

Study Protocol

The proposed study will examine the question of whether phobic individuals will use a mobile phone in self-directed exposure therapy. A second question is whether phobic participants will find the use of a mobile phone as an acceptable means of conducting self-directed exposure therapy.

Accompanying these two research questions are additional specific hypotheses. The first hypothesis is that filmed exposure stimuli, available on a mobile phone, will be associated with greater fear reduction in a self-directed exposure group relative to a control group. The second hypothesis is that greater presence will be reported with first-person perspective versus third-person perspective.

Method

Experimental Design

A three-group by two-assessment mixed prospective design will be used in this study. Participants will be randomly assigned to the order of each group and condition. See *Figure 1* for flowchart of the proposed study.

Participants

G*Power 3, a power analysis program, developed by Faul, Erdfelder, Lang, and Buchner (2007), was used to determine sample size. In order to achieve a power of $\phi = .80$ with two measurements and three groups at a medium effect size of .25, the analysis suggests a total sample size of at least 36 participants. Inclusion for participation will include fluency in the English language, being 18 years of age or older, own or have access to a mobile phone, and report discomfort with dental related care. The participants will receive a compensation of \$40.00 upon completion of the study. This study will adhere to the guidelines presented by the

American Psychological Association for treatment of human research participants. In order to participate, subjects will be required to sign an informed consent statement that will be approved by the West Virginia University Institutional Review Board.

Apparatus

Physiological Data Acquisition. A computer installed with DATAQ data acquisition recording software controls a Coulbourn Instrument no. S75-01 High Gain Bioamplifier/Coupler in order to filter and amplify electrocardiogram (ECG) data, which is used to obtain heart-rate. A Schmitt trigger apparatus, including a #551-12 Dual Retriggerable One-Shot and CI #S21-06 Bipolar Comparator, will be used to detect an R wave during recording of ECG data. Participants will have three Ag/AgCl electrodes attached: one below the right clavicle, one below the left clavicle, and one on the left torso (i.e., below the rib cage) as a ground. The electrodes are equipped with adhesive ends and are filled with a NaCl .05 molar solution. Beats per minute (bpm) are transformed from the recorded interbeat intervals.

Access to exposure materials. The self-directed exposure will be provided to the participants via Qualtrics, which is an online website designed to conduct research. Qualtrics is available to use on mobile devices, which will be utilized by the researchers. The participants will be given an ID and password to log into Qualtrics, and the assigned IDs will be used to differentiate the participants. Before and after each exposure video, the participants will rate distress on the Subjective Units of Distress Scale (SUDS; Wolpe, 1973). Participants will complete the SUDS on their mobile phones that will be accessing the Qualtrics website. The rating of SUDS and participants' total time spent on each webpage will be collected and stored on Qualtrics, which will be available for the researcher to download at a later time. Participants will receive daily text messages as a reminder to conduct the exposure session.

Self-Report Measures

Demographic and general dental information questionnaire. See appendix A for specific questions related to demographics and general dental information. The questionnaire will consist of 20-items asking about the participants' age, sex, ethnicity, yearly income, education, employment status, transportation to the dentist, and dental related experiences.

Anxiety and Related Disorders Interview Schedule for DSM-5-Adult Version (ADIS-5). The ADIS-5 is a structured interview conducted by trained professionals that diagnosis current DSM-5 anxiety disorder, however, only the specific phobia section will be used in this study. Previous versions (i.e., ADIS, ADIS-R, & ADIS-IV) have demonstrated good psychometric properties (Brown, Di Nardo, Lehman, & Campbell, 2001; Di Nardo, Moras, Barlow, Rapee, & Brown, 1993). For the current study, The ADIS-5 will be conducted by clinicians in training, and be used in order to describe the study's sample.

Subjective Units of Distress Scale (SUDS; Wolpe, 1973). The SUDS is a visual analog scale in which the participants rate their anxiety/fear based on a range between 0 (*no anxiety/fear*) and 100 (*very severe anxiety/fear*). Refer to appendix B. A SUDS rating will be collected at the end of each video segment, reflecting maximum distress experienced during the viewing. An average of maximum distress ratings will be calculated for all segments viewed at a single time.

Dental Fear Survey (DFS; Kleinknecht, Klepac, & Alexander, 1973). The DFS consists of 20 self-report items that measure anxiety in regard to dental situations. Refer to appendix C. The measure examines physiological and behavioral responses to specific dental circumstances and situations, and contains three subscales. The subscales assess dental avoidance and anxiety, fear of dental stimuli/procedures, and arousal associated with dental

treatment. The DFS is rated on a 5-point Likert-type scale assessing how much of the responses (i.e., behavioral & physiological) occur in dental situations or the level of anxiety felt within the specific situations. The DFS has a total score of 100, and higher scores reflecting more anxiety felt with dental care-related fear (Kleinknecht et al., 1973).

DFS scores reflect general dental care-related fear and anxiety. The DFS has been widely utilized in behavioral dentistry research due to low demand on the participant in regard to time and cognitive requirements. The specific situations allow for individually measuring the participants' dental care-related fears. Furthermore, the DFS has demonstrated reliability (test-retest $r = .88$) and validity (α 's ranging from 75 to 95; McGlynn, McNeil, Gallagher, & Vrana, 1987; Smith & Moore, 1995; Heaton, Carlson, Smith, Baer, & Leeuw, 2007).

IGroup Presence Questionnaire (IPQ; Schubert, Friedmann, & Regenbrecht, 2001).

The IPQ is a 13-item questionnaire that measures the subjective report of *presence* within a virtual environment. Refer to appendix D. Three subscales make up the IPQ: spatial presence, involvement, and realness. The IPQ is rated on a Likert-type scale ranging from 0 to 6, and contain a variety of anchors (e.g., *fully disagree* to *fully agree*, *not at all* to *very much*).

Psychometrics for the IPQ has been demonstrated to be sound, and the factor structure, across many samples, has been replicated (Schubert et al., 2001).

Abbreviated acceptability rating profile (AARP; Tarnowski & Simonian, 1992).

The AARP consists of 8-items that assess acceptability of treatment. Refer to appendix E. Items are rated on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Good psychometrics have been demonstrated with the AARP (Cronbach's alpha ranging from .93 to .97; Caporino & Karver, 2012; Tarnowski & Simonian, 1992). The AARP was slightly modified to fit the current study.

Dental Behavior Avoidance Test (DBAT). In a laboratory furnished to exemplify a dental operatory, the DBAT will be conducted, consistent with prior research by McNeil, McGlynn, Cassisi, and Vrana (1989). The DBAT will consist of eight steps that simulate a dental examination, and each step will last up to 60 seconds. Escape from, or avoidance of, each step will be allowed, and will constitute a measure of escape/avoidance (i.e., total number of seconds of escape/avoidance behavior). A researcher will portray the dentist, and an undergraduate research assistant will portray the dental assistant. A maximum-distress SUDS rating will be reported by the participants at the end of each step of the DBAT. Throughout the procedure, participants' heart rate will be measured using a computer that controls a Coulbourn Instrument to measure ECG data. A four minute baseline will be recorded prior to the start of the DBAT. Before initiating the next step in the procedure, there will be a 60 second baseline recording.

Procedure

The participants in the study will be recruited through advertisements in local newspapers, posted flyers on the campus of West Virginia University, and advertised on Craigslist (e.g., a website that provides services/goods). Upon arrival to the study, participants will be given a written informed consent form and information on study procedures. The researchers will discuss the process of the study and what is expected of the participant. The participants will be informed that they will receive \$40.00 for compensation at the completion of the study. After agreement to enlist in the study and completion of the ADIS-5, the participants will be randomly assigned to group (i.e., 2-week waitlist or treatment group) by previously prepared sealed opaque envelopes, complete the demographic questionnaire, conducted the DBAT, and answer the DFS. The researchers will then provide a 15-minute demonstration on how to conduct self-directed exposure therapy on the participant's mobile phone, and how to rate

SUDS. The researchers will describe that watching the exposure video three times per day is the ideal, one time per day is the suggested minimum, and viewing the exposure video five times per day is the suggested maximum.

The video will display a typical preventive visit to the dentist, including walking into the dental office, being called back for treatment by the dental assistant, sitting in the dentist chair, and seeing the dentist perform a teeth cleaning. The video will be 15-minutes in length, and be recorded by the researchers in both first- and third-person perspective. The actors in the video will be confederates and have knowledge about the purpose of the video. The actors in the video are from the School of Dentistry at West Virginia University.

Participants in the treatment group will receive daily text messages as a reminder to conduct the exposure. Participants will be asked to follow the link and sign in each day with their mobile phones. Before each exposure video, the participants will rate expected distress on the SUDS. Then the participants will be asked to watch a video depicting dental care-related phobic material. After viewing the exposure video, participants will rate actual distress experienced on the SUDS. The participants will then be prompted to watch the video again. If the participant decides to view the video again, they will go through the same procedure of pre-rating fear and anxiety, watching the video, and post-rating fear and anxiety. Finally, the participants will be prompted to complete the procedure once more. After completing the procedure three times, the participants will no longer be prompted, however, they have the ability to complete the procedure two more times if they so desire.

The participants in the treatment group will be randomly assigned by previously prepared sealed opaque envelopes to video content (i.e., first- or third-person perspective). After 1-week of first or third video perspective, the participants will be assessed by the researcher via

telephone. Questions on the PQ and the DFS will be answered by the participants. After the assessment, participants in the first-person perspective will be informed that the video content will change to third-person perspective. Participants in the third-person condition will be informed that the video content will change to first-person perspective. At the end of the two weeks, participants will be asked to return in person for a follow-up and to receive \$40.00 compensation. The follow-up assessment will consist of the DBAT, completing the DFS, answering the PQ, and rating acceptability of using a mobile phone as a mean of self-directed exposure.

The control group will be assessed on the DFS after one week via telephone. After the two weeks the participants in the control group will be asked to return for a follow-up assessment and receive \$40.00 compensation. The assessment will consist of the same as the treatment group. At the follow-up session, participants in the control group will be offered the same treatment, for ethical reasons, as the experimental group, however, the data will not be analyzed.