



Effects of a stand-alone web-based electronic screening and brief intervention targeting alcohol use in university students of legal drinking age: A randomized controlled trial



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HIGHLIGHTS

- German version of the eCHECKUP TO GO was used as stand-alone intervention (e-SBI).
- Significant interaction effects were found on alcohol consumption after 3 and 6 months.
- Significant interaction effects were found on blood alcohol concentration after 3 months.
- Findings are valid for German university students of legal drinking age.

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ABSTRACT

Background: Many intervention efforts targeting student drinking were developed to address US college students, which usually involves underage drinking. It remains unclear, if research evidence from these interventions is generalizable to university and college students of legal drinking age, e.g., in Europe.

Objective: To evaluate the effectiveness of a translated and adapted version of the eCHECKUP TO GO, applied as stand-alone web-based electronic screening and brief intervention (e-SBI), in German university students at risk for hazardous drinking.

Methods: A fully automated web-based two-arm parallel-group randomized controlled trial was conducted. Participants were randomized to an e-SBI or assessment-only (AO) condition. The current paper analyzed students with baseline AUDIT-C scores ≥ 3 for women and ≥ 4 for men (sample at baseline: e-SBI [$n = 514$], AO [$n = 467$]; 3-month follow-up: e-SBI [$n = 194$], AO [$n = 231$]; 6-month follow-up: e-SBI [$n = 146$], AO [$n = 200$]). The primary outcome was prior four weeks' alcohol consumption. Secondary outcomes were frequency of heavy drinking occasions, peak blood alcohol concentration, and number of alcohol-related problems.

Results: Mixed linear model analyses revealed significant interaction effects between groups and time points on the primary outcome after 3 and 6 months. Compared to students in the AO condition, students in the e-SBI condition reported consuming 4.11 fewer standard drinks during the previous four weeks after 3 months, and 4.78 fewer standard drinks after 6 months. Mixed results were found on secondary outcomes.

Conclusions: The results indicate that evidence on and knowledge of web-based e-SBIs based on US college student samples is transferable to German university students of legal drinking age. However, knowledge of what motivates students to complete programs under voluntary conditions, although rare, is needed.

1. Introduction

Alcohol (i.e., ethanol) is a psychoactive substance with stimulant and sedative short-term effects that is consumed worldwide (Hendler,

Ramchandani, Gilman, and Hommer, 2013; WHO, 2014). It is accountable for a large number of negative health-related outcomes (Rehm et al., 2009). College students are particularly vulnerable for consumption of high quantities of alcohol and risky drinking patterns

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(Karam, Kypri, and Salamoun, 2007; Merrill and Carey, 2016; Winograd and Sher, 2015) as well as for associated secondhand consequences (Thompson et al., 2017). This applies to university and college students in the United States (White and Hingson, 2013) as well as in Europe (Wicki, Kuntsche, and Gmel, 2010).

Since many students are convinced that they do not exhibit risky drinking or drinking problems in general (Caldeira et al., 2009), computer- and web-based interventions were developed to raise awareness of drinking consequences to a broad range of students (Cronce, Bittinger, Liu, and Kilmer, 2014). This is especially true as students prefer low-threshold intervention options (Buscemi et al., 2010) that are, for the most part, anonymous (Laging et al., 2012). Terminology of those interventions overlaps, as web-based interventions vary in their nature, for example, in content and intensity (Balhara and Verma, 2016; Dedert et al., 2015). If web-based interventions involve, at minimum, a screening process and personalized feedback components, they are referred to as electronic screening and brief interventions (e-SBI; Tansil et al., 2016) or personalized feedback interventions (Cronce et al., 2014).

Current evidence on the effects of e-SBIs was summarized in a recent examination of systematic reviews of computer-based alcohol interventions for problematic alcohol use (Sundström, Blankers, and Khadjesari, 2016). Up to six months post-intervention in student populations, for instance, small and small-to-medium effect sizes were found for level of alcohol consumption, binge drinking frequency, and alcohol-related problems (Carey, Scott-Sheldon, Elliott, Bolles, and Carey, 2009; Tait and Christensen, 2010). A meta-analysis that included predominantly high-risk student samples found an overall effect of $d = 0.22$ for personalized feedback interventions without therapeutic guidance (Riper et al., 2009). Similarly, a systematic review of e-SBIs that included student and general population samples found significant reductions in weekly alcohol consumption between three months and < 12 months after intervention (Donoghue, Patton, Phillips, Deluca, and Drummond, 2014).

One established e-SBI targeting problem drinking in students is the eCHECKUP TO GO (eCHUG; Moyer, Rikard, Van Sickle, Walters, and Wilson, 2004). The eCHUG program structure uses components in the style of the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, and Marlatt, 1999; see Cronce et al., 2014) that gathers individual data about one's drinking behavior and uses established screening instruments to compile a personalized feedback on alcohol risk status as well as a personalized normative feedback (for more details, see e.g., Walters, Vader, and Harris, 2007). In contrast to mostly significant effects of the eCHUG on the drinking behavior of freshmen or mandated students for up to three months (e.g., Alfonso, Hall, and Dunn, 2012; Hustad, Barnett, Borsari, and Jackson, 2010), the only randomized controlled trial investigating the effects of eCHUG on the drinking behavior of heavy-drinking college students did not find stronger effects of the eCHUG on student drinking compared to students in an assessment-only condition (Walters, Vader, Harris, Field, and Jouriles, 2009).

Since BASICS and eCHUG were developed to address US college student samples, which usually includes underage drinking (under the age of 21; WHO, 2014), the question arises, how research evidence and knowledge are transferable, for example, to European university students (cf. Wicki et al., 2010). European students usually reach legal drinking age earlier than US students do, generally at 18 years of age or even younger at 16 years (WHO, 2014). Moreover, basic characteristics with regard to (student) cultures differ, such as school systems, student housing utilization, and fraternity or sorority engagement. However, findings on alcohol use, drinking patterns, and other influencing factors indicate similarities between US and European students with regard to prevalence, drinking motives, gender, living circumstances, and social norms (cf. Karam et al., 2007; Kuntsche, Rehm, and Gmel, 2004; Wicki et al., 2010).

Previous findings on web-based intervention effects are limited due

to the fact that the majority of research is based on (often underage) US college student samples (Balhara and Verma, 2016; Donoghue et al., 2014). The current study used the German version of the eCHUG to test the applicability of program contents on university students of legal drinking age. In order to increase research on e-SBIs for university and college student drinkers, a randomized controlled trial was conducted to test if this fully automated, stand-alone web-based e-SBI would reduce alcohol consumption in German students at risk for hazardous drinking.

2. Method

2.1. Trial design

This was a fully automated, web-based, with equal randomization, parallel-group study conducted in Germany, starting after ethical approval by the German Association of Psychology (DGPs: TH_042015_1) during the summer semester in 2015. The trial has been registered at [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT02453971).

2.2. Participants and procedure

Study invitations, sent by email to the university email addresses of students attending three southwestern German universities, directed prospective participants to the informed consent form that explained study details and design (World Medical Association, 2013). Consent was given by entering an individually chosen email address in the provided input field, to which the informed consent and the hyperlink to the study were sent by confirmation email. By activating the hyperlink, participants received a randomly generated personal identification number (ID; 20 digits) on a secure website. To provide anonymity, study data were linked to IDs, resulting in separate datasets for study data and email addresses. All participants were unknown to the study team. Following a simple randomization procedure (using the PHP-function 'rand'), participants were randomly assigned to one of two conditions (e-SBI or assessment only [AO]). Requests for participation to the follow-ups were sent to all available participants' email addresses. To compensate for participation, after completion of baseline and follow-ups, all IDs were included in a drawing to win one tablet PC and 30 vouchers worth 30 Euros each.

2.3. Interventions

Whereas participants of both conditions, the AO group and the e-SBI group, completed the questionnaires at baseline, three months, and six months, participants of the e-SBI condition were additionally requested to complete a stand-alone web-based intervention one time after the baseline assessments by directing them to the program via hyperlink. The German version of the eCHUG was used as the e-SBI. Prior to the present study, the eCHUG was translated and adapted at the Esslingen University of Applied Sciences in cooperation with the eCHUG developer team. Contents and structure of the program remained the same. The adaptation involved measures, norms, legal aspects, drug approvals, references, and comprehensibility. The intervention is designed to motivate individuals to reduce their alcohol consumption by assessing and giving feedback on their consumption levels, drinking motives, risk factors, and readiness to change. Furthermore, social norms, general aspirations and goals, illustration of expenses, and protective behavioral strategies are included within the web-based personalized feedback report. The intervention takes approximately 30 min to complete. The e-SBI was run anonymously according to its usual application.

2.4. Outcomes

All measures were self-report questionnaires. Demographic

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