Adapting Behavioral Activation to Technology Platform

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**Specific Aims**

An estimated 3.1 million adolescents are diagnosed with depression (MDD) each year (SAMHSA, 2016), and adolescent onset MDD is associated with chronic physical, mental and psychosocial disability (Birmaher et al., 1996). However, over 60% of adolescents with MDD do not receive mental health care, and, among those who do, treatment engagement is low (SAMHSA, 2016; Olfson et al., 2003). Behavioral Activation (BA) is an evidence-based psychosocial intervention (EBPI) for individuals with MDD (Dimidjian et al., 2006). While BA holds promise as an effective treatment with adolescents (McCauley et al., 2015, 2016), previous research approaches have found that adolescents may be better reached and engaged through social media, mobile technologies, and other technology platforms (Boyd, 2007; Park & Calamaro, 2013). In addition, BA requires frequent interaction from patients over time, which can be difficult and costly for clinicians to administer directly. Thus, there is an opportunity to improve usability and engagement of EBPIs via new technology-based tools. Asynchronous Remote Communities (ARC) is a promising technology-based approach for engaging adolescents that capitalizes on the reach of technology while also providing support, social interactions, and motivation to engage. ARCs are technology-mediated groups that use private online platforms to deliver weekly tasks to participants and gather information about perceptions in a format that is lightweight, accessible, usable, and low burden. We aim to *test* the feasibility of an BA+ARC approach in a small feasibility study with adolescents experiencing mild to moderate depression. We propose the following specific aims:

**Study Aim: *Test* feasibility and usability with small pilot groups of adolescent and clinician target users:** Once we have a robust enough prototype of the ARC delivery platform for BA, we will conduct a small pilot study with adolescents at-risk for depression and clinicians to assess the feasibility and usability of the approach. We will collect data on the feasibility, usability, user burden, acceptability, and symptom outcomes.

This research supports the mission of the UW ALACRITY Center by combining expertise in psychology and human-centered computing to improve the usability and accessibility of an EPBI for a high need population.

**Study Protocol**

We aim to *test* the feasibility of our approach in a small feasibility and usability study with clinician and adolescent patient target users.

*Participant Recruitment:* Adolescents with PHQ-9 scores between 5 and 20 (Mild to Moderately Severe Range) who do not report current suicidality (Pine et al., 1999) will be recruited from clinician target users' practice settings. Dr. Jenness has formed recruitment relationships with primary care clinics, Seattle Children's Hospital clinics (e.g., Adolescent Medicine) and school health centers. Dr. McCauley is core faculty at the School Mental Health Assessment, Research, & Training (SMART) center with contacts at school-based mental health centers in Seattle

*Testing the Feasibility of the ARC method for Delivering a Behavioral Activation Intervention*

We will *test* the feasibility of our ARC BA approach previously in a short pilot study with a group of 10 clinicians and 10 adolescents at risk for depression (see Bhattacharya et al., 2021). This pilot study will involve recruiting a small set of participants and running a second ARC to deliver the components of the BA approach using the Slack platform. The primary goal of this pilot will be to understand the patient burden and acceptability of the approach. To assess the usability, feasibility, and burden of the ARC approach, we will administer the recommended DDBT

measures including the User Burden Scale (Suh et al., 2016) (developed by Co-PI Kientz) with both clinician and adolescent participants and the System Usability Scale with adolescent participants (Brooke, 1996). We will also administer all three subscales of the Acceptability of Intervention Measure, Intervention Appropriateness Measure, and Feasibility of Intervention Measure to assess acceptability of the BA intervention itself (Weiner et al., 2017). Although assessing patient outcomes is not the primary goal of this pilot, we will administer the PHQ-9 (Richardson et al., 2010) pre- and post-study to gather preliminary data indicating improved outcomes. To assess engagement with the platform, we will use the built-in analytics tools for the Slack application to identify the number of logins and posts per day per participant. We will also conduct semi-structured interviews with participants at the end of the ARC to understand more details on the acceptability of the approach and to understand which specific aspects and features of it were acceptable and get ideas for how the approach can be improved further. As this is a pilot analysis, we will examine outcome effect sizes and percentile cut-offs to determine acceptability, usability, feasibility of the ARC approach.

**Statistical Analysis Plan**

For qualitative interviews, the coders first read and inductively coded a part of the data (four teen-interview transcripts) line by line and wrote their codes in a cumulative document. The coders then met for weekly discussions to prepare a codebook. We distributed the weekly Slack data and interview transcripts between three coders and the remainder of the data was coded using the final codebook (Appendix C). All coders read and shared memos with each other and met for discussions to resolve discrepancies in coding. We conducted affinity modelling (Holtzblatt et al., 2004), an open-ended process by which researchers iteratively discuss and cluster data, to identify emergent themes. Three main themes emerged from our analysis. The research team further iterated on these themes through discussion and while writing. We summarize the results focusing on the insights we gained for iterating on our design below and a detailed empirical analysis can be found in (Bhattacharya, 2020, Chapter 5).

To provide descriptive characterization of our sample, we calculated average scores of PHQ-8 pre- and post-study. We calculated an average score for each item of the Acceptability, Intervention Appropriateness, and Feasibility of Intervention Measure for the clinician group and teen group, respectively. For the User Burden Scale (Suh et al., 2016), we computed average scores of teens and clinician groups separately across each of the 6 constructs – physical, mental & emotional, time & social, financial, difficulty of use, and privacy. In the IUS, items are rated on a Likert scale from 0 (strongly disagree) to 4 (strongly agree), with half of the items reverse-scored (Lyon, Pullman, et al., 2020). A total score is normally calculated by multiplying the sum of these scores by 2.78 (range: 0-100). Drawing parallels from scoring the system usability scale (SUS), above a 68 would be considered above average and anything below 68 is below average (Lewis, 2018).

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**Appendix B.1. Consent/assent form for adolescent participants**

HUMAN CENTERED DESIGN & ENGINEERING
UNIVERSITY of WASHINGTON

# Design study to support mental health management for adolescents

**Researchers:**
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## Purpose of our research study

Hi! We are asking you to be in a research study because we are trying to learn more about how we can design tools to support mental health management for teenagers . The aim of this study is to get your feedback on an online application for mental health management to design better tools for collaborating with peers and clinicians to manage mental health.

### Eligibility

You are eligible to participate if you are between 13 and 19 years of age.

### Study Tasks

If you agree to be in this study, you will join an online group on Slack (slack.com) with 5-10 other teenage and mental health clinician participants for 8 to 10 weeks. We will ask you to do the following tasks:

1. We may ask you to fill out an online survey with questions about your experiences with mood and navigating mental health.

2. You will participate in a **private online group** on Slack (slack.com) to try out an application designed to support mental health. You can use this application privately and have the option to participate and share in the online group with other teenagers and clinicians for up to 8-10 weeks. In this group, you will participate in the following:

    a. **Discussions:** We will ask you to respond in comments after watching videos or reading articles related to stress and depression and share photographs/videos to share your challenges, strengths, and ideas on mental health management.
    b. **Try out the application, share ideas and feedback:** We will post weekly activities to try out different functions of the online application (e.g., logging mood and activities, planning goals for mental health, and working through barriers). You will be asked to provide feedback on these ideas (privately or you can choose to share on the group).
    c. **Option to share with others on the group:** You will have the option to anonymously share your activities with other teens and clinicians on the group

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and get their insights on your activities such as planned goals, challenges, and weekly mood charts.

*For this activity, please note that:*
(A) The apps you are asked to use may consume your data/battery;
(B) Any information entered into those apps may become available to the app developer per the applications' terms of service;
(C) Your participation in this activity will be voluntary and we will not require/request you to pay for any apps/technologies.

You may share your thoughts on the above with the group in comments or posts. Alternatively, you may send us private messages, and we can post on your behalf if you wish to not disclose who you are or do not want to share with the group at all.

Please note that you may be withdrawn from the online group if you do not abide by the guidelines of the online group.

3. On completion of activities, we will ask you to **fill out another online survey where you can give us your feedback** on the activities you did in the group.

4. At the end of 8-10 weeks or when you choose to withdraw from the study, or if and when you are withdrawn from the online group, you may be asked to **interview** with us one on one to share your own experiences. If you continue in the study and/or group, you may continue in the same group or be enrolled in a different group to continue activities for up to one year. You will have the option to exit the study at any point.

## Benefits of This Study

We hope that sharing your experiences and feedback will be beneficial towards discussion among the group about this important topic and spreading knowledge about stressors for teenagers and families. It will also help build better tools for supporting stress management but the tools will not be ready in this study so you won't be able to use them during the study. On completing the study each week, you will receive **$10-$20 in gift-cards** depending on the time of the activities ($10 for 20 minutes of activity time).

## Confidentiality of Research Information

We will copy/download and take notes on data from the online group, such as text in comments, images from what you post in online groups, and emails or private messages you send us for the study. We will audio record phone calls and interviews by notifying you and asking your permission and transcribe the recordings. When we save the data, we will use pseudonyms (false names) without any identifiable information. All data including: audio recordings; images and text from comments, posts, and private emails and messages; survey responses; and transcripts from interviews, will be stored on a password-protected, secured server and will be kept private to the level required by law.

It is possible that emergencies may occur during the study that you may disclose to us. We cannot promise to keep the information secret.

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**There are two exceptions to confidentiality:**

First, if we learn that **you are being actively abused or neglected or have been abused or neglected in the past**, we are required to report this information to the proper authorities, such as your local Child Protective Services. We will try to inform you and a trusted adult in your network before we report this information to DSHS, but no matter what, we would report within your state's required reporting window. Study materials might be court ordered for use in custody or other court hearing if that happens. The researcher will make every reasonable effort to protect the confidentiality of the information, though it is possible that a civil or criminal court might demand the release of the material obtained.

Second, **if we learn that you might harm yourself or another**, we must report that information to the proper authorities. If we learn that you might harm yourself we will inform an adult in your network (information requested below) and work with you and them to ensure that a safety plan is in place.

If you are experiencing thoughts of suicide or are in situations of abuse, you can let us know. We can provide you with resources to reach out to for seeking support. There is help available (see section on Adverse Events below). If someone else in the group is expressing concerns of suicide or other distress that makes you uncomfortable, and/or you have concerns on how to address or respond to such concerns, please also let us know on email or through private message. This information will also be posted within the online group information/guideline section.

*Government or university staff sometimes review studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk of harm.*

## Risks, Stress, or Discomfort

While on the study, the risks are:
The risk of emotional distress from discussing sensitive topics.
The risk of possible loss of confidentiality in the online group.

In order to minimize these risks, you may choose the extent to which you participate in discussions in the online group. You may discontinue the study at any time.

You may choose to allow the use of quotations or images from your contributions to the discussion in publications or presentations of this work, below. While not sharing content with others outside of the group is a group guideline, ultimately, you will not be able to control other group members' use of the content posted to the group. We encourage you to review Facebook/Slack's privacy settings and terms of use before beginning the study and ask us any questions you may have.

If you experience any emotional distress, please let us know and we can provide you with information about available resources and counselling services you may contact at your discretion. The online posts are not monitored 24/7 and members of our research team will review them once per business day. In the event that you reach out to the moderators/research

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team online, **please note that it may be one day (on weekdays) or up to 3 days (if you reach out on Friday/holidays) before you receive a response.**

## Adverse Events and Emergency

**If you feel unsafe or in crisis, you may contact for free for professional help:**

- Teen Link (6-10pm): **1-866-833-6543**, https://866teenlink.org/
- Crisis Text Line number: **741741** text START or HELP
- Crisis clinic (24x7): call **206-461-3222**
- NATIONAL SUICIDE LIFELINE **1-800-273-TALK**
- Immediate physical threat or medical emergency: **911**

**If you don't want to be in the study**, you don't have to participate. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop. Not participating will also not affect your relationship with the University of Washington or your relationship with your mental health care team or clinic in any way.

**Source of Funding**

The study team and the University of Washington is receiving financial support for this study from the Department of Human Centered Design and Engineering.

**Research-Related Injury**

If you think you have been harmed from being in this research, contact Jessica Jenness at jennessj@uw.edu or 206-616-7967 or Julie Kientz at jkientz@uw.edu.

You can ask any questions about the study. If you have a question later you can contact Jessica Jenness at jennessj@uw.edu or 206-616-7967.

After you read this information and decide whether or not to participate, please indicate your decision by clicking on "I agree" or "I disagree" at the bottom and submitting the form. You will be emailed a copy of this form after you have agreed to be a part of the study.

## Participant's' statement:

This research has been explained to me. I have had a chance to ask questions. If I have more questions, I can ask the researcher.

I agree/I disagree to participate in this study.

I agree/disagree that my deidentified quotes may be used for publications, media articles, and conference presentations.

I agree/disagree that my deidentified images may be used for publications, media articles, and conference presentations.

**Please provide us contact information of an adult we can reach out to during medical emergency:**

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Whom to contact during emergency: _____

Phone number of contact person: _____

If I have questions about my rights as a research subject, I can call the University of Washington's Human Subjects Division at (206) 543-0098 or call collect at (206) 221-5940.