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**Research Article**

# Combination of Two Behavioral Techniques Reduces Craving in Problematic Alcohol Consumption by One Third: A Randomized Controlled Trial

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## Abstract

***Introduction:*** Craving alcohol is a core symptom of alcohol use disorder (AUD) and an important target for treatment. A new line of treatment for AUD aims at overriding the urge to consume alcohol by changing implicit cognitions via approach bias modification (ApBM). In a prior study, we tested a variant of ApBM called imaginal retraining, which reduced craving. As addiction and body-focused repetitive behaviors (BFRBs) share important symptoms (e.g., inability to resist urges), for the present study we merged imaginal retraining with a technique aimed at BFRB, called decoupling, to augment treatment effects. We hypothesized that the new technique, which is called 3P, would lead to a greater reduction in craving relative to (active) control conditions. ***Methods:*** The study was conducted online. Data from 227 participants were considered. Participants were randomized to 1 out of 5 conditions. Craving for alcohol before and after the brief intervention was the primary outcome. ***Results:*** Only the 3P condition lessened craving by approximately one third at an almost medium effect size (improvement: 34.5%, $p = 0.003$, $d = 0.458$). Effects were significantly larger relative to the wait-list control and two active control conditions ($p$'s $< 0.02$; greater reduction than imaginal retraining at a small but nonsignificant effect size). ***Discussion/Conclusion:*** If replicated, the combination of imaginal retraining and decoupling (3P) represents a promising, easy-to-implement self-help technique to reduce immediate craving. Long-term effects in participants with formally diagnosed AUD have not yet been investigated.

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## Introduction

Craving alcohol is a core symptom of alcohol use disorder (AUD) [1] and an important target for treatment. Beyond the hardship AUD inflicts on affected individuals and their families, the disorder results in high direct (e.g., treatment in rehabilitation units) and indirect (e.g., inability to work) costs [2]. Although effective psychological and pharmacological interventions are available, relapse rates remain high [3]. As treatment seeking and adherence are low, researchers have called for new

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low-threshold as well as more appealing interventions [4].

A new line of treatment for AUD [5] aims at changing implicit cognitions in individuals with AUD via approach bias modification (ApBM). The rationale of ApBM is derived from embodied cognition theory, which stipulates a close connection between movements/body posture, thoughts, and emotions (for a discussion of different theories on embodiment see [6]). In the original ApBM procedure, the individual has to push away pictures of alcohol beverages on a computer screen via a joystick with the intention to reduce the embodied urge to consume alcoholic beverages. Building upon this paradigm, our research group developed the imaginal retraining technique. In contrast to the original ApBM technique, imaginal retraining is a noncomputerized imaginal self-help technique. The participant is instructed to imagine hurling their favorite alcoholic beverage(s) away from themselves; the movement is actually performed, but the beverage and the situation are only imagined. The noncomputerized design and the possibility of personalization are deemed advantageous for a more widespread application in everyday life. Imaginal retraining has shown efficacy in randomized controlled trials targeting problematic alcohol use [7], tobacco use [8], and obesity [9], but with mainly small effect sizes.

As addiction and body-focused repetitive behaviors (BFRBs; e.g., trichotillomania, skin picking, nail biting) share important features (e.g., inability to resist urges), we have merged imaginal retraining with decoupling [10], a technique that has successfully decreased BFRBs in controlled trials [10–12] (see https://www.free-from-bfrb.org/videos/ for a video demonstrating the procedure), with the aim of augmenting treatment effects. In the present study, we compared the combined technique, named 3P (for pull-pause-push; the manual can be downloaded at www.uke.de/craving), to active control conditions for their effects on craving for alcohol. A technique that may reduce these urges could become an important complement to standard treatment. We hypothesized that 3P would show larger reductions in craving for alcohol relative to control conditions, with greatest effects shown against the passive control condition.

## Materials and Methods

Recruitment for the web-based intervention was carried out via WisoPanel [13], a participant pool of German-speaking people who have registered for participation in web-based studies (see the CONSORT flowchart and checklist in the online suppl. material;

see www.karger.com/doi/10.1159/000527877 for all online suppl. material). Members of WisoPanel are drawn from diverse sources, both online and offline, thus reducing selection bias. The study was planned as a randomized controlled study. Following the guidelines of the European General Data Protection Regulation (GDPR), no IP addresses were stored. The only inclusion criterion was the self-reported desire to reduce problematic alcohol consumption. Severity of drinking behavior was assessed with the 10-item Alcohol Use Disorders Identification Test (AUDIT).

Participants were asked to rate their current level of craving for alcohol (primary outcome) on a scale ranging from 0 (not at all) to 100 (extreme) via a slider after viewing the same three alcohol-related pictures as in the baseline assessment (see appendix). Participants were then randomized (QuestBack® algorithm) to 1 out of 5 conditions (no allocation bias occurred due to the fully automated procedure). Each participant was shown the same photo of a hand holding a full wine glass (for the photo, see online suppl. material). The participants were given 1 out of 5 instructions: (1) in the wait-list control condition, they were asked to look at the photo for some time; (2) in the zooming-out condition, they had to make the photo smaller in their imagination (zooming-out was chosen as one of the active control conditions as it is a standard feature of ApBM procedures); (3) in the imaginal retraining without movement condition, participants were asked to imagine pouring out the liquid or throwing the glass away without making the actual movement (this condition was chosen as a control condition that eliminated the effects of the movement); (4) in the imaginal retraining condition with movement, participants were asked to imagine pouring out the liquid or throwing the glass away while making the actual movement; and (5) in the 3P (pull-pause-push) condition, participants were asked to imagine bringing the glass close to their mouth, stopping just short of their mouth, and then pouring out the (imagined) liquid or throwing the glass away while making the actual movement. In conditions 2–5, participants were asked to perform the exercise at least five times; general instructions were essentially the same. After the intervention, participants were asked whether they had actually executed the task, and had to indicate their current level of craving for alcohol on a scale from 0 to 100.

## Results

Data from 227 participants were included (see the CONSORT flowchart in the online suppl. material). Slightly more men than women participated (53.7% vs. 46.3%). On average, participants were in their mid-50s (M = 54.89 years, SD = 14.27). Approximately one third (32.6%) of the participants had not finished high school. The mean AUDIT score was 12.91 (SD = 7.26), which equates to hazardous or harmful drinking (range: 8–14); 33% were in the alcohol-dependent range (score ≥15). Groups did not differ ($p = 0.779$) regarding baseline levels for craving ($M_{tot} = 23.65$, SD = 26.58; see online suppl. material). In the intention to treat analyses, craving did not change in the wait-list control condition ($n = 43$,

change: −1.40 (worsening: −5.52%); $p = 0.323$, $d = 0.150$), zooming-out condition ($n = 46$, change: 0.87 (improvement: 4.00%), $p = 0.622$, $d = 0.073$), imaginal retraining without movement condition ($n = 49$, change: 0.00 (0.00%), $p > 0.99$, $d \sim 0.000$), and imaginal retraining with movement condition ($n = 43$, change: 3.95 (improvement: 14.77%), $p = 0.139$, $d = 0.230$). Only the 3P condition lessened craving at a medium effect size ($n = 46$, change: 8.48 (improvement: 34.51%), $p = 0.003$, $d = 0.458$), which was significantly larger relative to conditions 1–3 (all $p$'s < 0.02; see online suppl. material for full data and effect sizes as well as data of the per protocol analyses, which yielded similar results). Moderation analyses (see online suppl. material) showed that participants in the 3P group with high craving benefited the most from the intervention relative to those in conditions 1–3. No moderator effects were seen based on either the AUDIT or sociodemographic factors. No adverse events were observed.

## Conclusion

Our study suggests that a combination of imaginal retraining and decoupling for BFRB called 3P (for pull-pause-push) may lead to a significant decline in immediate craving for alcohol relative to both the inactive and two of the active control conditions (the effect of 3P was also larger than in the imaginal retraining technique with movement, 34.51% versus 14.77%, but failed to reach significance). Studies on the original imaginal retraining paradigm suggest that this behavioral technique has a lasting ameliorating effect on important behavioral outcomes, particularly drinking behavior. However, the long-term effectiveness of 3P has not yet been tested. Several limitations need to be acknowledged, such as the fairly small sample size and lack of externally verified diagnoses. Future research should incorporate the preferred alcoholic beverage, clinician-rated assessments as well as laboratory parameters such as blood alcohol levels to verify responses regarding current alcohol consumption. To conclude, 3P holds promise as an intervention that may lead to a notable reduction of craving in situations where an individual's temptation to drink is strong.

## Statement of Ethics

Participants (adults ≥18 years) gave their written informed consent. The study protocol has been approved by the research institute's committee on human research (LPEK University of Hamburg, Ethics Committee; approval number: LPEK-030). The study was registered as DRKS00028199.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare. Importantly, the technique under investigation is available at no cost, precluding any financial conflict of interest.

## Funding Sources

## Author Contributions

All authors (Steffen Moritz, Anja Göritz, Josefine Gehlenborg, Simone Kühn) have contributed substantially to the manuscript and proofread and approved the final version of the manuscript. Steffen Moritz and Josefine Gehlenborg designed the study; Anja Göritz and Simone Kühn assisted with recruitment and treatment development. Their involvement fully justified inclusion as coauthors.

## Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries may be directed to the corresponding author (moritz@uke.de) who will share all data.

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