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Attentional bias and treatment adherence in substitute-prescribed opiate users

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HIGHLIGHTS

- We tested attentional bias modification in treatment-seeking opiate users.
- We also compared those who did and did not adhere to opiate substitution treatment.
- Attentional bias modification did not influence attentional bias or craving.
- Adherent patients had attentional bias away from opiate-stimuli and lower craving.
- Attentional bias may predict adherence in treatment-seeking drug users.

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ABSTRACT

Background: Attentional bias (AB) is implicated in the development and maintenance of substance dependence and in treatment outcome. We assessed the effects of attentional bias modification (ABM), and the relationship between AB and treatment adherence in opiate dependent patients.
Method: An independent groups design was used to compare 23 opiate dependent patients with 21 healthy controls. Participants completed an AB task before either a control or an ABM task designed to train attention away from substance-related stimuli. Pre- and post-ABM AB and craving were assessed to determine any changes. Relationships between treatment adherence ('using on top' of prescribed opiates or not) and AB, craving and psychopathology were also examined.
Results: There was no baseline difference in AB between patients and controls, and no significant effect of ABM on AB or substance craving. However, treatment adherent patients who did not use illicit opiates on top of their prescribed opiates had statistically significantly greater AB away from substance-related stimuli than both participants using on top and controls, and reported significantly lower levels of craving than non-treatment adherent patients.
Conclusion: Whilst we did not find any significant effects of ABM on AB or craving, patients who were treatment adherent differed from both those who were not and from controls in their attentional functioning and substance craving. These findings are the first to suggest that AB may be a within-treatment factor predictive of adherence to pharmacological treatment and potentially of recovery in opiate users.

1. Introduction

Attentional bias (AB) – where disorder-related stimuli become the focus of one's attention – has been consistently demonstrated for substance-related stimuli in substance users relative to non-users (Field & Cox, 2008; Wiers & Stacy, 2006). Furthermore, AB is associated with craving in addiction (Field, Eastwood, Bradley, & Mogg, 2006), is positively correlated with frequency of substance use (Morgan, Freeman, Schafer, & Curran, 2010; Morgan, Rees, & Curran, 2008) and has been linked to relapse in individuals abstaining from substance use (Cox, Hogan, Kristian, & Race, 2002; Marissen et al., 2006).

Consequently, AB features as a key component of many recent theoretical models of addiction (Franken, 2003; Ryan, 2002; Wiers & Stacy, 2006), where it is awarded a central role in the development and maintenance of substance use. These models suggest a reciprocal causal relationship between craving and AB. It follows, therefore, that direct manipulation of AB should produce meaningful changes in clinically relevant variables such as substance craving and frequency of substance use.

One approach to addressing this question has used the modified visual probe task, which aims to experimentally manipulate AB

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(MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). Here, the task is modified by adjusting task contingencies, so that probes replace neutral images more often than substance-related images thereby training participants' attention towards neutral stimuli.

To date, the modified visual probe paradigm has been applied to tobacco smokers (e.g. Attwood, O'Sullivan, Leonards, Mackintosh, & Munafò, 2008) and to alcohol users both in the community and the clinic (Schoenmakers, Wiers, Jones, Bruce, & Jansen, 2007; Schoenmakers et al., 2010). These studies typically suggest that AB can be readily modified. However, mixed findings have been reported for the broader effects of ABM on craving and substance use behaviour (e.g. Attwood et al., 2008; Field et al., 2007). For example, in studies with healthy controls, rather than clinically relevant benefits (when training away from substance cues), it appears more common to induce 'adverse' effects (when training towards substance cues) such as increased subjective craving (Field et al., 2007, for participants aware of experimental contingencies only; Attwood et al., 2008, in men only).

There has been only one ABM study to date examining a treatment-seeking, clinical sample (alcohol dependent patients; Schoenmakers et al., 2010). Importantly, this study did report broader beneficial effects of ABM away from substance-related stimuli: training effects generalised to novel substance-related stimuli (i.e. to stimuli other than those used during ABM) and participants were also discharged from treatment significantly earlier than the control group. However, whilst successful generalisation to novel stimuli was reported here, other studies have failed to demonstrate this effect (Schoenmakers et al., 2007).

Although only a preliminary study, Schoenmakers et al. (2010) provide some tentative yet important evidence of clinically-relevant benefits of ABM. Given that AB is positively correlated with frequency of substance use, it may be that AB is more modifiable in clinical samples, and as Field, Marhe, and Franken (2013) have pointed out, the inconsistent findings regarding ABM in substance use to date is possibly because almost all studies have used non-clinical, student samples.

The present study had a primary and secondary aim. Primarily, we set out to investigate the effects of a single session of ABM on AB, craving, and frequency of substance use using a modified visual probe task in opiate dependent participants receiving opiate substitute treatment. No study to date has investigated ABM in this population. The secondary aim was based on our previous finding in a similar patient population that AB away from substance-related stimuli was positively correlated with length of abstinence in ex-opiate users (Constantinou et al., 2010). This suggestion of a link between AB and treatment progress therefore led us to also explore in the present study the relationship between AB and a key aspect of treatment adherence: whether participants were using illicit opiates on top of their prescribed opiates.

Specifically, we hypothesised that: 1) Opiate dependent participants would show a significant baseline AB towards substance-related stimuli relative to non-substance using controls. 2) Participants receiving ABM away from substance-related stimuli would show decreased AB and substance craving following ABM compared with those receiving the control visual probe task. In addition, we explored the differences between treatment adherent and non-treatment adherent participants in the opiate using group and controls on AB, substance craving and other clinically relevant measures.

2. Method

2.1. Design and participants

An independent groups design was used to compare 23 current opiate users (patient group) with 21 participants (control group) who did not use illicit substances.

Patient group participants were required to be opiate users prescribed a substitute medication as part of their treatment within National Health Service (NHS) drug services. In the NHS, treatment typically includes substitute opiate prescription and regular meetings with a key worker who provides advice and support. Patients were recruited via their key workers and advertisements. Exclusion criteria were a current diagnosis of a psychotic disorder or alcohol dependence; use of illicit substances and alcohol on testing days.

To control for the relatively high levels of depression and anxiety in opiate users (Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998), control participants were recruited from an NHS primary care mental health service (Improving Access to Psychological Therapies; IAPT). However, to address the gender imbalance of patients comprising substance misuse (majority male) and IAPT (majority female) services, we also recruited healthy male participants from the local community. The final control group consisted of 10 participants recruited from IAPT, and 11 healthy control participants. IAPT participants were recruited via poster advertisements or a database of the service's patients who expressed interest in research. Healthy participants were recruited via the University College London's online community participant recruitment service. Exclusion criteria for controls were a history of or current illicit substance use, alcohol dependence or psychotic disorder.

The study was approved by the NHS National Research Ethics Committee, Surrey, and the UCL Psychology Ethics Committee. Written, informed consent was obtained from all participants. Patients were paid £20 and controls £10 for participation.

3. Materials and measures

3.1. Stimuli

Stimuli were 44 picture pairs (Fig. 1). Forty pairs, each matched for visual complexity and composition, contained one opiate-related (e.g. spoons, needles, lighters, heroin-like substance) and one non-opiate related (neutral; e.g. forks, pencils) image. The remaining four pairs contained neutral images only. The 40 opiate-neutral pairs were divided into five sets of eight.

3.2. Substance use

The Timeline Followback method (Sobell & Sobell, 1996) was used to gather substance use (including alcohol and tobacco) over the past 28 days.

3.3. Questionnaire measures

Baseline measures comprised the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001), Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006), and the Barratt Impulsiveness Scale-11 (BIS-11; Patton, Stanford, & Barratt, 1995); on each of these, higher scores reflect greater symptomology. Subjective craving was assessed by three 10 cm Visual Analogue Scales (VAS; Bond & Lader, 1974): "I would like to use drugs," "I want to use drugs," and "I have an urge to use drugs," each anchored "not at all" and "extremely".

4. Procedure

There were 3 separate testing sessions for the patient group: Session 1 (day 0), Session 2 (day 8) and Session 3 (day 28). For controls, only session 1 was attended as they would not be expected to derive any clinical benefit from ABM. Sessions 1, 2 and 3 took approximately 90, 15 and 20 min to complete, respectively.

On Session 1, eligible participants were randomly assigned to receive either ABM away from substance-related stimuli (ABM-away) or a standard visual probe control task (ABM-control). The day before each test sessions, all participants were reminded not to consume illicit