

## Process evaluation of a smartphone app (Drink Less) for reducing alcohol consumption in the UK: engagement and behavioural mechanisms of action

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**Introduction:** Drink Less is a popular, evidence- and theory-informed alcohol reduction app for adults in the UK who drink at increasing and higher risk levels. Its effectiveness was recently evaluated in a large randomised controlled trial (n=5,602) in comparison with usual digital care. Having shown that it is effective, it is now also critical to understand its mechanisms of action, or how it works, to inform and design more effective interventions. To this end, we conducted a process evaluation to assess whether participants' engagement and behavioural characteristics were mechanisms of action underpinning the effectiveness of Drink Less.

**Method:** Engagement measures consisted of (1) self-reported adherence to the recommended digital tool (Drink Less and usual digital care) reported in the baseline and 6-month surveys, and (2) frequency, amount, duration, and depth of engagement over six months from app download, collected automatically from the app (Drink Less only, n=2,788). Behavioural characteristics were motivation to drink less, urges to drink, and self-monitoring and self-regulatory behaviours, and were assessed at baseline and 6-month surveys. A series of causal mediation analyses were run to assess the potential causal mechanisms of action.

**Results:** Self-reported adherence to both digital tools was over 70% (Drink Less: 78.0%, 95% CI=77.6-78.4; usual digital care: 71.5%, 95% CI=71.0-71.9). Self-reported adherence to the intervention (average causal mediation effect [ACME]=-0.250, 95% CI=-0.42, -0.11) and self-monitoring behaviour (ACME=-0.235, 95% CI=-0.44, -0.03) both partially mediated the effect of the intervention (versus comparator) on alcohol reduction.

**Discussions and Conclusions:** Adults in the UK who drink at increasing and higher risk levels engaged frequently with the Drink Less app. Following the recommendation to use the app (self-reported adherence) and using the tracking feature (self-monitoring behaviour) of the Drink Less app appear to be important mechanisms of action for alcohol reduction.

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