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Comorbidity in detoxification: symptom interaction and treatment intentions[☆]

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ABSTRACT

Co-occurring substance use and mental health disorders (CODs) are common. However, very little is known about individuals' recognition of, and perception of the relationship between these disorders. The current study aimed to examine problem recognition, perceived disorder relationships, treatment intentions, and treatment preferences of individuals attending Australian detoxification facilities. Questionnaires were completed by 225 participants, including the Mental Health Screening Form III and the Treatment Preferences Questionnaire. Results indicated that 56.4% of participants screened positive for CODs, with only 4.2% failing to recognise their mental health problems. Participants perceived a functional relationship between disorders, where improvement/deterioration of one disorder leads to the improvement/deterioration of the other. Recognition of mental health problems and perception of a functional relationship between disorders, predict high mental health treatment intentions. These findings have important clinical implications when planning treatment programs and counselling individuals with CODs.

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Epidemiological and clinical research has consistently demonstrated the frequent co-occurrence of mental disorders and substance use disorders (SUDs; Davidson & White, 2007). Co-occurring disorders (CODs), or comorbidity, refers to the presence of one or more mental disorders with one or more SUDs (Mills et al., 2009). According to epidemiological research, over a 12 month period 63% of Australians who misuse drugs nearly every day have a mental disorder, compared to 20% of the overall Australian population (Australian Bureau of Statistics, 2007). Among alcohol and other drug (AOD) treatment seeking populations, lifetime prevalence of a mental health disorder is between 50 and 75% (Center for Substance Abuse Treatment, 2007). In line with this, an Australian study found that 64 to 71% of individuals attending a residential substance use treatment facility screened positive for CODs (Mortlock, Deane, & Crowe, 2011). Rates of individuals who screen positive for CODs within AOD detoxification settings are higher than other treatment settings, with rates between 80 and 83% reported from the Netherlands

(Hendriks, 1990) and the USA (Johnson, Brems, Mills, & Fisher, 2007). Prior to the present study, mental health screening for CODs among Australian AOD detoxification facilities has not been conducted.

Individuals with co-occurring mental disorders and substance use disorders experience increased symptomatology, poorer treatment outcomes, and worse prognosis across both disorders when compared to individuals with substance use disorders only (Myrick & Brady, 2003). Addressing mental health comorbidity leads to improved outcomes such as decreased mental health symptomatology and reduced AOD use (Kranzler et al., 1994; Litten & Allen, 1998). However, poor recognition of CODs within treatment settings often precludes appropriate treatment. Research conducted across six outpatient AOD treatment settings indicated that services only recognised 54% of people with CODs. Alarming, of these, comorbidities were addressed in only 23% of cases (Schulte, Meier, Stirling, & Berry, 2010). Another study involving individuals attending an inpatient detoxification facility found only 20% of participants were referred to psychiatric services, despite 84% of the sample meeting criteria for a comorbid mental health disorder (Craig & DiBuono, 1996).

Despite detoxification being an ineffective stand-alone treatment for SUDs or CODs (Blondell, Smith, Canfield, & Servoss, 2006; Center for Substance Abuse Treatment, 1995; Mattick & Hall, 1996), many individuals fail to transition into further mental health treatment. This trend is of concern given findings that individuals who receive treatment following detoxification experience better treatment outcomes (McKay, 2005). A major function of detoxification is to

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provide individuals with the opportunity to link with further treatment (McLellan, 2003).

One reason for low treatment seeking following detoxification is likely to be problem recognition. A central component of the help seeking process involves recognition of the problem (Meadows et al., 2002). Individuals within detoxification settings have demonstrated recognition of their substance use problems, however, it is unclear whether they recognise their co-occurring mental health problems. In order to recognise a problem, the individual must firstly have an understanding of personal symptomatology. However, there is a lack of research exploring problem perception among individuals with CODs. In turn, it is unclear how an individual's perception of his or her mental health problems, influences intentions to seek mental health treatment following detoxification.

According to Rachman (1991), knowledge of the functional relationship between mental health disorders and substance use disorders is of crucial importance in promoting service providers' understanding of the two disorders. At present, only two small-scale studies have explored the perceived interaction between co-occurring SUDs and post traumatic stress disorder (PTSD), and how this informs the individual's preference for further treatment.

In the first, the interaction between co-occurring PTSD and SUDs among 42 individuals attending an inpatient detoxification facility was investigated (Brown, Stout, & Gannon-Rowley, 1998). The second replicated that study with 23 participants experiencing co-occurring cocaine dependence and PTSD (Back, Brady, Jaaimagi, & Jackson, 2006). The results of both studies indicated that participants perceived their PTSD symptoms and SUDs to be functionally related. According to Back et al. (2006), almost all participants (96%) perceived a functional relationship. Both studies demonstrated a significant relationship between the deterioration/improvement in PTSD symptomatology and subsequent substance use. When PTSD symptoms worsen, up to 86% of participants indicated that their substance use increases. Similarly, when PTSD symptoms improve, up to 79% indicated that substance use decreases (Back et al., 2006; Brown et al., 1998). Furthermore, Brown et al. (1998) demonstrated that 51% of participants endorsed a functional relationship between deterioration/improvement in substance use and PTSD symptomatology. However, Back et al. (2006) did not find a significant association between improvement/deterioration in cocaine use and PTSD symptomatology. Approximately half of the participants across both studies endorsed a preference to seek concurrent PTSD treatment and substance use treatment. Thirty percent of participants endorsed a preference for sequential treatment for substance use first, then PTSD treatment and the remaining 20% endorsed a preference for sequential treatment for PTSD first, then substance use treatment.

These studies provide initial evidence that individuals perceive a functional relationship between their co-occurring PTSD and SUDs. Furthermore, these perceptions are associated with their hypothetical treatment preferences. However, there is a need to broaden our understanding of these relationships beyond PTSD as the specified comorbid mental disorder because individuals entering services present with a wider range of mental health disorders. It is expected that increased understanding of the interactions between perceived symptom relationship, treatment preferences, and intentions to seek treatment will provide valuable information in facilitating the development of strategies to promote help seeking and improve treatment delivery.

In the current study, it was hypothesised that participants who screen positive for mental health disorders will have higher help seeking intentions for further mental health treatment and drug and/or alcohol treatment than those who do not screen positive. Participants who screen positive for mental health disorders, and do not recognise their mental health problems, are less likely to intend to seek mental health treatment when compared to those who screen positive and recognise they have a mental health problem. It was also hypothesised that screening positive for a mental health disorder, recognising co-occurring

mental health disorders, and the perception of a functional relationship between disorders, will predict help seeking intentions for both mental health and drug and/or alcohol treatment.

1. Materials and methods

1.1. Participants

The sample consisted of individuals consecutively admitted to two Australian residential detoxification facilities provided by a non-government organisation (The Salvation Army). Both facilities were located in Queensland Australia. One detoxification centre had 12 male beds and the other had 11 mixed beds. A requirement of entry to the programs was that all individuals have alcohol and/or other substance dependence. The average length of stay at the detoxification program is 7 days, however, this varies depending on the level of care required. Complex medical detoxifications are not admitted for detoxification within the services. Clients were not approached to participate until they had completed at least 2 days in the units. This allowed participants to resolve physical symptoms associated with the detoxification process.

It was estimated that 520 clients accessed the services during the study period, with 225 (43.3%) of clients agreeing to participate. Data were collected from January 2013 to July 2013. There was an even distribution of participants across both sites with 114 (50.7%) coming from one site and 111 (49.3%) from the other. The main reasons for non-participation were unwillingness to participate, being physically unwell, and participants leaving before being approached by staff. No information was collected on participants who did not agree to participate. Of the individuals who agreed to participate, the average age was 39.21 years ($SD = 10.79$), and the majority of participants were male (147, 65.3%). Most participants were born in Australia (78.7%), 1.3% of participants reported a primary language other than English and 3.1% of participants identified as Aboriginal or Torres Strait Islander. Alcohol was the primary substance of abuse (49.3%), followed by amphetamine type substances (16.0%) and cannabis (15.1%). More than half (56.4%) of participants indicated having a prior mental health diagnosis, with the majority reporting depressive disorders (39.1%) and anxiety disorders (21.3%). Twenty eight percent of participants identified having two or more previously diagnosed mental health disorders in addition to an alcohol or other SUD. Demographic information, drug use history, and prior mental health diagnoses are provided in Table 1.

1.2. Measures

1.2.1. Background information

A brief background questionnaire was used to obtain demographic information including age, gender, country of origin, and primary language. Information on substance use was collected including primary substance of abuse, the number of years they have had substance abuse problems, types of substances used in past 12 months, previous substance abuse treatment sought, and type of treatment(s) planned for the future. Participants were also asked to provide information regarding previous mental health diagnoses.

1.2.2. Problem recognition

Recognition of mental health problems was measured by a single item using a 5-point Likert scale. Participants were asked to rate how much they think they have a mental health problem from 0 (*no problem*) to 4 (*very large problem*). Problem recognition was defined as a response of 3 or 4 on this item.

1.2.3. Mental Health Screening Form III (MHSF-III)

The MHSF-III (Carroll & McGinley, 2001) is an 18-item self report screening tool designed to screen for mental health disorder

Table 1
Demographic information ($N = 225$).

Characteristics	<i>n</i>	%	<i>M</i>	<i>SD</i>
Gender: male	147	65.3		
Age (years)			39.21	10.79
Detox day			4.4	1.36
Reported length of AOD problem			17.39	9.78
Primary substance of abuse ($n = 218$) ^a				
Alcohol	111	49.3		
Amphetamine type substances	36	16.0		
Cannabis	34	15.1		
Heroin	18	8.0		
Opioid type substances	19	8.4		
Cocaine	0	0.0		
Prior mental health diagnosis (in addition to AOD)	127	56.4		
Multiple (2 or more) prior mental health diagnoses	63	28.0		
Prior mental health diagnosis ^b				
Depression	88	39.1		
Anxiety	48	21.3		
Bipolar	14	6.2		
Post traumatic stress disorder	13	5.8		
Schizophrenia	11	4.8		
Personality disorders	9	4.0		
Other	8	3.5		

^a Missing data of 7 participants.

^b Participants could provide more than one answer so the total may be greater than 100.

comorbidity in individuals utilising drugs and alcohol. A modification was made to the MHSF-III where the participants were asked to respond (yes or no) twice to each question, once in relation to their life history (original MHSF-III format) and once in relation to the past 30 days (modified format).

The MHSF-III is a valid measure for use in an addictions treatment facility ($r = .74$ for test–retest; Cronbach's alpha of between .83 and .89; Carroll & McGinley, 2001). Furthermore, a review of more than 150 screening tools found the MHSF-III to be one of the three best performing measures in identifying overall need for follow up treatment (Sacks et al., 2007). A cut off score of 6 on the MHSF-III was utilised to indicate the likely presence of a mental disorder. This cut off has been found to be the most accurate against structured clinical diagnostic interviews with sensitivity of 96.5%, specificity of 38.7% and accuracy of 67.6% (Mortlock, Deane, & Crowe, 2012).

1.2.4. Treatment Preference Questionnaire (TPQ)

The Treatment Preference Questionnaire (Back, 2004) was developed based on questions from Brown et al. (1998) and Najavits (2000), and was initially designed to be used with individuals experiencing co-occurring PTSD and SUDs. The TPQ assesses the perceived relationship between disorders, preferred sequence of addressing disorders, and preferred therapy format including preferences about psychotherapy and pharmacotherapy (Back et al., 2006). For the purposes of the present study, questions relating to perceived relationship and preferred treatment options were utilised. Psychometric data for the TPQ have not been previously reported.

The original version of the TPQ consists of 13 questions, the present study utilised 6 of these. The questions were adapted from being PTSD specific to measuring all mental health symptomatology. The response format was adapted from open response to a single option multiple-choice format. In order to improve the clarity of the questions, the response options were adapted from the original (*get worse, stay the same, get better*) to *decrease, stay the same and increase*. The following is an example of an original question: "If your drug use improves (e.g., you cut down or stop using), what happens to your PTSD symptoms (e.g., do they get worse, get better, or stay the same)?" (Back, 2004, p. 1). This was adapted to the following format: *If your drug and/or alcohol use improves (e.g., you decrease, cut down or stop using), what happens to your mental health symptoms*. Participants were instructed

to circle one response from the following options: *decrease, stay the same or increase*.

1.2.5. Intentions to seek further treatment

Intentions to seek further mental health treatment and further drug and alcohol treatment were measured using questions previously developed to test help seeking intentions for further AOD treatment in detoxification contexts (Leung, Kelly, & Deane, 2010; Wang, Deane, & Kelly, 2012). Analysis of four intentions items used by Wang et al. (2012) indicated ceiling effects with extremely high intentions ($M = 6.36$ out of 7) and a high Cronbach's alpha suggesting item redundancy (Cronbach's $\alpha = .92$, $n = 165$). To reduce the number of items we selected those items with the lowest mean scores to decrease the ceiling. Furthermore, in order to improve variability on the measure the items that were included were also those with the largest standard deviations: "I intend to use further drug/alcohol services after detoxification" ($M = 6.16$, $SD = 1.61$) and "I expect to use further drug/alcohol services after detoxification" ($M = 6.35$, $SD = 1.35$). Cronbach's alpha for these two items was still satisfactory at .85. These two items were utilised to measure further drug and alcohol treatment intentions and were adapted to measure mental health treatment intentions. The adapted questions were: "I intend to use further mental health services after detoxification" and "I expect to use further mental health services after detoxification". The response format was a 7 point Likert scale ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*). High treatment intentions were categorised as those who had a mean of 6 or greater (out of a possible high score of 7) across two intentions items.

1.3. Procedure

Staff members of the detoxification facility invited all clients who entered the units to participate in the study. Staff approached clients once they had been medically stabilised, were capable of giving informed consent, and were able to participate in the study. Typically, this occurred by the third day of the person's detoxification, however there was some variation based on individual differences. The average length of stay when the survey was completed was 4.4 days ($SD = 1.36$). Participants completed the surveys independently, but staff were available to assist where necessary. Completed surveys were returned to staff members. All participants provided informed consent and the study protocols were reviewed and approved by the University of Wollongong Human Research Ethics Committee.

1.4. Data analysis

Descriptive statistics were used to report the current and lifetime prevalence rates of screening positive for a co-occurring mental health disorder. Descriptive statistics were also used to analyse participants' perceptions of their mental health status, participants' treatment preferences, and perceived relationship between disorders.

The treatment intentions items were highly skewed, therefore non-parametric tests were used to analyse these items. Wilcoxon signed ranks tests were used to analyse differences between mental health treatment intentions and drug and/or alcohol treatment intentions of all participants, those who screen positive for mental health disorders, and those who recognise having current mental health problems. Mann–Whitney U tests were used to compare the treatment intentions of those who screen positive and those who screen negative for mental health disorders as well as those with a previous mental health diagnosis and those without a previous diagnosis. A Mann–Whitney U test was also used to test whether a perceived relationship between disorders is related to treatment preferences. A chi-square analysis was used to compare recognition of current mental health problems of those with a previous mental health diagnosis, compared to those without a previous diagnosis.

Table 2
Recognition of mental health problems by mental health screening and previous diagnosis.

	Mental health screening last 30 days ^a (n = 214)		Mental health screening ever ^b (n = 217)		Previous mental health diagnosis ^b (n = 217)	
	Screen positive	Screen negative	Screen positive	Screen negative	Previous diagnosis (n = 127)	No previous diagnosis (n = 90)
Problem recognition						
Recognise current mental health problem	116 (54.2%)	66 (30.8%)	166 (76.5%)	19 (8.8%)	124 (57.1%)	61 (28.1%)
Do not recognise current mental health problem	9 (4.2%)	23 (10.7%)	22 (10.1%)	10 (4.6%)	3 (1.4%)	29 (13.4%)
Chi-square tests	$\chi^2(1) = 14.21, p < .001$		$\chi^2(1) = 10.37, p = .001$		$\chi^2(1) = 37.36, p < .001$	

^a Missing data from 11 participants.

^b Missing data from 8 participants.

Chi-square analyses were also used to test for associations of treatment preferences between those who screened positive and those who screened negative for a mental health disorder, and to analyse perceived disorder relationships. Assumptions were checked for all tests and assumptions were met. There were small amounts of missing data for some variables so that sample sizes may vary slightly for some analyses (range $n = 204$ to $N = 225$).

2. Results

2.1. Mental health screening and problem recognition

Of all participants, 127 (56.4%) screened positive for a mental health disorder in the last 30 days and 192 (85.3%) screened positive for a mental health disorder ever. Of all participants, 186 (82.7%) recognised having a mental health problem in addition to a substance use problem.

Although the MHSF-III is not designed to provide specific diagnoses the following are the highest and lowest item endorsement rates reflecting the range of responses. For last 30 days the highest rate of endorsement was for item 6 reflecting depressive disorder symptoms (69%) and the lowest rate of endorsement was for item 7 reflecting PTSD symptoms (7%). For “ever” experiencing symptoms, the highest endorsement was for item 15 reflecting obsessive compulsive disorder symptoms (81%) with the lowest for item 5 reflecting psychotic symptoms associated with schizophrenia (35%).

Table 2 represents participants' recognition of current mental health problems by mental health status and previous mental health diagnosis. Notably, there was a high concordance rate between the single item problem recognition question and the MHSF-III. Only 4.2% of all participants screened positive for a mental illness in the last 30 days and did not recognise they had a mental health problem on the single item-screening question.

A 2 (previous mental health diagnosis) by 2 (problem recognition) chi-square was conducted, in order to determine whether there were significant differences in recognition of current mental health problems between those with a previous mental health diagnosis compared to those without a previous mental health diagnosis (see Table 2 for frequencies). There was a significant association between a previous mental health diagnosis and recognition of a current mental health problem, with 57.1% of those with a previous diagnosis indicating that they had a current mental health problem, compared to 28.1% of those without a previous diagnosis (see Table 2).

2.2. Treatment intentions

Of all participants, 111 (49.3%) had high mental health treatment intentions and 144 (64.0%) had high drug and/or alcohol treatment intentions. A Wilcoxon signed ranks test indicated that participants ($n = 209$) were significantly more likely to intend seeking help for drug and/or alcohol treatment ($M_{\text{rank}} = 64.57$), than mental health treatment ($M_{\text{rank}} = 60.71, z = -2.95, p = .003, r = -.20$).

Table 3 represents the frequencies of high/low treatment intentions by mental health screening status. Those who screened positive for a mental health disorder in the last 30 days were significantly more likely to have high mental health treatment intentions than those who screened negative, but were not significantly more likely to have high drug and alcohol treatment intentions (see Table 3).

Table 4 provides results for the Mann–Whitney U test indicating that those who screened positive for a mental health disorder in the last 30 days had significantly greater mental health treatment intentions ($n = 124; M_{\text{rank}} = 116.28$) than those who screen negative ($n = 87; M_{\text{rank}} = 91.34$). Those with a previous mental health diagnosis ($n = 121; M_{\text{rank}} = 129.18$) have significantly greater mental health treatment intentions than those without a previous mental health diagnosis ($n = 87; M_{\text{rank}} = 72.97$, see Table 4).

Drug and alcohol treatment intentions of those who screen positive for a mental health disorder in last 30 days ($n = 122; M_{\text{rank}} = 102.00$) were not significantly different to those who screen negative ($n = 85; M_{\text{rank}} = 106.87$, Table 4).

A Wilcoxon signed ranks test indicated that of those who screen positive in the last 30 days for a mental health disorder ($n = 124$), there were no significant differences between intentions to seek drug and/or alcohol treatment ($M_{\text{rank}} = 39.48$) and intentions to seek mental health treatment ($M_{\text{rank}} = 33.30$, Table 4). Similarly, for those who recognised having a mental health problem ($n = 183$), there were no significant differences between intentions to seek drug and/or alcohol treatment ($M_{\text{rank}} = 53.04$) and intentions to seek mental health treatment ($M_{\text{rank}} = 48.11$, Table 4).

2.3. Perceived relationship between disorders

The frequencies of participant's responses to the interaction between mental health symptoms and drug and alcohol use are outlined in Table 5. The results indicate a dominant response pattern in the expected direction. There appears to be a stronger relationship between worsening features of one disorder in relation to the other (approximately 75%), compared to improving features of one disorder in relation to the other (approximately 52%). Fifteen percent of

Table 3
High/low treatment intentions by mental health screening status.

	Mental health screening last 30 days (n = 204) ^a		Chi-square tests
	Positive	Negative	
Mental health treatment intentions			
High	73 (35.8%)	37 (18.2%)	$\chi^2(1) = 5.60, p = .02$
Low	47 (23.0%)	47 (23.0%)	
Drug and alcohol treatment intentions			
High	81 (39.7%)	61 (29.9%)	$\chi^2(1) = 0.61, p = .45$
Low	39 (19.1%)	23 (11.3%)	

^a Missing data from 10 participants who completed the mental health screener for last 30 days.

Table 4

Analyses of treatment intentions across variables.

Variable	n	Mean rank	U	z	p	r
Mental health treatment intentions ^a						
Screen positive ^b	124	116.28	4119.00	−3.06 ^d	0.002	−0.21
Screen negative ^c	87	91.34				
Previous mental health diagnosis	124	129.18	2520.00	−6.88 ^d	<.001	−0.74
No previous diagnosis	87	72.97				
Drug and alcohol treatment intentions ^a						
Screen positive ^b	122	102.00	4941.00	−0.64 ^d	0.52	−0.04
Screen negative ^c	85	106.87				
Treatment intentions of those who screen positive	124					
Drug and alcohol treatment intentions		39.48		−0.31 ^e	0.76	−0.03
Mental health treatment intentions		33.30				
Treatment intentions of those who recognise a current mental health problem	183					
Drug and alcohol treatment intentions		53.04		−1.61 ^e	0.11	−0.12
Mental health treatment intentions		48.11				

^a These analyses were based on the continuous mean intentions ratings.^b Screen positive for a mental health disorder in the last 30 days.^c Screen negative for a mental health disorder in the last 30 days.^d Mann–Whitney–U test.^e Wilcoxon test.

participants indicated that as their drug and/or alcohol use reduces their mental health symptoms increase.

2.4. Treatment preferences

Frequencies of treatment preferences of all participants and by those who screen positive or negative for mental health disorders are outlined in Table 6. The majority of participants endorsed a preference to seek concurrent treatment for drug/alcohol use and mental health symptoms (50.7%), followed by working on drug/alcohol use first and later mental health treatment (27.9%) and working on drug/alcohol use only (14.4%).

2.5. Treatment preferences, screening status, and disorder relationships

A 3 (treatment preferences) by 2 (screen status) chi-square was conducted, in order to determine whether there were different treatment preferences between those who screened positive or negative (last 30 days). The three treatment preferences were: (1) both AOD and mental health treatment together (“Both”); (2) AOD first followed by mental health treatment (“AOD first”), and; (3) AOD treatment only (“AOD only”). These three categories were selected since they had the highest rates of endorsement.

There was a significant association between treatment preferences and screening status [$\chi^2(2) = 14.5, p = .001$]. Three 2 (treatment preference) \times 2 (screening status) Pearson’s chi-squares were conducted in order to clarify where these differences occurred. For the 2 (Both, AOD only) \times 2 (screen status) comparison there was a significant association between mental health screening status and treatment preference, [$\chi^2(1) = 12.2, p < .001, OR = 4.35$]. Eighty-eight percent of those who screened positive indicated they preferred

Table 5Frequencies of disorder relationships for all participants ($n = 206$)^a.

Symptom interaction	Decrease	Stay the same	Increase
If drug and/or alcohol use improves, mental health symptoms	110 (53.4%)	65 (31.6%)	31 (15.0%)
If drug and alcohol use worsens, mental health symptoms	14 (6.8%)	40 (19.4%)	152 (73.8%)
If mental health symptoms improve, drug and alcohol use	106 (51.4%)	85 (41.3%)	15 (7.3%)
If mental health symptoms worsen, drug and alcohol use	16 (7.8%)	33 (16.0%)	157 (76.2%)

^a Missing data from nineteen participants.

to seek both treatments together compared to only 62.9% of those who screened negative. For the 2 (Both, AOD First) \times 2 (screen status) comparison there was a significant association between mental health screening status and treatment preference [$\chi^2(1) = 6.53, p = .01, OR = 2.33$]. Seventy-three percent of those who screened positive endorsed seeking both treatments together compared to only 53.1% of those who screened negative. For the AOD First, AOD Only by screening status comparison there was no significant difference in treatment preferences by screening status [$\chi^2(1) = 1.80, p = .18$].

A Mann–Whitney U test was used to test whether a stronger perceived relationship between the disorders is related to treatment preferences. The strength of the perceived relationship between both disorders was calculated as the sum of the two “symptoms worsen” items, which could range between −1 and 1 with zero representing no relationship. Participants who endorsed a preference to seek both drug and/or alcohol treatment and mental health treatment together rated having a significantly stronger relationship between their AOD and mental health symptoms ($n = 107; M_{\text{rank}} = 112.62$) than those who did not indicate a preference to seek both types of treatment ($n = 100; M_{\text{rank}} = 94.78, U = 4428, z = -2.46, p = .01, r = -0.17$).

In order to replicate the analyses by Back et al. (2006) and Brown et al. (1998) we also conducted chi-square analyses on the perceived relationships between disorders. Table 7 provides a comparison of results from the present study with the results of the previous studies,

Table 6

Frequencies of treatment preferences.

Treatment preferences	All participants ^a $n = 215$	Mental health screen last 30 days	
		Positive $n = 122$	Negative $n = 89$
Work on both the drug/alcohol use and the mental health symptoms together	109 (50.7%)	74 (60.7%)	34 (38.2%)
Work on the drug/alcohol use first, and then later work on the mental health symptoms	60 (27.9%)	28 (23.0%)	30 (33.7%)
Work on the drug/alcohol use only	31 (14.4%)	10 (8.2%)	20 (22.5%)
Work on the mental health symptoms first and then later work on the drug/alcohol use	8 (3.7%)	6 (4.9%)	2 (2.2%)
Work on the mental health symptoms only	4 (1.9%)	2 (1.6%)	2 (2.2%)
I would not seek professional help for these issues	3 (1.4%)	2 (1.6%)	1 (1.1%)

^a Missing data from 10 participants.

Table 7
Comparison of findings to previous research.

	Present study <i>N</i> = 225	Back et al. (2006) ^a <i>N</i> = 23	Brown et al. (1998) ^b <i>N</i> = 42
Disorder relationship			
If drug and/or alcohol ^c use improves mental health symptoms ^d decrease.	53.4% $\chi^2(2) = 43.49^{***}$	ns ^e	51.5% $\chi^2(2) = 9.46^{**}$
If drug and/or alcohol use worsens, mental health symptoms increase.	73.8% $\chi^2(2) = 165.10^{***}$	ns ^e	51.4% $\chi^2(2) = 8.63^*$
If mental health symptoms improve, drug and/or alcohol use decreases.	51.5% $\chi^2(2) = 67.22^{***}$	63.6% $\chi^2(2) = 10.18^{**}$	78.8% $\chi^2(2) = 30.73^{***}$
If mental health symptoms worsen, drug and/or alcohol use increases.	76.2% $\chi^2(2) = 181.26^{***}$	86.4% $\chi^2(2) = 11.64^{***}$	77.1% $\chi^2(2) = 31.77^{***}$
Treatment preferences			
Both drug and/or alcohol treatment and mental health treatment together.	50.7%	41.0%	52.5%
Drug and/or alcohol treatment first, followed by mental health treatment.	27.9%	27.0%	27.5%
Mental health treatment first, followed by drug and/or alcohol treatment.	3.7%	23.0%	20.0%

^a The data in column 3 are from "Cocaine Dependence and PTSD: A Pilot Study of Symptom Interplay and Treatment Preferences", by S.E. Back, K.T. Brady, U. Jaanimagi and J.L. Jackson, 2006, *Addictive Behaviors*, 31(2), p. 351–354. Copyright 2005 Elsevier Ltd.

^b The data in column 4 are from "Substance Use Disorder PTSD Comorbidity: Patients, Perceptions of Symptom Interplay and Treatment Issues", by P.J. Brown, R.L. Stout and J. Gannon-Rowley, 1998, *Journal of Substance Abuse Treatment*, 15(5), p. 445–448. Copyright 1998 Elsevier Science Inc.

^c For Back et al. (2006) all questions were specific to cocaine use.

^d For Back et al. (2006) and Brown et al. (1998) all questions were PTSD specific.

^e Reported as not significant, but Chi-square statistics and percentages not reported.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

including the frequencies of perceived disorder relationship and treatment preferences.

Chi-square analysis of disorder relationships in the present study, provided in Table 7, shows that there is a stronger perceived relationship when symptoms worsen [$\chi^2(2) = 165.10$, $p < .001$, $\chi^2(2) = 181.26$, $p < .001$] than when they improve [$\chi^2(2) = 43.49$, $p < .001$, $\chi^2(2) = 67.22$, $p < .001$].

2.6. Predicting intentions to seek treatment

A binary logistic regression was conducted to predict high treatment seeking intentions for mental health treatment and AOD treatment, using screening status, problem recognition, and perceived relationship between disorders as predictor variables. For mental health treatment intentions, a test of the full model against a constant only model was statistically significant. This indicated that the predictors reliably distinguished those with high mental health treatment intentions from those with low mental health treatment intentions [$\chi^2(3) = 18.17$, $p < .001$]. Although significant, the Nagelkerke's R^2 indicated that the predictors accounted for only 12.0% of the variance in high treatment seeking intentions. The overall model was 67.0% accurate, being able to predict high mental health treatment intentions with 86.8% accuracy and those with low mental health treatment intentions with 43.2% accuracy. The predictor variables for mental health treatment intentions calculated from the regression are summarised in Table 8. The regression analysis revealed two significant predictors of high mental health treatment intentions. Participants who recognised having a mental health problem were 3.74 times more likely to have high mental health

treatment intentions than those who do not recognise having a mental health problem. Those who recognise a stronger relationship between disorders were 2.09 times more likely to have high mental health treatment intentions than those who recognise a weaker or no relationship between disorders.

For AOD treatment intentions, a test of the full model against a constant only model was not statistically significant, indicating that the predictors do not reliably distinguish those with high AOD treatment intentions from those with low AOD treatment intentions.

3. Discussion

This study investigated comorbid problem recognition, perceived disorder relationships, treatment intentions, and treatment preferences of individuals attending an Australian detoxification facility. Several important findings emerged. A high rate (56.5%) of individuals attending Australian detoxification settings screened positive for co-occurring mental health disorders. A high percentage (85.3%) of participants recognised having a mental health problem, in fact, more participants recognised having a mental health problem than screened positive for a current mental health disorder using the MHSF-III. Those who said they had a previous mental health diagnosis were significantly more likely to recognise/identify themselves as having a current mental health problem. Participants perceived a functional relationship between their CODs in the expected direction. Concurrent AOD treatment and mental health treatment were the most commonly endorsed treatment modality and were associated with perceived disorder relationship. Furthermore, recognition of mental health problems, having a previous mental health diagnosis

Table 8
Predictor variables of high mental health treatment intentions.

Variable	β (SE)	Exp (β)	95% CI of exp (β)
Mental health screen status ^a	0.41 (0.31)	1.51	0.82, 2.8
Recognition of mental health problem ^b	1.32 ^{**} (0.51)	3.74	1.38, 10.13
Strength of perceived relationship between disorders ^c	0.74 [*] (0.34)	2.09	1.08, 4.05
Constant	-1.72 (0.53)	0.179	

Note. Dependent variable is mental health treatment intentions. 0 = low intentions, 1 = high intentions.

Last 30 days.

^a Mental health screening status of last 30 days 0 = screen negative, 1 = screen positive.

^b Recognition of mental health problem 0 = no recognition of mental health problem, 1 = recognise mental health problem.

^c Strength of perceived functional relationship between disorders ranging between -1 and +1 with zero representing no relationship

* $p < .05$.

** $p < .01$.

and screening positive for a current mental health disorder, predict high mental health treatment intentions.

Overall, participants had higher help seeking intentions for further drug and/or alcohol treatment than mental health treatment. As hypothesised, participants who screened positive for mental health disorders had higher help seeking intentions for further mental health treatment than those who screened negative. However, the drug and/or alcohol treatment intentions of those who screened positive for a mental health disorder were not significantly different to those who screened negative. Given only 4.2% of participants who screened positive for a mental health disorder did not recognise having a mental health problem, it was not possible to explore the hypothesis that the treatment intentions of this group would differ to those who screened positive and recognised having mental health problems.

In line with the results of Brown et al. (1998) participants in the present study identified a functional relationship between CODs in the expected direction. Participants indicated that as one disorder worsens the other worsens and as one improves, the other improves. This finding is in line with the hypothesis that co-occurring SUDs and mental health disorders have a mutual influence across time (Kavanagh & Connolly, 2009). This hypothesis is supported by research demonstrating a bi-directional relationship between psychotic symptoms and substance misuse (Hides, Dawe, Kavanagh, & Young, 2006). It may therefore be wise to address CODs as being mutually influential. Examining and addressing the bi-directional relationship within treatment settings appear to be of particular importance (Kavanagh & Connolly, 2009).

The results of the present study indicate a much clearer relationship between disorders when symptoms worsen, compared to when symptoms improve. It might be that the negative consequences of symptoms getting worse have a greater impact on the individual's life, and therefore are more salient than when symptoms improve. For example, it is possible that an individual is more likely to recognise an increase in symptoms of mental illness and an increase in AOD use compared to an improvement in those symptoms. This implies that, at a minimum, the priority is to address at least one of the disorders to prevent worsening of the other disorder.

Interestingly, 15.0% of participants indicated that a decrease in AOD use leads to an increase in mental health symptoms. This finding is in line with the self-medication hypothesis, which posits that AOD use develops from attempts to alleviate symptoms of mental illness (Cooper, Frone, Russell, & Mudar, 1995; Khantzian, 1997). In our study the significant proportion of people indicating that reductions in substance use led to increases in mental health symptoms suggest that identifying this group may be clinically useful to help understand the potential impact of this interaction on their motivation for future treatment seeking.

Half of participants in the present study preferred concurrent AOD treatment and mental health treatment, 28% preferred AOD treatment then mental health treatment; and 14% preferred AOD treatment only. Only 3.7% of participants in the present study, compared to up to 23.0% of participants in previous studies (Back et al., 2006; Brown et al., 1998), indicated a preference for mental health treatment first, followed by drug and/or alcohol treatment. As noted such variation may be due to the PTSD specific nature of prior research and differences in experiences of symptoms.

The present study found a significant association between treatment preferences and mental health screening status. Participants who screened positive for mental health disorders were more likely than those who screened negative to endorse seeking concurrent treatment rather than sequential treatment (AOD treatment first, then mental health treatment) and AOD treatment only. This suggests that participants with CODs are likely to have a preference to address both disorders concurrently. Such preferences are fortunate given the growing evidence that integrated versus sequential treatment of CODs is more effective (Baker et al., 2010;

Drake, O'Neal, & Wallach, 2008; Mueser, Kavanagh, & Brunette, 2007). However, it is likely to be important to enquire about treatment preferences and underlying perceptions of CODs to address any mismatch in expectations for further treatment.

Previous research has noted participants' treatment preferences were in line with the perception of their disorders being functionally related (Back et al., 2006; Brown et al., 1998). The present study explored this further and examined the association between perceived disorder relationship and treatment preferences. The results indicated that participants who endorsed a preference to seek concurrent AOD treatment and mental health treatment perceived a stronger relationship between AOD use and mental health symptoms. Furthermore, the results of the current study indicate that recognition of mental health problems and the perception of a functional relationship between disorders significantly predict high mental health treatment intentions. However, these were not demonstrated to predict AOD treatment intentions. It may be that, while concurrent treatment is preferred among individuals who perceive a functional relationship between disorders, the alleviation of mental health symptoms is of a higher priority.

The findings of the current study have important implications for treatment settings. In situations where individuals do not recognise their mental health problems and do not perceive a relationship between their disorders, it is advisable that treatment staff focus on increasing awareness and exploring the potential interaction between these problems. Detoxification is an optimal setting for this to occur as treatment staff have the opportunity to identify the presence of co-occurring mental health disorders through conversing with and observing clients. After identifying the presence of a mental health disorder, the staff member could provide the client with education about symptoms, highlight the need for mental health treatment and link the client with mental health services. Promoting increased awareness of mental health problems and promoting greater insight into disorder relationships are likely to increase intentions to seek mental health treatment.

The results of the present study indicate that the vast majority of participants endorsed a preference to engage in mental health treatment concurrently with AOD treatment. Not only do individuals appear to prefer this mode of treatment, reviews of the literature suggest that the integration of mental health and AOD treatment into a single cohesive package appears most promising in the treatment of CODs (Baker et al., 2010; Drake, Mueser, Brunette, & McHugo, 2004; Drake et al., 2008). However, at present, most Australian services are not well equipped to provide concurrent treatment because services are generally partitioned between mental health and AOD treatment (Kavanagh & Connolly, 2009). This problem is not unique to Australia and has been well documented in the United Kingdom and North America (Graham et al., 2003; Lesage et al., 2008). This highlights a need to improve service organisation and provision in order to meet the needs of individuals with CODs.

The findings of the current study also suggest that individuals attending detoxification facilities have a high level of insight into the presence of mental health problems. Furthermore, the results indicate a high concordance rate between a single item measure of mental health problem recognition and the mental health screen. This suggests simply asking the individual whether they have a mental health problem is almost as accurate as a full screening measure (MHSEF-III). This is of particular importance in busy treatment settings where limited resources may not allow for a comprehensive mental health assessment. At a minimum it suggests that a single screening question may be a useful precursor to a more comprehensive screening measure.

Strengths of the current study include the large sample size relative to previous research and the extension of findings from being PTSD specific to including a broader range of mental health comorbidities. However, there were several limitations to the present study. Firstly, the study was conducted in two detoxification facilities in Queensland,

Australia so the findings may therefore not be generalisable to other states or internationally. Previous international research has identified higher rates of CODs among individuals in detoxification facilities (approximately 80%, Hendriks, 1990; Johnson et al., 2007) compared to the present study (56.5%). This variation may be due to differences in methodologies such as the timing of assessments and use of different screening measures (Costa & Oliveira, 2012; Mortlock et al., 2012). Furthermore, the current study utilised a screening measure to collect information about mental health disorders, rather than actual diagnosis. In addition, there is a need for further psychometric validation of the TPQ that was used in this and other studies. Finally, information was not collected on non-participants, which precluded a comparison of those who did and did not participate. It is possible that those who chose to participate were more motivated to seek future treatment or chose to participate because they were aware they had a mix of substance use and other mental health problems.

Given the current study only looked at intentions to seek further treatment, it is suggested the study be replicated to include analysis of actual treatment attendance. Further research is required to understand the perceived relationship between CODs and treatment preferences across different types of AOD settings, including residential and outpatient treatment settings and across different geographical locations. Furthermore, replication of the study among individuals with CODs attending mental health treatment settings would provide clarification as to whether the current findings generalise to individuals seeking mental health treatment.

The findings of the present study suggest individuals in detoxification settings generally recognise they have co-occurring mental health problems. In addition, the participants perceived a functional relationship between their disorders. A particularly clear relationship was noted when symptoms of either disorder worsen. The results indicate that the participants' treatment preferences are in line with their screening status and treatment intentions. Furthermore, recognition of mental health problems and perceived disorder relationship predict high mental health treatment intentions. These findings have important clinical applications when planning treatment programs and counselling individuals with CODs.

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