Popular Online Content as a Treatment-as-Usual Control in Digital Mental Health Intervention Trials: Two Online Randomized Controlled Trials

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Abstract

Background: Treatment-as-usual (TAU) conditions are meant to reflect the support people typically receive in a treatment setting. For digital mental health interventions (DMHIs) implemented online, TAU should therefore reflect online help-seeking as usual. Mental health-related popular online content (e.g., advice TikToks, lived experience vlogs, and self-care infographics) may offer an ecologically valid basis for online TAU.

Objective: Examine if popular online content is feasible as a TAU control in DMHI trials.

Methods: In each study, participants were randomized to one of three 10-20-minute interventions. In Study 1 (n = 916), (1) a researcher-created single-session intervention (SSI) for depression and anxiety; (2) unguided web-searching for resources; or (3) a curated library of 120 pieces of annotated popular online content. In Study 2 (n = 431), (1) a single-session SSI for loneliness; (2) a curated library of popular online content related to loneliness; or (3) an attention-matched control. Participants reported treatments' credibility and expected benefit, as well as their distress (Study 1) and loneliness (Study 2).

Results: In Study 1, dropout during the treatment was 9.6% for the curated library, 25.9% for unguided help-seeking, and 4.8% for the SSI. Credibility and expected benefit for the curated library did not differ from the SSI's (d = 0.08, P = .88) and were higher than unguided help-seeking's (d = 0.23, P = .01). In Study 2, dropout was 4.8% for the curated library and 0.0% for both other conditions. Credibility and expected benefit ratings for the curated library were comparable to the attention-matched control's (d = 0.00, P > .99) but lower than the SSI's (d = 0.32, P = .02). Change in distress and loneliness over eight weeks did not differ across conditions (ds < 0.15).

Conclusions: Curated libraries of popular online content provide a valuable and fairly realistic TAU benchmark for effectiveness trials of online DMHIs. Clinical Trial: study 1: https://osf.io/3dyma and study 2: https://osf.io/nvd79

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Background: Treatment-as-usual (TAU) conditions are meant to reflect the support people typically receive in a treatment setting. For digital mental health interventions (DMHIs) implemented online, TAU should therefore reflect online help-seeking as usual. Mental health-related popular online content (e.g., advice TikToks, lived experience vlogs, and self-care infographics) may offer an ecologically valid basis for online TAU.

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Conclusions: Curated libraries of popular online content provide a valuable and fairly realistic TAU benchmark for effectiveness trials of online DMHIs.

Introduction

Research on digital mental health interventions (DMHIs) is evolving from a narrow focus on efficacy toward a broader emphasis on real-world effectiveness. To evaluate DMHIs' utility over leading alternatives, randomized controlled trials (RCTs) require credible treatment-as-usual (TAU) controls that reflect the resources participants would likely access if they did not receive a DMHI [1]. For DMHIs delivered in online settings, TAU controls should reflect resources typically used by online help-seekers (i.e., online help-seeking as usual). RCTs of online DMHIs used a variety of controls, ranging from waitlists to human-supported psychotherapy [2], but most of these controls do not

constitute TAU because they do not reflect the resources that online help-seekers actually tend to access [3].

Popular Online Content as Mental Health Support

Compared to the alternatives typical of current DMHI trial control conditions, online help-seekers are far more likely to engage with mental health-relevant popular online content. Popular online content is ubiquitous, tailored to particular audiences, and can provide valuable guidance and emotional support. As such, it may provide the basis for ecologically valid TAU (or "online help-seeking as usual") controls in trials of DMHIs.

Popular online content is online media intended for a public audience; some is created with the intent of supporting consumers' mental health, e.g., TikToks with self-care advice, ADHD infographics, and blog posts about facing anxiety. Other popular online content is not explicitly about mental health but may support relevant goals. For example, a philosophy podcast might encourage one to shift their mindset, while a favorite music video could help to regulate difficult emotions. Such content is rarely evidence-based [4], though users may view its popularity among their online peers as sufficient validation.

Some RCTs have used popular online content as a core component of experimental conditions. One trial sent participants weekly emails with psychoeducational online content related to positive psychology, including videos and blog posts [5]. Another study repurposed popular YouTube videos, articles, and infographics as stress management "microinterventions" [6]. These studies provided early evidence that popular online content can be feasible and acceptable in RCTs of DMHI. However, work is needed to learn how popular online content-based controls compare to more typical controls, and which kinds of popular online content controls best account for factors such as expectations and engagement.

Aims

In secondary analyses from two RCTs, we examined popular online content's feasibility as a TAU comparator. We evaluated popular online content-based interventions' acceptability and efficacy relative to researcher-created DMHIs and a more typical attention-matched control.

Methods

Participants

In Study 1, we recruited global participants aged 16 and older experiencing elevated depression or anxiety via advertisements on social media and the online participant recruitment platform CloudResearch Connect [7]. In Study 2, we recruited American adults experiencing elevated loneliness only via CloudResearch Connect.

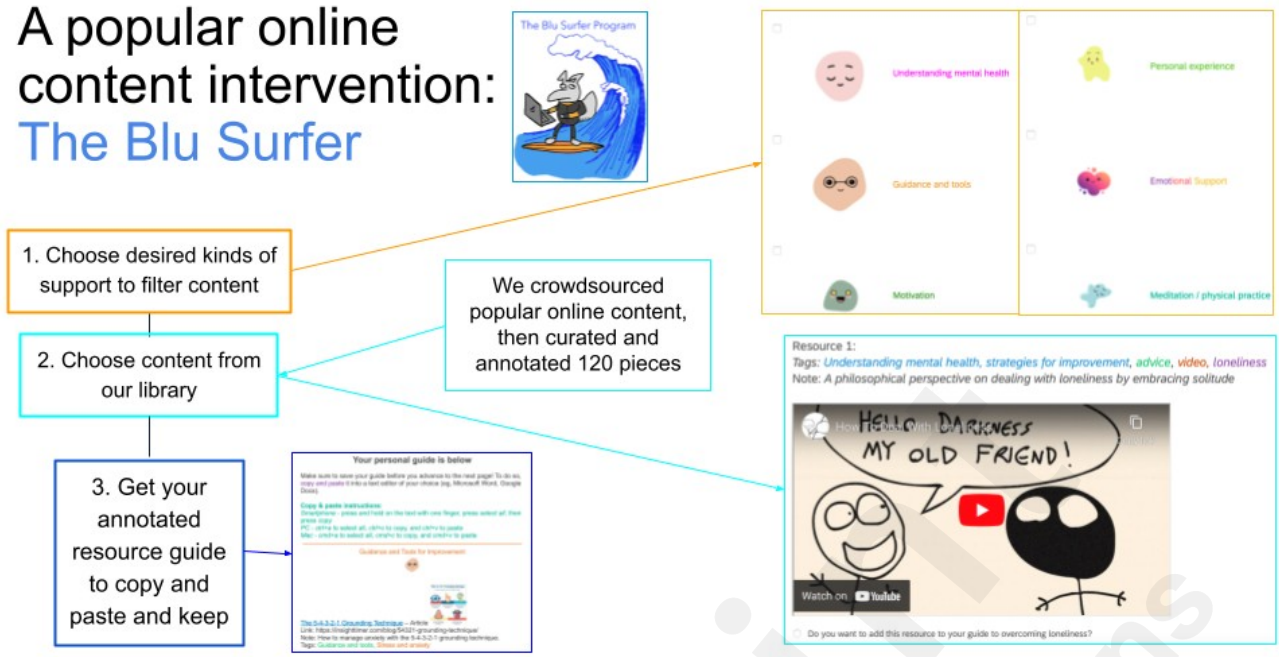
Procedure

Study 1

Participants were randomized (parallel) to one of three ~20-minute conditions (1:1:1). The first was the Action Brings Change (ABC) Project, a researcher-created digital single-session intervention (*SSI*) for depression and anxiety [8]. The second was *unguided online help-seeking*, in which participants were instructed to independently search the web for relevant popular online content and create a personal "resource guide" of links to the ones they found most helpful. The third was a *curated popular content library*, in which participants browsed up to 120 annotated pieces of popular online content and selected pieces to keep in a personal "resource guide" (See Fig. 1).

The *curated popular online content library* aimed to reflect popular online content's diversity, ensuring all kinds of participants could find content they resonated with. To create the library, we crowdsourced content from online mental health support community members and undergraduate students by asking them, "If you could link to one video, image, article, or other online content to help someone struggling with their mental health, what would you send?".

Figure 1. A popular online content-based program for overcoming distress



While *unguided online help-seeking* is a TAU for the online help-seeking context, the curated version can be seen as an enhanced TAU (E-TAU) [9]. E-TAUs include enhancements to TAU intended to focus the trial design on the question by removing variability that might interfere with or confound the outcomes. For example, primary care trials often train participating physicians uniformly to reduce variability related to physician knowledge. The curated E-TAU focuses the comparison on the production source of the intervention content (popular online content vs researcher).

Study 2

Participants were randomized (parallel) to one of three interventions (1:1:1) – 1) a digital *SSI* for loneliness [10]; 2) a *curated popular content library* with the most often chosen pieces of content from the curated library in Study 1 plus additional loneliness-related content; or 3) an *attention-matched control* that was structurally similar to the digital SSI but lacked evidence-based intervention content, the “Sharing Feelings Project” [8].

The popular online content conditions are described in more detail in pp. 79-81 of [11]. Notably, these conditions were originally conceived as active comparators rather than controls – we hypothesized that they would be more efficacious than the researcher-created SSIs. Our investigation of their suitability as an online TAU is secondary to the original framing of the studies.

Ethical Considerations

Study procedures were approved by the University of California, Irvine Human Subjects Review Board (Protocol 1253) and carried out in accordance with the World Medical Association Declaration of Helsinki. Participation was anonymous, and all procedures were conducted online, without direct contact between participants and the research team. In both studies, participants received $10.00 for their participation across a screener, intervention, four-week follow-up, and eight-week follow-up.

Measures

We measured outcomes at baseline, post-intervention, four weeks, and eight weeks. In Study 1, the primary outcome was psychological distress, measured using the total score of the Depression Anxiety Stress Scale nine-item version [12]. In Study 2, the primary outcome was loneliness, measured by the UCLA Loneliness Scale, Version 3 [13]. Both studies used the Credibility / Expectancy Questionnaire to measure how much users found the SSI credible and expected it would improve the study’s primary outcome for them [14]. Dropout was defined as leaving the study while completing the condition to which one was assigned. Additional outcomes are described in the study preregistrations.

Eligibility

To be eligible for Study 1, participants had to be fluent in English, at least 16 years old, and score at least 3 (range 0-6) on either the depression or anxiety subscale of the PHQ (4-item version), as these scores are suggestive of a depressive or anxiety disorder [15]. To be eligible for Study 2, participants had to be fluent in English, be at least 18 years old, and meet our criteria for "struggling with loneliness," meaning they indicated their loneliness was causing them distress and their score on the UCLA Loneliness Scale (3-item version) was 6 or greater [16].

Analysis Plan

We compared outcomes across conditions using ANOVAs, completion rates using chi-squared tests, and differences in change over time using linear mixed-effects regression models. The primary preregistered analysis in each study compared efficacy, while secondary preregistered analyses examined feasibility and acceptability. Analyses included all available data under missing-at-random assumptions (intent-to-treat).

Results

916 participants were randomized in Study 1 and 431 were randomized in Study 2. The studies' CONSORT diagrams are available at [17]. In Study 1, the median age was 32, 52.6% of participants identified as female, and 63.0% identified as Caucasian. In Study 2, the median age was 36, 56.1% of participants identified as female, and 68.7% identified as Caucasian. Baseline demographics are provided at [18] (Study 1) and [19] (Study 2).

Feasibility

In Study 1, the *curated popular online content library*'s average credibility and expected benefit did not significantly differ from the SSI's (d = 0.08, P = .88) but was higher than that of *unguided online help-seeking* (d = 0.23, P = .01). *Unguided online help-seeking*'s average credibility and expected benefit was lower than the SSI's (d = 0.16, P = .04). Participants were also less likely to drop out during the *curated popular content library* than *unguided online help-seeking* (9.6% vs. 25.9%, P < .001). The *curated popular online content library's dropout rate* (9.6%) was higher than the SSI's (4.8%, P = .03).

In Study 2, average credibility and expected benefit did not differ between the *curated popular online content library* and attention-matched control (d = 0.00, P > .99), and both were lower than the SSI (ds =.32 and .34, Ps = .02). The *curated popular online content library*'s dropout rate (4.8%) was higher than the other two conditions' (both 0.0%, P = .001).

Impacts on Mental Health Outcomes

Distress in Study 1 (b = -2.30; d = -0.40; P < .001) and loneliness in Study 2 (b = -6.06 ; d = -0.53; P < .001) decreased significantly from baseline to eight-week follow-up, but, over this period, study condition did not moderate change in the primary outcomes (distress in Study 1 and loneliness in Study 2); Study 1 ds < 0.15, Ps > .06; Study 2 ds < 0.12, Ps > .25. For model output and figures, see [20] for Study 1 and [21] for Study 2.

Discussion

Rigorous effectiveness trials of online DMHIs need controls approximating TAU for an online help-seeking context [3]. In secondary analyses from two RCTs, we explored the utility of mental health-related popular online content as a central feature of TAU controls. Curated libraries of popular online content (E-TAU) provided a useful comparator to researcher-created SSIs and an attention-matched control. The curated libraries outperformed unguided online help-seeking in terms of dropout and acceptability. Yet, a curated popular online content library had a higher dropout rate than the SSI and attention-matched control in Study 2, suggesting there is room to streamline these conditions. Limitations include paid samples and self-report outcomes, as well as the content libraries being culture- and time-specific.

To be considered effective in real-world settings, DMHIs intended for online implementation should be able to outperform the supportive resources people tend to access when seeking support online. Curated popular content offers a practical, ecologically valid TAU comparator that can strengthen inference in online DMHI trials.

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Conflicts of Interest
SMS has received consulting payments from Boehringer Ingelheim and Otsuka Pharmaceuticals and is a member of the Headspace Scientific Advisory Board, for which he receives compensation. BTK and DCM report no conflicts of interest.

Data Availability
We preregistered both study 1: https://osf.io/3dyma and study 2: https://osf.io/nvd79. Materials, data, and analysis code are available (study 1: https://osf.io/wfxgb/, study 2: https://osf.io/jeapc/).

Authors' Contributions
BTK designed and conducted the studies under the supervision of SMS. BTK performed the data analyses and drafted the manuscript. All authors contributed to the writing and approved the final version of the manuscript.

Abbreviations
DMHI: digital mental health intervention; RCT: randomized controlled trial; SSI: single-session intervention; TAU: treatment-as-usual

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Supplementary Files

Figures

A popular online content-based program for overcoming distress.