

The community sample. This sample (*n* = 300) was recruited through local radio stations, local newspapers and a major Brisbane newspaper. All members of the community sample reported alcohol use, with a mean daily consumption of 1.97 standard drinks, which is comparable to average Australian consumption (Australian Bureau of Statistics, 2001). Just over half (52.3%) of the community sample were women; the mean age was 31.12 years. Three quarters (76%) of the community sample were born in Australia; 46% reported being single, 43.3% married, 5% separated and 4.3% divorced. The level of education of the participants was high, with 39% having completed a university degree; 13.7% had completed high school and 14% had not completed high school. The majority of the community sample (60%) did not smoke. About half (43.3%) of this sample worked at least 40 hours per week and 12.7% were unemployed; only 1.35% received some kind of disability benefit. All individuals interested in participating in the study were asked to provide their names and addresses in order that a questionnaire could be mailed to them, and all participants were rewarded for their time with a free movie ticket.

The treatment sample. This sample consisted of 300 alcohol-dependent participants (mean age = 32.24 years), who had recently undergone a detoxification program and/ or were in a treatment program for alcohol dependence. Participants were recruited from various hospitals and alcohol treatment centers around Brisbane, upon approval from the participants and their doctors or care-workers. Participants (*n* = 300; 172 men) were diagnosed as being dependent on alcohol by psychiatrists at the place of recruitment, using DSM-IV criteria for alcohol dependence (American Psychiatric Association, 1994). The majority (84.7%) of this sample also originated in Australia. Compared with the community sample, more of the treatment sample had never been married (54%) and fewer people were currently married (18%). There was also a higher degree of separation and divorce in this sample (14% each). Only 18.3% of this sample had completed a university degree; 36.7% had completed high school and 16.3% had not completed high school. In contrast to the community sample, a large proportion of the treatment sample smoked cigarettes on a regular basis (69.3%). There were also observable differences in the number of hours worked, with 27.3% of the treatment sample working at least 40 hours per week, 16% unemployed and 23.7% on disability benefit.

Measures

The COPE questionnaire (Carver et al., 1989) is a 52-item questionnaire addressing different ways of coping with problems. Items are rated on a 4-point scale, ranging from 1 ("I usually don't do this at all") to 4 ("I usually do this a lot"). These items are then summated to provide 13 subscales: active coping, planning, suppression of competing activities, restraint coping, seeking social support for instrumental reasons, seeking social support for emotional reasons, positive interpretation and growth, acceptance, turning to religion, focus on venting of emotions, denial, behavioral disengagement and mental disengagement. Carver et al. (1989), in their report of the scale, also included exploratory scales of humor and drug or alcohol disengagement. As the authors of this article are interested in how coping related to alcohol drinking behavior and aim to confirm the factor structure of the questionnaire in community drinkers and a sample dependent on alcohol, the alcohol or drug disengagement scale was also included, resulting in a 56-item questionnaire.

Participants also completed a short demographic data sheet. Such information as gender, age and country of birth was recorded.

Procedure

As part of a larger study, a questionnaire consisting of the above measures was mailed to all community participants who responded to the advertisements. A stamped, self-addressed envelope was enclosed, to allow participants to mail their completed questionnaires to the researchers. Each questionnaire included an information sheet about the experiment and participants were assured that confidentiality was to be maintained.

Participants in the alcohol-dependent group were recruited approximately 1 week after completing detoxification programs, from several hospitals and alcohol treatment centers in the Brisbane metropolitan area. A research assistant at the place of recruitment dispensed the questionnaire, which took approximately 45 minutes to complete. Participants were free to complete the questionnaire in their own time. Approximately 1 week after administration of the questionnaires, the research assistant returned to the place of recruitment to collect the completed questionnaires.

Data analysis

Exploratory factor analysis. Before conducting a confirmatory factor analysis, exploratory factor analysis was conducted, to assure that the primary factor structure of the COPE was evident in these samples. Factor analysis was performed with SPSS 10.0, using principal components analysis with oblique rotation with Kaiser Normalization, which allows for correlation among variables (Tabachnick and Fidell, 1996). This was the procedure originally used by Carver et al. (1989) and was used here to allow an exact replication of the structure. Criteria for an acceptable factor

solution were also based on Carver et al.'s (1989) original study: (1) minimum eigen values of 1, (2) exclusion of factor loadings below 0.3 and (3) a minimum of three items on each factor. Individual factors were also required to be conceptually coherent.

Confirmatory factor analysis. EQS 5.7b was used to perform a confirmatory factor analysis (CFA) of the COPE for both the community and alcohol-dependent groups. Maximum likelihood estimation was used for all analyses. It is worth noting that, in CFA, significant chi-square statistics indicate a nonsignificant result (i.e., the model is not an acceptable fit to the data). Since a nonsignificant chi-square is difficult to achieve with large sample sizes, a range of other fit indices is presented. By convention, these are deemed acceptable if over 0.9 (Bentler, 1995).

Several analyses were performed for each group. First, the 14 subscales were examined, to determine if the items did load onto these factors. In all subsequent analyses, the items of the COPE scale were loaded onto the 14 subscales described by Carver et al. (1989) and these subscales loaded onto higher-order factors. The 4-factor higher-order factor solution proposed by Carver et al. (1989) was examined first, followed by the 3-factor model. Both these models were then subjected to another CFA, in which items, primary factors and higher-order factors were included in the analyses, with the higher-order factors loading onto a single total score. See Figures 1 and 2 for a representation of the complete 3- and 4-factor models.

Results

Community drinkers

Investigation of the distributional properties of items in this group showed that responses to most items were normally distributed. Responses to items on the active and planning factors were negatively skewed, however, and a positive skew was evident on the items relating to the avoidant factors of religion, denial, behavioral disengagement and drug and alcohol disengagement. Platykurtic distributions were seen in items corresponding to seeking social support and acceptance, and leptokurtic distributions were seen in denial and behavioral disengagement items.

No items were removed or subjected to transformation. As the distributions deviated from normality in expected directions for this sample (e.g., negatively skewed for active coping and positively skewed for using drugs or alcohol to cope), it was assumed that the shape of the distribution reflected the actual distribution that would be found in the population. In addition, Tabachnick and Fidell (1996) suggest that, with large sample sizes, the actual value of skewness and the shape of the distribution are more salient than significance level. Although visual examination of the distributions revealed skewed distributions for religion, denial

and drug or alcohol disengagement, most values were relatively small and visual examination of the other frequency distributions revealed sufficiently normal distributions. Further, it has been suggested that with samples exceeding 200 participants, effects of violations of normality assumptions regarding kurtosis are minimal (Tabachnick and Fidell, 1996). Last, as the COPE questionnaire is widely used in this form, it was thought that comparison to other examinations of the factor structure would be facilitated by not transforming items; yet, some care should be taken in interpreting the results.

Analysis of eigen values and a scree plot from the exploratory factor analysis revealed a 14-factor solution to be most acceptable for the community sample. These 14 factors represented the same factors as reported by Carver et al. (1989) and accounted for 72.32% of the total variance in the data. All items loaded on the same factors as described by Carver et al. (1989), with one exception. This item ("I take direct action to get around the problem"), which, according to the original factor structure formed part of the active coping factor, loaded on planning in the exploratory factor analysis. Investigation of communalities revealed them to be high, with all items having communalities above 0.47. Cronbach's alpha coefficients were calculated on the 14 factors to determine their internal consistency. All results were above 0.70, with the lowest being mental disengagement (0.73).

First, a CFA was performed, loading the 56 items of the COPE onto the 14 factors proposed by Carver et al. (1989). This resulted in an adequate fit to the data (χ^2 = 2,296.07, 1,379 df, $p < .001$; Comparative Fit Index [CFI] = 0.903; root mean squared error of approximation [RMSEA] = 0.048); however, modification indices suggested the removal of seven items due to cross loadings on at least three factors. The removal of these items produced a better model fit (χ^2 = 1,601.85, 1,036 df, $p < .001$; CFI = 0.931; RMSEA = 0.043). (See Table 1 for all CFA test statistics.)

Investigation of the removed items showed them to consist of the problematic item from the exploratory factor analysis (originally an active coping item, which loaded on planning here), as well as two suppression items ("I put aside other activities in order to concentrate on this: "I keep myself from getting distracted by other thoughts of activities"), one restraint item ("I force myself to wait for the right time to do something"), one growth item ("I learn something from the experience") and two items from the acceptance factor ("I get used to the idea that it happened"; "I accept that this has happened and that it can't be changed").

Items that were removed from the analyses were found to be primarily the items with the lowest factor loadings in the exploratory factor analysis. Internal consistency of these dimensions remained high after removal of these items (active: α = 0.75; suppression: α = 0.62; restraint: α = 0.72;

TABLE 1. Summary of test statistics for confirmatory factor analysis

Model	χ^{2a}	df	AIC[b]	CFI[c]	BNFI[d]	BNNFI[e]	RMR[f]	SRMR[g]	RMSEA[h]
Community sample									
14 primary factors with 56 items	2,296.07	1,379	-461.93	.903	.791	.892	.067	.057	.048
14 primary factors with 49 items[i]	**1,601.85**	**1,036**	**-470.15**	**.931[j]**	**.829**	**.922**	**.059**	**.048**	**.043**
3 higher order factors[k]	2,629.59	1,468	-306.41	.877	.760	.871	.121	.102	.052
3 higher order factors with religion	1,905.54	1,110	-314.46	.903	.797	.897	.112	.094	.049
3 higher order factors and total score	**1,838.59**	**1,101**	**-363.41**	**.910**	**.804**	**.904**	**.116**	**.098**	**.048**
4 higher order factors[k]	2,611.67	1,465	-318.33	.879	.762	.872	.120	.101	.052
4 higher order factors with religion	2,501.16	1,461	-420.84	.890	.772	.884	.108	.091	.049
4 higher order factors and total score	1,905.10	1,107	-308.90	.903	.797	.897	.117	.099	.049
Alcohol-dependent sample									
14 primary factors with 56 items	6,098.70	1,393	3,312.70	.550	.491	.502	.116	.113	.107
14 primary factors with 49 items[i]	6,650.68	1,113	4,424.68	.382	.344	.347	.225	.201	.130
3 higher order factors[k]	7,152.51	1,468	4,216.51	.456	.403	.429	.160	.145	.115
3 higher order factors with religion	6,926.51	1,459	4,008.51	.477	.422	.448	.137	.130	.113
3 higher order factors and total score	5,586.09	1,110	3,366.09	.501	.449	.471	.165	.145	.117
4 higher order factors[k]	5,767.96	1,112	3,543.96	.481	.431	.451	.193	.172	.119
4 higher order factors with religion	6,853.79	1,460	3,933.79	.484	.428	.456	.139	.133	.112
4 higher order factors and total score	5,633.18	1,110	3,413.18	.495	.444	.465	.174	.152	.118

[a]All χ^2 statistics were significant at $p < .001$. [b]Akaike Information Criterion. [c]Comparative Fit Index. [d]Bentler-Bonett Normed Fit Index. [e]Bentler-Bonett Nonnormed Fit Index. [f]Root mean squared residual. [g]Standardized root mean squared residual. [h]Root mean squared error of approximation. [i]These models excluded seven items noted to have low factor loadings or high intercorrelations. [j]The most acceptable models are highlighted in boldface type. [k]These analyses were performed with the exclusion of the religion factor; all other models included religion in the analyses.

growth: $\alpha = 0.85$; acceptance: $\alpha = 0.82$). These items were removed from all subsequent analyses. As a consequence, both the suppression and acceptance scales consisted of only two items. Since reliability was still high, however, and inclusion of the problematic items resulted in a poorer model fit, the 2-item scales were used in the following analyses. This resulted in a revised 49-item version of the COPE questionnaire.

Second, CFA was used to examine the 4-factor model, which suggests underlying factors of active, cognitive, emotion and avoidant coping. This was first performed without the religion subscale, as it had been omitted by Carver et al. (1989) in the original extraction of higher-order factors. Thus, the analysis investigated 49 items of the COPE questionnaire, which loaded onto 14 factors (including religion), 13 of which (due to the exclusion of religion) loaded onto four higher-order factors. (See Figure 1 for a schematic representation of the complete 4-factor model.) This analysis produced a moderate fit ($\chi^2 = 2,611.67$, 1,465 df, $p < .001$; CFI = 0.879; RMSEA = 0.052); however, examination of the modification indices revealed religion should be included on the higher-order factor of avoidance. This addition resulted in a better (χ^2 diff. = 110.51, 4 df, $p < .001$), although still only moderate, fit ($\chi^2 = 2,501.16$, 1,461 df, $p < .001$; CFI = 0.890; RMSEA = 0.049). In fact, a χ^2 difference test revealed the 14-factor model to be better than the 4-factor model (χ^2 diff. = 899.31, 425 df, $p < .001$). (See Table 1 for fit indices.)

Third, the 3-factor model proposing underlying factors of task coping, emotion coping and avoidance coping was

examined. Analyses were again performed without the religion subscale, resulting in an examination of 49 items loading onto 14 primary factors, 13 of which loaded onto 3 higher-order factors. (See Figure 2.) The results of this analysis revealed a moderate model fit ($\chi^2 = 2,629.59$, 1,468 df, $p < .001$; CFI = 0.877; RMSEA = 0.052). Modification indices again indicated religion should be included in the model as an element of the avoidance factor. The revised model produced more acceptable fit indices ($\chi^2 = 1,905.54$, 1,110 df, $p < .001$; CFI = 0.903; RMSEA = 0.049). A χ^2 difference test again revealed the 14-factor model to be more acceptable than the higher-order model (χ^2 diff. = 303.69, 74 df, $p < .001$).

Last, both the 4-factor (Figure 1) and 3-factor (Figure 2) models were tested with the higher-order factors loading onto a single total score. Religion was included on the avoidance factor for both analyses. Thus, both models tested the 49 items loading onto 14 primary factors, all of which load onto the higher-order factors, which then loaded onto a total score. Although χ^2 difference tests showed the 14-factor model to be superior to both the 3-factor and total score model (χ^2 diff. = 236.74, 65 df, $p < .001$) and the model with four factors and a total score (χ^2 diff. = 303.25, 71 df, $p < .001$), both models produced an acceptable model fit. The 3-factor model ($\chi^2 = 1,838.59$, 1,101 df, $p < .001$; CFI = 0.910, RMSEA = 0.048) produced slightly better fit statistics than the 4-factor model ($\chi^2 = 1,905.10$, 1,107 df, $p < .001$; CFI = 0.903, RMSEA = 0.049). A χ^2 difference test also revealed the 3-factor model to be a better model than the 4-factor model (χ^2 diff. = 66.51, 6 df, $p < .001$), as
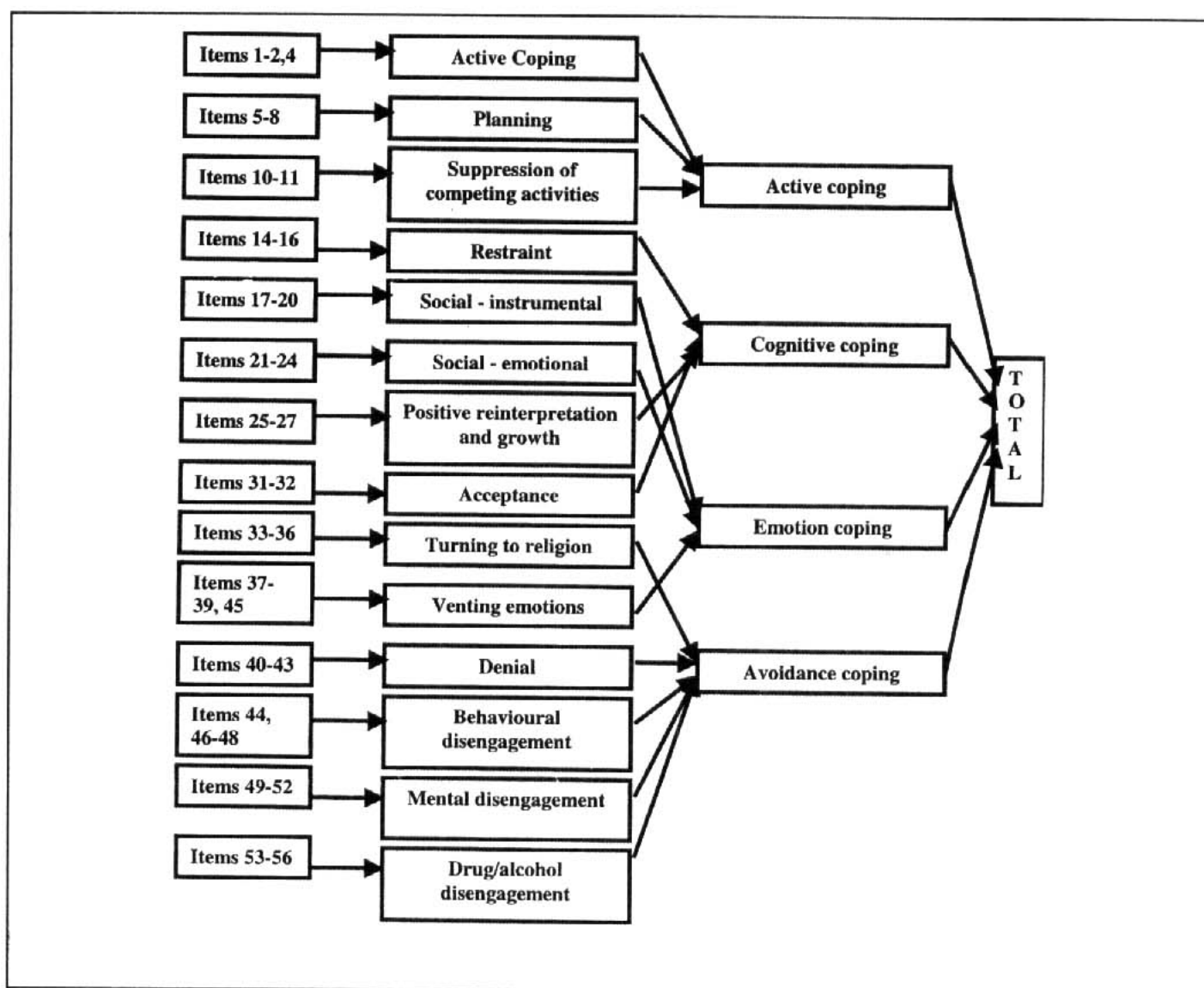
FIGURE 1.   Schematic representation of the 4-factor model of the COPE questionnaire (Items 3, 9, 12, 13, 28, 29 and 30 removed)

did the change in the Akaike Information Criterion (AIC), with a larger change for the 3-factor model (see Table 1). All CFA test statistics are shown in Table 1.

In comparing the models, it appears that the 14 primary factors are sufficient to account for the variance in coping styles. This model produced the best fit statistics, and was found to be superior to any of the higher-order models tested. Of the higher-order models, the 3-factor model with higher-order factors loading onto a total score is a better description of coping styles than the other models tested. This model achieved higher fit indices and lower error statistics than the three factors alone, or any of the 4-factor models. Results for this model, including standardized coefficients for each item, primary factors and higher-order factors, are shown in Table 2.

Alcohol-dependent sample

Frequency distributions of the items for the alcohol-dependent sample were found to be platykurtic for almost all items, although, as previously mentioned, the effects of negative kurtosis diminish with sample sizes in excess of 200 (Tabachnick and Fidell, 1996). Skewed distributions were also noted for some items, with positive skew on denial and behavioral disengagement items and negative skew on drug and alcohol disengagement items. Visual examination of the frequency distributions revealed these deviations to be minimal. Thus, no items were removed or transformed.

Both orthogonal and rotated factor analyses were attempted, in an effort to replicate the 14-factor structure in the alcohol-dependent sample. These failed to produce an
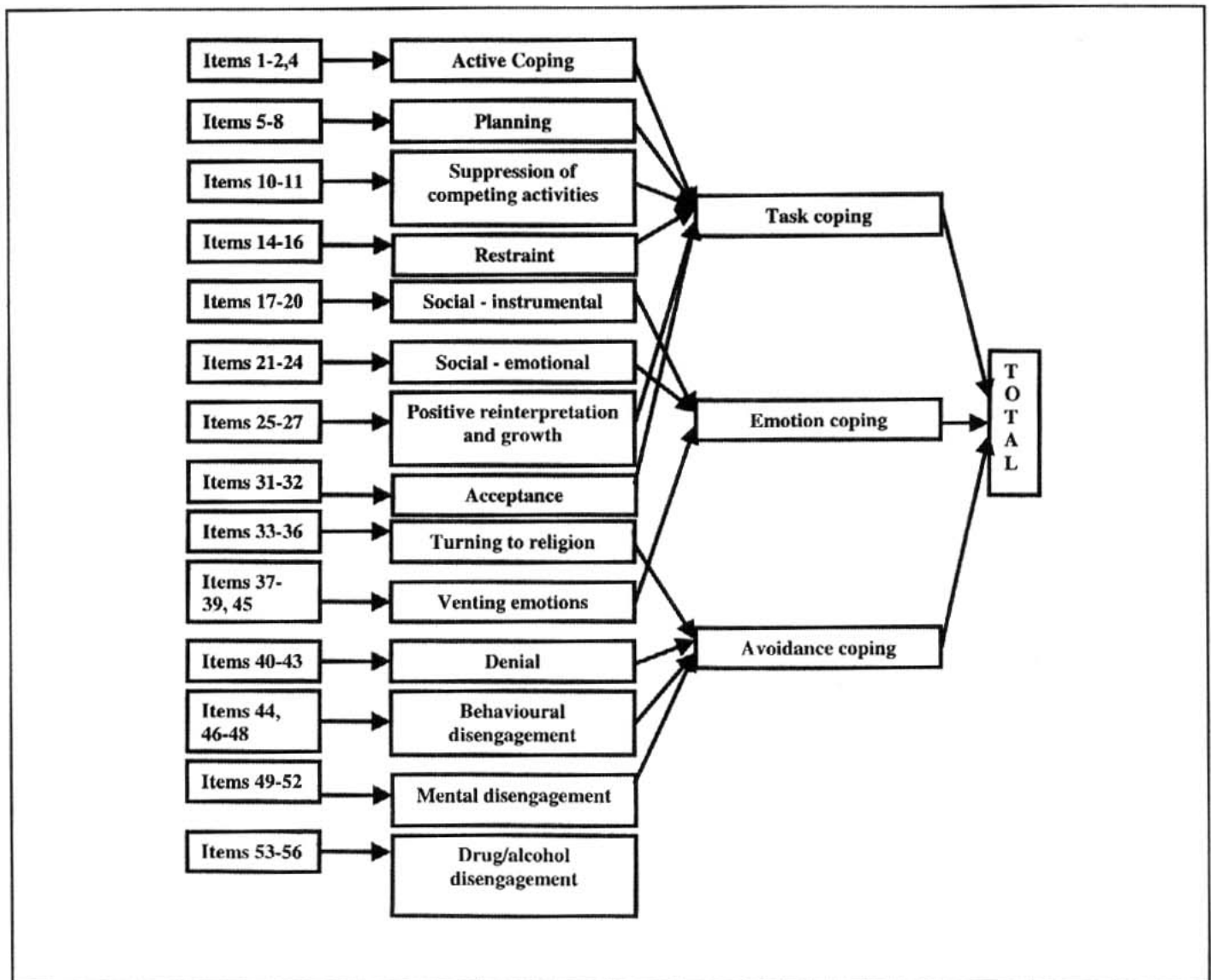
FIGURE 2.   Schematic representation of the 3-factor model of the COPE questionnaire (Items 3, 9, 12, 13, 28, 29 and 30 removed)

interpretable factor solution, however. Whereas initial principal components analysis with oblique rotation yielded 14 factors with eigen values over 1, accounting for 71.84% of the variance, the pattern matrix failed to converge. With deletion of some items (mainly those reflecting active coping strategies) the solution was able to converge. This resulted in between six and eight factors being extracted, none of which could be interpreted meaningfully.

Some factors were observed to be more stable than others when analyzed alone. Seeking social support for emotional reasons (a = 0.80), venting of emotion (a = 0.75), turning to religion (a = 0.83), denial (a = 0.80) and drug and alcohol disengagement (a = 0.93) showed some stability, although when all items were analyzed together, the analyses failed to produce a stable, interpretable factor struc-

ture. The most stable of the factors were denial and drug and alcohol disengagement, showing consistent stability across the analyses.

Due to the failure to extract a factor structure in the exploratory factor analysis for this sample, it was assumed a confirmatory factor analysis of the original COPE structure would not produce a good fit to the data. Still, the analyses were performed, for the sake of consistency and comparison with the community group.

An initial CFA examining the fit of the 14 subscales revealed a poor-fitting model for the clinical sample (χ^2 = 6,098.70, 1,393 df, $p < .001$; CFI = 0.550; RMSEA = 0.107). Given the poor fit of the subscales, it seemed unlikely that any of the higher-order factor models would produce an acceptable fit. This is exactly what was observed, with no

TABLE 2. Standard coefficients for 3-factor model of the COPE

Factor	Item	Standardized coefficient	Error	R^2
Primary factors				
Active (F1)	V1	.769	.639	.592
	V2	.893	.450	.797
	V3	.503	.864	.253
Planning (F2)	V4	.855	.519	.731
	V5	.870	.493	.757
	V6	.635	.772	.403
	V7	.449	.893	.202
Suppression (F3)	V8	.691	.723	.478
	V9	.675	.738	.456
Restraint (F4)	V10	.680	.733	.463
	V11	.784	.620	.615
	V12	.596	.803	.355
Social-instrumental (F5)	V13	.720	.694	.518
	V14	.891	.455	.793
	V15	.744	.668	.554
	V16	.628	.779	.394
Social-emotional (F6)	V17	.832	.567	.678
	V18	.860	.511	.739
	V19	.881	.474	.776
	V20	.704	.710	.496
Growth (F7)	V21	.780	.625	.609
	V22	.827	.562	.684
	V23	.734	.679	.539
Acceptance (F8)	V24	.761	.649	.579
	V25	.910	.415	.828
Religion (F9)	V26	.917	.398	.842
	V27	.938	.345	.881
	V28	.884	.468	.781
	V29	.781	.624	.610
Venting emotion (F10)	V30	.875	.484	.766
	V31	.689	.725	.474
	V32	.894	.448	.799
	V38	.674	.738	.455

Continued

TABLE 2. *Continued*

Factor	Item	Standardized coefficient	Error	R^2
Denial (F11)	V33	.873	.487	.763
	V34	.696	.719	.484
	V35	.745	.667	.556
	V36	.649	.761	.421
Behav. disengage. (F12)	V37	.610	.792	.372
	V39	.782	.623	.612
	V40	.784	.621	.614
	V41	.719	.695	.518
Mental disengage. (F13)	V42	.663	.748	.440
	V43	.672	.741	.451
	V44	.594	.804	.353
	V45	.508	.861	.258
Drug/alcohol disengage. (F14)	V46	.918	.396	.843
	V47	.912	.411	.831
	V48	.945	.327	.893
	V49	.903	.429	.816
Higher order factors				
Task coping	F1	.728	.685	.530
	F2	.683	.730	.467
	F3	.801	.598	.642
	F4	.512	.859	.263
	F5	.604	.797	.365
	F6	.996	.094	.991
Emotion coping	F7	.630	.777	.397
	F8	.192	.981	.037
	F10	.395	.919	.156
	F9	.499	.867	.249
Avoidant coping	F11	.773	.634	.598
	F12	.901	.434	.802
	F13	.770	.638	.593
	F14	.553	.833	.305
Total score	Task	.982	.189	.964
	Emotion	.408	.913	.166
	Avoidant	-.089	.996	.008

model reaching acceptable test statistics. Modification indices indicated religion should be included on the avoidance factor for this sample, although inclusion of religion failed to improve model fit. Model statistics can be seen in Table 1.

Discussion

This study attempted to confirm the primary and higher-order factor structure of the COPE, reported by Carver et al. (1989), in community drinkers and an alcohol-dependent sample. Confirmatory factor analyses revealed the 14 primary factors to be acceptable in the community group, although 7 items were excluded due to high cross-loadings on other factors. Using the revised 49-item version of the questionnaire, Carver et al.'s (1989) 4-factor higher-order structure of active, cognitive, emotional and avoidant coping was not confirmed in this sample. The popular 3-factor structure (reflecting task, emotional and avoidant coping)

was confirmed. Both models were found to be acceptable when the higher-order factors loaded onto a total COPE score.

It is suggested that, in describing coping styles using the revised 49-item COPE questionnaire, a 3-factor model incorporating religion as part of avoidant coping and a total score is the most acceptable model. This model was observed to have higher fit indices in the CFA as well as lower residual errors, compared to the other 3-factor models and the 4-factor models. In addition, a 3-factor model incorporating task, emotion and avoidant coping has often been reported in the literature, and seems to be the model of choice in describing coping styles.

The finding that the 3-factor model is a better fit than the 4-factor model is not surprising in light of the current literature. Most attempts at replicating the factor structure of the COPE have concluded that a 3-factor model reflecting task or problem coping, emotion-focused coping and

avoidance is the most reliable description of the underlying coping styles assessed by the COPE (e.g., Ingledew et al., 1996; Lyne and Roger, 2000).

Whereas the 14 primary factors produced acceptable test statistics, it is suggested that this model is not the most efficient way to describe the coping styles assessed by the COPE questionnaire. It has often been noted that 14 factors provide a complex description of coping, and that higher-order factors can provide similar information in a more concise way, especially if only a general description of coping is required (Steed, 1998). Should a more detailed description of coping be required, this study shows the 14-factor model to be acceptable.

Support for the 14-factor model is a result that has rarely been found in previous attempts to confirm the factor structure of the COPE. Given the vast differences in scales that are included in the analyses, however, it is difficult to accurately compare individual studies. Confirmatory factor analyses of the 56-item and 49-item questionnaires in relation to the 14 subscales appear to indicate that both scoring methods assess stable and reliable dimensions of coping, in line with those proposed by Carver et al. (1989). The 49-item version obtained a slightly better model fit in the CFA, however, and was shown to produce acceptable model fit in the community group when the higher-order factors were included in the model.

Exploratory factor analysis failed to replicate the 14-factor structure of the COPE in the alcohol-dependent group. It is not surprising that CFA also failed to confirm Carver et al.'s (1989) factor structure. Some factors were found to be stable when analyzed alone, however, especially denial and drug and alcohol disengagement.

Two explanations for the failure to replicate and confirm the factor structure in the alcohol-dependent sample are possible. First, a sample size of 300 may not be sufficient to perform these analyses, with so many parameters to estimate. As the factor structure could be confirmed in the community group with the same number of participants, however, this explanation is unlikely.

Second, the failure to replicate the factor structure in the alcohol-dependent sample may merely reflect the differences inherent in the samples. The primary difference is that the level of alcohol consumption and dependence is higher in the alcohol-dependent group. It has repeatedly been found that individuals dependent on alcohol use alcohol as a coping strategy in the absence of any other available coping mechanism (Cooper et al., 1995; Holahan et al., 2001). This would explain why drug or alcohol disengagement showed consistent factor stability, whereas other factors were observed to have limited or no stability.

The stability of some of the primary factors is also an indication of sample differences. One of the most consistent findings in the coping and alcohol literature is that avoidant coping styles are predictive of alcohol consumption (Chung et al., 2001; Fromme and Rivet, 1994; Laurent

et al., 1997; Williams and Clark, 1998). In the current study, the most stable factors in the alcohol-dependent sample were denial and drug or alcohol disengagement, both of which are avoidant coping styles. Furthermore, primary factors displaying some limited stability in this study (e.g., seeking social support for emotional reasons and venting emotion) have been considered avoidant in some of the coping literature (e.g., Moos et al., 1990), whereas turning to religion, which showed some stability, loaded on the avoidance higher-order factor in the community group in this study.

An interesting result is the inclusion of religion on the avoidance factor for both samples. In most attempts to confirm Carver et al.'s (1989) factor structure, religion has either formed a higher-order factor in itself or has failed to load on any factor at all. This has resulted in researchers either removing the factor from the analyses, as was done in the original formulation of the COPE (Ingledew et al., 1996), or including it as a separate factor (e.g., Belding et al., 1996). The religion factor comprises such items as "I put my trust in God" and "I pray more than usual." Although these may be adaptive coping mechanisms, the individual is not actively engaging in activity or thought about solving the problem. In this sense, turning to religion may be seen as an avoidant coping style.

One limitation of the study that must be considered is that the exploratory and confirmatory analyses were performed on the same data in each group. This procedure has obvious shortcomings; however, the primary aim of this study was to confirm the factor structure of the COPE. Exploratory factor analyses were performed merely to insure that the structure to be confirmed was indeed evident in this data—a check that proved invaluable in the alcohol-dependent group! Nevertheless, as previously mentioned, replication of the 49-item version of the COPE is required for further validation of the questionnaire. It would also be interesting to determine whether the lack of stability in the COPE that was observed in the alcohol-dependent sample in this study is replicated in other samples of dependent drinkers.

The COPE is not psychometrically sound in a clinical group and thus, at present, it should not be used with alcohol-dependent persons. The 49-item COPE is psychometrically sound in the community group; however, recent research undertaken by this laboratory found the total score on the COPE to have no relationship to either volume or frequency of alcohol consumption in a sample of community drinkers (Hasking and Oei, in press). In a follow-up study investigating the subscales of the COPE and their relationship to alcohol consumption, it was found that only three of the subscales were related to volume of consumption, and an additional two were related to frequency of alcohol consumption (Hasking and Oei, manuscript in preparation). Contrary to research suggesting avoidant coping strategies or emotion-focused strategies are more closely

linked to drinking behavior than are more active strategies (Chung et al., 2001; Fromme and Rivet, 1994; Laurent et al., 1997; Williams and Clark, 1998), only two of the scales that were related to drinking behavior could be considered avoidant or emotion-focused coping strategies. Taken together, these results suggest that, despite sound psychometric properties, the COPE may not be a valid tool to assess coping in a sample of community drinkers and should be used with extreme caution. Last, if the COPE lacks conceptual validity in relation to drinking behavior, this could further explain the lack of psychometric stability in the alcohol-dependent sample.

Although the total scores on the COPE and the subscales appear problematic in assessing coping in relation to drinking behavior, it would be worthwhile to investigate the utility of the higher-order factors in predicting alcohol consumption. Given that little or no relationship could be found with either the total score or the subscales, however, it would be surprising if the higher-order factors were any more useful. This, of course, presents the problem of just how to assess coping in a drinking population. It is a valuable question, but it is beyond the scope of this article to provide an answer. The assessment of coping in a drinking population and the development of a tool to accurately measure this construct would be an invaluable addition to the field.

In light of the current results, it is suggested that the COPE is not an adequate tool for assessing coping dimensions in an Australian alcohol-dependent sample. Some of the primary factors may provide useful information when used alone; however, taken as a whole, the questionnaire lacks a stable or interpretable factor structure when used as a measure of coping styles in this group. It is therefore suggested that the COPE not be used in a sample of dependent drinkers. Furthermore, although the COPE appears psychometrically stable in a community sample it may not be conceptually valid. Thus, caution is encouraged when using the COPE to assess coping in relation to drinking behavior in both community and clinical samples.

References

AMERICAN PSYCHIATRIC ASSOCIATION. Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), Washington, DC, 1994.

AUSTRALIAN BUREAU OF STATISTICS (ABS). Aussies turn to wine, fruit and veg. (on-line). Retrieved May 2001 from: http://www.abs.gov.au/ausstats/4306.0, 2001.

BELDING, M.A., IGUCHI, M.Y., LAMB, R.J., LANKIN, M. AND TERRY, R. Coping strategies and continued drug use among methadone maintenance patients. Addict. Behav. 21: 389-401, 1996.

BENTLER, P.M. EQS Structural Equations Program Manual, Encino, CA: Multivariate Software Inc., 1995.

CARVER, C.S., POZO, C., HARRIS, S.D., NORIEGA, V., SCHEIER, M.F., ROBINSON, D.S., KETCHAM, A.S., MOFFAT, F.L., JR. AND CLARK, K.C. How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. J. Pers. Social Psychol. 65: 375-390, 1993.

CARVER, C.S., SCHEIER, M.F. AND WEINTRAUB, J.K. Assessing coping strategies: A theoretically based approach. J. Pers. Social Psychol. 56: 267-283, 1989.

CHUNG, T., LANGENBUCHER, J., LABOUVIE, E., PANDINA, R.J. AND MOOS, R.H. Changes in alcoholic patients' coping responses predict 12-month treatment outcomes. J. Cons. Clin. Psychol. 69: 92-100, 2001.

COOK, S.W. AND HEPPNER, P.P. A psychometric study of three coping measures. Educ. Psychol. Meas. 57: 906-923, 1997.

COOPER, M.L., FRONE, M.R., RUSSELL, M. AND MUDAR, P. Drinking to regulate positive and negative emotions: A motivational model of alcohol use. J. Pers. Social Psychol. 69: 990-1005, 1995.

EKLUND, R.C., GROVE, J.R. AND HEARD, N.P. The measurement of slump-related coping: Factorial validity of the COPE and modified-COPE inventories. J. Sport Exerc. Psychol. 20: 157-175, 1998.

FINSET, A. AND ANDERSSON, S. Coping strategies in patients with acquired brain injury: Relationships between coping, apathy, depression and lesion location. Brain Injury 14: 887-905, 2000.

FROMME, K. AND RIVET, K. Young adults' coping style as a predictor of their alcohol use and response to daily events. J. Youth Adolesc. 23: 85-97, 1994.

HASKING, P.A. AND OEI, T.P. The differential role of alcohol expectancies, drinking refusal self-efficacy and coping resources in predicting alcohol consumption in community and clinical samples. Addict. Res. Theory, in press.

HASKING, P.A. AND OEI, T.P. Specific expectancies and coping styles interact to predict drinking behaviour, manuscript in preparation.

HOLAHAN, C.J., MOOS, R.H., HOLAHAN, C.K., CRONKITE, R.C. AND RANDALL, P.K. Drinking to cope, emotional distress and alcohol use and abuse: A ten-year model. J. Stud. Alcohol 62: 190-198, 2001.

INGLEDEW, D.K., HARDY, L., COOPER, C.L. AND JEMAL, H. Health behaviours reported as coping strategies: A factor analytical study. Brit. J. Hlth Psychol. 1 (Part 3): 263-281, 1996.

KALLASMAA, T. AND PULVER, A. The structure and properties of the Estonian COPE Inventory. Pers. Indiv. Diff. 29: 881-894, 2000.

LARIMER, M.E., PALMER, R.S. AND MARLATT, G.A. Relapse prevention: An overview of Marlatt's cognitive-behavioral model. Alcohol Res. Hlth 23: 151-160, 1999.

LAURENT, J., CATANZARO, S.J. AND CALLAN, M.K. Stress, alcohol-related expectancies and coping preferences: A replication with adolescents of the Cooper et al. (1992) model. J. Stud. Alcohol 58: 644-651, 1997.

LONGABAUGH, R. AND MORGENSTERN, J. Cognitive-behavioral coping-skills therapy for alcohol dependence: Current status and future directions. Alcohol Res. Hlth 23: 78-85, 1999.

LYNE, K. AND ROGER, D. A psychometric re-assessment of the COPE questionnaire. Pers. Indiv. Diff. 29: 321-335, 2000.

MOOS, R.H., FINNEY, J.W. AND CRONKITE, R.C. Alcoholism Treatment: Context, Process, and Outcome, New York: Oxford Univ. Press, 1990.

PARKER, J.D. AND ENDLER, N.S. Coping with coping assessment: A critical review. Europ. J. Pers. 6: 321-344, 1992.

RECKLITIS, C.J. AND NOAM, G.G. Clinical and developmental perspectives on adolescent coping. Child Psychiat. Human Devel. 30: 87-101, 1999.

ROGER, D., JARVIS, G. AND NAJARIAN, B. Detachment and coping: The construction and validation of a new scale for measuring coping strategies. Pers. Indiv. Diff. 15: 619-626, 1993.

SPANGENBERG, J.J. AND CAMPBELL, M.E. Anxiety, depression and coping strategies in recently detoxified alcoholics. Alcsm Treat. Q. 17 (3): 55-65, 1999.

STEED, L.G. A critique of coping scales. Aust. Psychol. 33: 193-202, 1998.

TABACHNICK, B. AND FIDELL, L. Using Multivariate Statistics, 3rd Edition, New York: HarperCollins, 1996.

WILLIAMS, A. AND CLARK, D. Alcohol consumption in university students: The role of reasons for drinking, coping strategies, expectancies, and personality traits. Addict. Behav. 23: 371-378, 1998.

WINDLE, M. AND WINDLE, R.C. Coping strategies, drinking motives, and stressful life events among middle adolescents: Associations with emotional and behavioral problems and with academic functioning. J. Abnorm. Psychol. 105: 551-560, 1996.