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Who benefits from computer-based brief alcohol intervention? Day-to-day drinking patterns as a moderator of intervention efficacy

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ABSTRACT

Objective: to test if people with different day-to-day drinking patterns benefitted differently from two brief alcohol interventions (BAIs).
Methods: A total of 1243 job-seekers with at-risk alcohol use aged 18–64 years (64% men) were randomized to (a) intervention tailored to the motivational stage (ST), (b) non-stage tailored intervention (NST), or (c) assessment only (AO). ST and NST contained individualized computer-generated feedback letters. Follow-ups were conducted at months 3, 6, and 15. Using growth mixture models, day-to-day drinking patterns were identified based on the number of drinks consumed on each day in the week prior to baseline assessment. To test drinking pattern-specific intervention effects, zero-inflated growth models were used. Outcomes were (1) the 15-month change in the likelihood of any alcohol use and (2) the 15-month change in the total number of drinks per week when alcohol was consumed.
Results: Four day-to-day drinking patterns were found: daily medium use (2–4 drinks/day; 47%), daily low use (1–2 drinks/day; 29%), weekend only use (18%), and no use (6%). Only persons with daily low use benefitted from intervention, with higher odds of being abstinent after 15 months in the ST group compared to AO (odds ratio, OR = 1.67, $p = 0.001$) and NST group (OR = 1.43, $p = 0.035$). ST worked better among persons with daily low use compared to daily medium use (OR = 1.91, $p = 0.001$).
Conclusions: Among at-risk drinking persons with regular low-quantity alcohol use, stage tailored BAIs may be superior over no BAI and non-stage tailored BAIs.

1. Introduction

Brief alcohol intervention (BAI) is efficacious in reducing alcohol use (Alvarez-Bueno et al., 2015; Harris et al., 2014; McQueen et al., 2011). BAI has the capacity to reach a large part of the population (Freyer-Adam et al., 2016; Prochaska, 2008), if delivered proactively. That is, each person of the target population is contacted individually and offered intervention. BAI is cost-effective as well (World Health Organization, 2014). Thus, the public health impact of BAI may be quite large (Glasgow et al., 1999). However, most BAI studies found only modest effects on alcohol use (Heather, 2010). Although valuable considering population impact, the findings raise the question of how BAI efficacy can be further improved. It may be helpful to address two gaps in our knowledge on BAI: (1) appropriate target populations and (2) suitable settings where proactive BAI can be optimally delivered.

It is usually stated that BAI works well for people with at-risk alcohol use but who are not alcohol dependent (Moyer et al., 2002). People with more severe alcohol problems are expected to need more intensive care, although evidence is inconclusive (Saitz, 2010). Beyond the volume and severity of alcohol use, patterns of drinking, that is, the way alcohol is consumed, may provide a useful basis for determining target populations for BAI and should be considered when designing interventions (Rehm et al., 2003). Drinking patterns have different psychosocial determinants, e.g., drinking motives, drinking norms, and capability to change (Stimson et al., 2007), as well as different health consequences, e.g., accidents, alcohol use disorders, and cardiovascular diseases (Rehm et al., 2010). Thus, people with different drinking patterns may require different BAI approaches. A modifiable factor

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associated with different implications on how to motivate people to change is the theoretical basis upon which BAI is developed.

Suitable settings for the delivery of BAI are facilities where large proportions of the target population can be proactively approached and where the provision of BAI is feasible. So far, research on the efficacy of BAI has primarily been conducted in medical settings (Alvarez-Bueno et al., 2015; McQueen et al., 2011; Mdege and Watson, 2013). Studies in non-medical settings are rare (Heather, 2010) and there is a need for settings outside the clinic where BAI can be easily disseminated. The job agency is such a setting. Job-seekers are a hard-to-reach population. Although health problems and health risk behaviors are highly prevalent (Henkel, 2011), job-seekers are less likely to participate in intervention studies compared to wage earners (Bender et al., 2014).

In this study, job-seekers with at-risk alcohol use were explicitly targeted and received one of two BAIs or no intervention. Both BAIs were proactive and sought to reduce alcohol use by providing individualized feedback on alcohol use and its psychological determinants. The first BAI was based on the transtheoretical model of intentional behavior change (TTM, Prochaska and Velicer, 1997) and provided feedback tailored to the person's motivational stage. The second BAI was based on the theory of planned behavior (TPB, Ajzen, 1991) and feedback was independent of the motivational stage. We found that the theoretical basis upon which the BAI is developed makes a difference concerning their efficacy: While the stage tailored BAI was efficacious in reducing alcohol use among the large majority of persons in early motivational stages, the non-stage tailored BAI produced better results in people in later stages (Freyer-Adam et al., 2014). In order to further improve the efficacy of BAI, it is important to know for what kind of people the benefits of both BAIs do apply.

This study aimed to explore if people with different drinking patterns benefit differently from two theory-based BAIs. As a first step, day-to-day drinking patterns among people with at-risk alcohol use were identified empirically. As a second step, drinking pattern-specific benefits of the two BAIs were investigated. The findings can help to point out advantageous refinements in the development of theory-based BAIs.

2. Material and method

This study reports results of the randomized controlled "Trial Of Proactive Alcohol interventions among job-Seekers" (TOPAS, ClinicalTrials.gov: NCT01311245) (Freyer-Adam et al., 2014, 2011). The local ethics committee approved the study. All trial participants provided informed written consent.

2.1. Participant recruitment

The study design is described elsewhere (Freyer-Adam et al., 2014, 2011). Between July 2008 and July 2009, all 18–64 years old job-seekers in three German job agencies were proactively approached by study assistants. In Germany, unemployed people and employed people threatened by job loss or below a minimal income limit register at municipal owned job agencies for receiving unemployment benefit, health insurance coverage, career counseling, or support for job and training placement. Persons cognitively or physically incapable, already recruited during an earlier visit, with insufficient language or reading skills, and escorting persons were excluded from screening participation. Screening participants received questions on health behaviors provided by handheld computers. Those who screened positive for at-risk alcohol use but negative for particularly severe alcohol problems were asked to participate in the trial. At-risk alcohol use was determined using the Alcohol Use Disorder Identification Test-Consumption (AUDIT-C, Bush et al., 1998) and cut-off values of 4 for women and 5 for men (Reinert and Allen, 2007). Particularly severe alcohol problems were determined using an AUDIT (Saunders et al., 1993) cut-off value of 20 (Donovan et al., 2006). Trial participants received a voucher of €10 per mail.

2.2. Randomization and study groups

One third each was assigned by random and by handheld computers to one of three study groups: stage tailored BAI, non-stage tailored BAI, or assessment only control group. As described elsewhere (Freyer-Adam et al., 2014), both BAIs consisted of individualized computer-generated feedback letters and self-help manuals that were sent out by ordinary mail after baseline and 3-month assessment. The letters were created by an expert system software (Bischof et al., 2007). The software selected supportive text modules and visualized feedback based on baseline and 3-month assessment data and pre-defined selection rules. The letters included information on the limits of low-risk drinking according to the National Institute on Alcohol Abuse and Alcoholism (2010), feedback on alcohol use in comparison to other persons of the same sex and on the individual risk associated with alcohol use.

The stage tailored letters were based on the TTM (Prochaska and Velicer, 1997) and included stage-specific feedback on all dimensions of the TTM (stage of change, processes of change, decisional balance, and self-efficacy). Participants received feedback in comparison to other persons in the same stage of change and feedback on intrapersonal changes by comparing the participant's current with previous data. The letters referred to particular pages in the accompanying stage-matched manual for further information.

The non-stage tailored letters were based on the TPB (Ajzen, 1991). Assessment data on the TPB-implied determinants of intention (attitude, subjective norm, perceived behavioral control, and the according beliefs) were used to provide feedback. The feedback was independent of intention or any other TPB construct. All participants in the non-stage tailored BAI group were encouraged to fill in a when/where/how-to-change plan. The letters referred to particular pages in the accompanying non-stage-matched standard manual.

Participants allocated to assessment only received minimal assessment including socio-demographics, alcohol use, and motivational stage.

2.3. Follow-up

All study groups were followed-up 3, 6, and 15 months after baseline primarily via computer assisted telephone interview. Interviewers were blinded to group allocation and partly involved in sample recruitment 3–15 months earlier. If 10 contact attempts failed, participants were asked to fill in self-administered questionnaires. The 6-month follow-up participants received a voucher of €30 per mail. The 15-month follow-up participants took part in a lottery drawing of 20 vouchers at €50.

2.4. Participant flow

Of the job-seekers eligible for screening participation, 7920 (80%) responded to the screening (Fig. 1). Of the 7396 respondents with evaluable screening measures, 1717 (23%) screened positive for at-risk alcohol use and negative for particularly severe alcohol problems. Of these, 1282 (75%) gave informed consent and were randomly assigned to study group. The final sample analyzed in this study consisted of all participants who received their allocated treatment (n = 1243).

Of the participants who received their allocated treatment, 1054 (85%) provided data at 3-month follow-up, 1052 (85%) at 6-month follow-up, and 907 (73%) at 15-month follow-up. More detailed information can be found elsewhere (Freyer-Adam et al., 2014).

At all three follow-ups, participants who dropped out were less likely to have 12 or more years of school than those who participated ($p < 0.01$) and differed regarding recruitment site ($p < 0.05$). None of the other baseline variables was predictive for dropout.