Negative attentional bias for positive recovery-related words as a predictor of treatment success among individuals with an alcohol use disorder

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HIGHLIGHTS

- Treatment outcome was predicted by implicit, not explicit measures.
- An attentional bias for positive change-related words predicts treatment outcome.
- Positive change-related words are a better predictor than alcohol-related words.
- A logistic regression model correctly identified 85% of successful outcomes.

ARTICLE INFO

ABSTRACT

Introduction: This study assessed relationships between clients' attentional bias (AB) for different types of stimuli and their treatment outcomes. Alcohol AB during detoxification has previously been shown to predict relapse, but further research was needed to clarify this relationship. The current study determined whether AB for recovery-related words would also predict treatment outcome.

Methods: Participants were 45 clients undergoing alcohol detoxification, and a control group of 36 staff members. They rated words for personal relevance in four categories (alcohol-related, neutral, positive change-related, and negative change-related). Participants completed an individualized Stroop task containing their chosen words. They were also assessed on readiness-to-change, difficulties with emotion regulation, drinking problems, anxiety, and depression. Clients were interviewed at a three-month follow-up to determine their treatment outcome.

Results: As predicted, questionnaire measures did not predict clients' treatment outcome ($p > .05$). A logistic regression model indicated that the best predictor of treatment outcome was AB for positive change-related words ($p = .048$), with successful individuals having less AB for these words than for the other word categories. Although this finding was unexpected, it was supported by significant relationships between positive change-related interference scores and continuous measures of drinking at follow-up [i.e. number of units drunk ($p = .039$) and number of drinking days ($p = .018$)].

Conclusions: The results suggest that positive change-related words are a better predictor of treatment outcome than are either alcohol-related words or negative change-related words.

1. Introduction

Health problems arising from alcohol misuse cost the UK National Health Service an estimated £3.5 billion annually (National Treatment Agency for Substance Misuse, 2013). Providing treatment at detoxification units is a cost-effective way of reducing the financial impact (Raistrick, Heather, & Godfrey, 2006). Despite continuous improvements in treatment services, the rate of relapse post-detoxification remains between 60 and 90% (Aguiar, Neto, Lambaz, Chick, & Ferrinho, 2012; Becker, 2008; Raistrick et al., 2006; Spada, Nuamah, Luty, & Nikcevic, 2008).

It is important to understand why these high rates of relapse after detoxification occur. It has been suggested that attentional bias (AB) for alcohol-related stimuli is a primary feature of alcohol dependency; it promotes craving and helps maintain the addiction (Field & Cox, 2008). AB is an automatic focus of attention on personally salient stimuli (Fadardi & Cox, 2008; Williams, Mathews, & MacLeod, 1996). According to Klinger and Cox's (2011) theory of current concerns,

drinking alcohol has become a major goal in the life of alcohol-dependent individuals. Being committed to achieving this major goal causes a *current concern* to develop. It is a latent, unconscious brain process, which allows alcohol to gain priority in the cognitive system to facilitate the goal of procuring and imbibing alcohol. As a result, the individual has automatic distractions for alcohol-related stimuli.

The most widely used measure of AB is the alcohol-Stroop test (Cox, Fadardi, & Pothos, 2006; Field & Cox, 2008). Typically, neutral and alcohol-related words are presented on a computer screen in various colors, and participants are required to respond as quickly and accurately to the color of the words while ignoring their meaning. Stroop interference, which is a measure of AB, is calculated by subtracting mean reaction times to the neutral words from mean reaction times to the alcohol words (Cox, Fadardi, Intriligator, & Klinger, 2014).

A large body of evidence shows that heavy drinkers have an AB for alcohol-related words on the alcohol-Stroop test (Cox et al., 2006; Cox, Blount, & Rozak, 2000; Cox, Yeates, & Regan, 1999). Individuals' degree of AB is proportional to the amount of alcohol that they habitually consume, with dependent drinkers showing the greatest AB (Fadardi & Cox, 2009; Field & Cox, 2008; Stormark, Laberg, Nordby, & Hugdahl, 2000). This is likely because dependent drinkers have the greatest concern for drinking alcohol, which gains priority in their cognitive system.

There are clinical implications of alcohol AB. Cox, Hogan, Kristian, and Race (2002) found that performance on the alcohol-Stroop task during detoxification predicted later relapse. In this study, clients completed an alcohol-Stroop task at the beginning of their detoxification, and again four weeks later prior to their discharge. A four-week, post-treatment follow-up indicated that the individuals who had relapsed had a greater AB for alcohol-related stimuli than successful individuals. Similar findings have also been found in predicting heavy drinkers' alcohol consumption (Cox, Pothos, & Hosier, 2007). Taken together, the results presented here provide support for the use of the alcohol-Stroop task as a predictor of later outcome, although further research is needed to clarify this relationship (Field, Marhe, & Franken, 2014).

Unlike the research described above, which focused on predicting relapse, the present study aimed to identify predictors of treatment success. This is consistent with a shift in the addiction field from a problem-management approach to a more positive recovery-based paradigm (White, 2007).

Miller and C'de Baca (2001) described the process of stopping drinking and moving toward recovery as an enduring transformation of cognitions, affect, and behavior—a process that might not be conscious (White, 2007). Many individuals in treatment may appear to have a conscious intention to change, regardless of whether they actually change. For example, scores on an explicit measure of change such as the Readiness-to-Change Questionnaire (RCQ; Heather & Hönekopp, 2008) can predict short-term reductions in consumption but not longer-term ones (Cox et al., 2007). In addition, because change is an expected outcome of treatment, some individuals may give socially desirable answers on such explicit measures. For these reasons, implicit measures of change might be a better predictor of actual change than self-report measures.

The current study assessed whether AB for change-related words on a Stroop task could serve as an implicit measure of change. It was expected that if individuals do experience a meaningful shift in their motivation for recovery, they would show an AB for change-related words. Consistent with the theory of current concerns (Klinger & Cox, 2011), recovery would have become a major goal for such individuals, thus causing them to react automatically to recovery-related stimuli.

The study aimed to determine whether AB for change-related stimuli could predict treatment success. It was hypothesised that clients who had successful treatment outcomes would have a greater AB for change-related words, and less AB for alcohol-related words, than would clients who relapsed. It was also predicted that clients would have a greater AB for both alcohol-related and change words than would a control group who had not been in treatment. Finally, it was expected that RCQ scores as a self-report measure of motivation for change would not predict treatment outcome.

2. Method

2.1. Participants

There were two groups of participants: (a) an experimental group of clients who had completed their pharmacological regime and were going to be discharged within the next three days and (b) a control group of staff members at the same detoxification unit. Staff members were chosen in an attempt to equalize the control group's exposure to alcohol-related cues (Cox et al., 2002). Exclusion criteria were that participants could not have had a severe psychotic disorder or neurological impairment, or a history of illicit drug use; staff members could not have had a history of alcohol dependency.

A total of 45 clients and 36 staff members were recruited. The sample size was almost twice as large as that in other similar studies (e.g., Cox et al., 2002), and was determined by the availability of the clinical population. A £10 voucher was provided as an incentive to participate.

2.2. Stimuli

Lists of positive and negative change-related words were compiled from interviews with clients who did not participate in the experimental study. These clients were actively involved in recovery and had maintained a substantial period of sobriety. They were asked to discuss their *change experience* and to list words that reminded them of it. Examples of positive and negative change-related words that these clients provided are, respectively, *hope* and *acceptance* and *death* and *crime*. Lists of alcohol-related and neutral words were compiled from words used in previous studies (e.g. Fadardi & Cox, 2009). Examples of alcohol-related words used are *bar* and *vodka*; examples of neutral words used are *chair* and *door*. Each list comprised 22 words. Participants were asked to select eight words from each of the four lists. All word lists were matched for mean number of syllables per word and word frequency using the Subtlex UK database of word frequencies (Van Heuven, Mandera, Keuleers, & Brysbaert, 2014).

Participants were asked to rate the personal relevance for them of each alcohol-related word on a Likert scale and to identify the eight words that were most personally relevant for them. They were also asked to rate the personal relevance of each of the neutral words, but this time they identified the eight words that were least personally relevant for them. In the same manner, participants in the experimental group rated and identified positive and negative change-related words that were personally relevant for them. In contrast, participants in the control group rated and identified words that they believed would be most personally relevant for clients undergoing detoxification. This was to avoid staff choosing change words relevant to their own lives.

The words that each participant chose were used in that person's Stroop task. Each word was presented twice in each of four font colors (red, blue, yellow, and green). In order to optimize the Stroop effect (Cox et al., 2006), words in each of the four categories were presented in separate blocks. These blocks were counterbalanced, and the words were randomized within blocks. In total, each participant completed 20 practice trials containing words from all four categories, and 256 experimental trials. Participants completed the experiment on a visual display monitor powered by a laptop, using a serial response PST button box.

2.3. Materials

A demographics questionnaire was administered. Daily drinking