

Efficacy of controlled breathing and heart rate variability (HRV) biofeedback on craving among people using alcohol and other drugs: a meta-analysis

Roxburgh, A.^{1,2}, Manning, V.^{1,2}, Lubman, D.I.^{1,2}, Rowland, B.^{1,2}, Sukhjit K. B.^{1,2}, Pek, M.³, Tso, B.³, & Arunogiri, A.^{1,2}

¹Monash Addiction Research Centre, Eastern Health Clinical School, Monash University,

²Turning Point, Eastern Health, ³Eastern Health Clinical School, Monash University

Presenter's email: ari.roxburgh@monash.edu

Introduction: Craving is a core feature of substance use disorders (SUDs) and a predictor of relapse. There is growing interest in somatic techniques such as controlled breathing to reduce craving and support recovery. Breathing-based interventions—including resonant, slow, deep, or heart-rate variability biofeedback (HRVB)—are simple, zero-cost strategies that can modulate physiological and emotional states. However, their effectiveness in reducing craving among people who use alcohol and other drugs is yet to be systematically evaluated.

Method: This pre-registered (CRD42024524235) meta-analysis synthesised data from trials investigating the effect of breathing interventions on craving in individuals who use alcohol or drugs. Studies were identified through systematic searches of Web of Science, PsycINFO, MEDLINE, CINAHL, EMBASE, PubMed, Scopus, and Cochrane Central Register of Controlled Trials. Eligible studies included randomized controlled trials (RCTs) and quasi-experimental designs that reported pre-post craving outcomes. Standardized mean differences (Hedges' g) were calculated, and random-effects models were used to estimate pooled effects. Risk of bias and study heterogeneity were assessed

Results: A total of 13 studies (7 RCTs and 6 quasi-experimental; 8 treatment and 5 non-treatment samples; $n = 591$ participants) met inclusion criteria. Breathing interventions significantly reduced craving compared to control conditions (Hedges' $g = -0.44$, 95% CI: -0.58 to -0.29 , $p < .001$), with low heterogeneity ($I^2 = 24.6\%$). Subgroup analyses showed consistent effects across HRVB compared to non-biofeedback breathing interventions. Funnel plot (publication bias), Trim and Fill analyses, and Fail-safe N test suggest the results are consistent across studies and there is no evidence of publication bias.

Conclusions:

Breathing interventions are associated with moderate reductions in craving among individuals who use alcohol and other drugs.

Implications for Practice or Policy:

These techniques offer a promising, highly accessible adjunct to existing treatment approaches. Incorporating structured breathing practices into AOD treatment may enhance outcomes by reducing craving.