A randomized trial of brief online interventions to facilitate treatment seeking for social anxiety

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Abstract

Objective: This study developed and evaluated a brief, single-session online intervention designed to facilitate treatment seeking among adults with clinically significant social anxiety (SA) symptoms, who generally seek treatment at exceptionally low rates.

Method: Adults ($N = 267$) reporting significant SA symptoms were recruited online and randomized to a brief, single-session online intervention: *Education* consisted of brief psychoeducation and treatment resources, or *Education+Motivation* which added treatment seeking-focused motivational content adapted from Motivational Interviewing and Acceptance and Commitment Therapy. Attitudes, intentions, perceived control, and treatment seeking were assessed at Pre, Post, and one-month follow-up (FU).

Results: Both interventions were feasible (90% completion) and improved all outcomes. At FU, 70% reported engaging in 1 or more SA treatment-seeking behaviors. *Education+Motivation* was more effective than *Education* at improving treatment-seeking attitudes and behaviors.

Conclusions: A brief online intervention with educational and motivational content is a promising direction for promoting treatment seeking for adults with SA symptoms.

Keywords: social anxiety disorder; internet; values; motivation; acceptance and commitment therapy; motivational interviewing

A Randomized Trial of Brief Online Interventions to Facilitate Treatment Seeking

for Social Anxiety

Social Anxiety Disorder (SAD) represents one of the most prevalent psychological

disorders, with US lifetime prevalence estimates ranging from 5-12% (Grant et al., 2005; Kessler

et al., 2005). SAD often causes substantial distress, impairment, and diminished quality of life

(Stein & Stein, 2008), even at subthreshold levels (Fehm, Beesdo, Jacobi, & Fiedler, 2008). The

disorder typically onsets during childhood or adolescence (Grant et al., 2005), runs a chronic

course if untreated (Bruce et al., 2005), and confers risk for mood (Stein et al, 2001) and

substance use disorders (Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007), causing negative

effects across the lifespan.

Fortunately, effective treatment for SAD is available. Cognitive-behavioral therapy

(CBT) and its variants demonstrate strong efficacy (e.g., Craske et al, 2014; Hofmann & Smits,

2008), as do selective serotonin reuptake inhibitors (SSRIs) (van der Linden, Stein, & van

Balkom, 2000). However, many consider CBT the first-line treatment (Mayo-Wilson et al, 2014)

due to lower side effects risk (Hansen et al., 2008) and most patients' preference for

psychological over pharmacological treatment (McHugh, Whitton, Peckham, Welge, & Otto,

2013).

Despite the existence of effective treatment, most affected adults never seek or receive

any SAD treatment (Keller, 2006). The minority who do seek treatment for SAD wait a median

of 16 years after disorder onset (Wang et al., 2005a) and only 38% of adults receiving past-year

SAD treatment received a minimally adequate dose or duration of treatment (Wang et al, 2005b).

Furthermore, few adults with anxiety disorders receive CBT, particularly CBT that includes

exposure (Wolitzky-Taylor, Zimmerman, Arch, De Guzman, & Lagomasino, 2015), which is

generally considered the most effective component of CBT for anxiety disorders (see Glenn et al., 2013). In summary, most adults with SAD do not receive any treatment for their disorder, much less gold-standard evidence-based psychotherapy.

We highlight three key facets underlying SAD's particularly low rates of help-seeking, with the first two reflecting issues of mental health literacy (MHL; Jorm et al., 1997). When low, MHL impedes mental health treatment seeking (Jorm, 2012). First, there are both general and SAD-specific barriers to seeking treatment (Chartier-Otis, Perreault, & Bélanger, 2010; Griffiths, 2013; Olfson et al., 2000). Prominent SAD-specific barriers include poorer recognition of SAD as a mental disorder than other anxiety or mood disorders (Coles, Schubert, Heimberg, & Weiss, 2014), and viewing SAD as an untreatable part of one's personality (see Ruscio et al., 2008). Low recognition of SAD is problematic because failing to identify a mental disorder where one exists generally results in lower treatment seeking (Jorm, 2012). A critical second facet is knowledge of the existence of effective treatments, including exposure-based CBT. Many community adults have not heard of exposure therapy, and providing brief online education about it vastly increases their willingness to try it (Arch, Twohig, Deacon, Landy, & Bluett, 2015). Taken together, we argue that increasing MHL (i.e., disorder recognition and treatment education) is crucial for increasing SAD treatment seeking behavior.

Additionally, we posit that *values-based motivation* (e.g., motivation based on who and what one most cares about) may represent a third facet of help-seeking behavior in SAD, in that symptoms of SAD often negatively impact domains that are personally valued, such as personal relationships, education, and work. Clarifying values and leveraging them to increase motivation and commitment to align behavior with one's values is a central focus of both Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Motivational Interviewing

(MI; Miller & Rollnick, 2002). Motivation may be particularly critical for treatment seeking in

SAD because the very symptoms of SAD (e.g., fear of talking with strangers or authority figures,

initiating or maintaining conversations, or revealing one's personality) present barriers to seeking

treatment (Brown & Barlow, 2014; Moscovitch, 2009). Strong, personally relevant motivation

may therefore be needed to overcome these barriers – as has been shown in the parallel literature

on treatment seeking in substance use disorders (Lundahl & Burke, 2009). Further support for

use of a motivational enhancement approach to increase treatment seeking arises from recent

studies showing that briefly affirming values led to more positive beliefs and intentions about

seeking counseling (Lannin,Vogel, & Heath, 2017; Seidman et al, 2018). Likewise, motivational

enhancement was indicated as a frequent component of interventions that improved youths and

adolescents' expectations of treatment (Becker, Boustani, Gellatly, & Chorpita, 2018). Thus,

converging evidence across developmental stages suggests that motivational enhancement

techniques are well-suited for the task of improving socially anxious adults' beliefs about and

intentions toward seeking treatment.

A review of randomized clinical trials (RCTs) that target treatment-seeking in general

suggests that psychoeducation and personalized feedback alone are usually insufficient to impact

treatment seeking behavior (Gulliver, Griffiths, Christensen, & Brewer, 2012). Enhancing

motivation to seek treatment holds promise for increasing the potency of such interventions.

Although ACT has not been used to enhance motivation for anxiety disorder treatment, it has

been successfully used to increase motivation and behavioral compliance with a challenging

medical rehabilitation treatment that suffers from very low compliance rates (Nelson et al.,

2019). Motivational enhancement may also have lasting effects on anxiety-related treatment

behavior, supported by the finding that MI before treatment facilitated subsequent CBT

engagement and outcomes for anxiety disorders (Westra, Arkowitz, & Dozois, 2009; Westra &

Dozois, 2006). In terms of socially anxious adults that have not yet sought treatment, a small

randomized controlled trial (RCT) (*N* = 27) by Buckner and Schmidt (2009) showed that

participants who received Motivational Enhancement Therapy (MET; Miller, Zweben,

DiClemente, & Rychtarik, 1992), a three-session, face-to-face intervention based on MI (Miller

& Rollnick, 2002), were significantly more likely to attend a CBT appointment by follow-up

compared to those who received brief personalized SAD feedback and psychoeducation. MET

also more robustly increased participants' confidence that they could change their anxiety-related

behavior, their willingness to attend CBT, and their interest in being contacted by a therapist.

However, the very small sample size and need for intensive resources (3.5 hours of individually

delivered MET) indicate a need for larger studies evaluating more scalable interventions.

Further, a recent large (*N* = 186) RCT comparing pretreatment MI (prior to CBT) versus

supportive counseling for adults presenting at a clinic for SAD treatment showed mixed results

(Peters et al., 2019). MI led to increased self-reported CBT homework completion, and for

participants with higher functional impairment, superior improvements to SAD symptoms.

However, session attendance and clinician-rated homework completion did not differ. Further,

there was some evidence that MI has a detrimental impact on self-reported SAD symptom

severity for those already high in change readiness. Again, both treatments were delivered in

three one-hour individual sessions. Thus, more work is needed to develop scalable motivational

intervention delivery, assess treatment seeking outcomes (as opposed to treatment outcomes

from those already enrolled in or seeking treatment), and reach patients who are not already

presenting for treatment.

  Online interventions represent a promising format for interventions promoting treatment

seeking in SAD, as they are scalable and can reach individuals who have not yet presented for treatment. An online format may help reduce the SAD-specific barrier of fear of direct contact with strangers or authority figures (e.g., therapists). Moreover, online interventions may reach individuals with SAD "where they are", as SAD symptoms correlate with a preference for online interaction (Caplan, 2007) and individuals with elevated social anxiety symptoms are overrepresented on online platforms such as Mechanical Turk (MTurk; Shapiro, Chandler, & Mueller, 2013). To date, one small known trial has tested an online intervention to increase treatment seeking in SAD (Griffiths, Walker, & Batterham, 2017). They found that an online session of psychoeducation plus one MI exercise, compared to an attention-matched control, improved attitudes and perceived need for, but not intentions for, seeking SAD treatment. As the study did not follow participants post-intervention, however, it could not assess treatment-seeking behavior. Thus, online psychoeducation with minimal motivational content for SAD appears to be helpful for changing treatment seeking attitudes but not intentions, and impact on actual treatment seeking behavior has not been tested. More robust motivational content may be needed to create enduring effects that impact behavior.

The Current Study

There thus remains a dearth of knowledge regarding how best to improve treatment seeking knowledge, motivations, and especially behavior for socially anxious individuals. We aimed to address this gap by developing, refining, and evaluating in an RCT, two brief, online interventions for improving these outcomes among adults reporting clinically significant social anxiety symptoms. This online approach is well-matched to socially anxious individuals' preferences and behavior (Caplan, 2007; Shapiro et al., 2013) and the current circumstance of global quarantine and social distancing measures due to COVID-19.

The interventions addressed two barriers to SAD treatment seeking: (1) the gap in MHL (i.e., awareness of SAD as a psychological disorder and knowledge that effective treatment exists), and (2) the gap in understanding how to change SAD treatment seeking attitudes, perceived behavioral control/confidence in one's ability to pursue treatment, behavioral intentions, and actual treatment-seeking behaviors. Our approach in examining these outcomes is informed by a widely used model of behavior change, the Theory of Planned Behavior[1] (TPB; Ajzen, 1991).

We thus developed and refined two single-session online interventions targeting MHL and MHL + motivation respectively: (1) *Education,* consisting of brief psychoeducation about SAD symptoms and CBT for SAD, along with information and guidance for locating treatment resources, and (2) *Education+Motivation,* consisting of *Education* followed by a brief motivation intervention within the same session. We aimed to examine the effect of the same psychoeducation content with and without additional motivational enhancement content. Importantly, we examined impacts on actual treatment seeking behavior as well as on motivation, in contrast to substantial prior work examining only treatment motivation or readiness. *Motivation* content was adapted from two traditions with empirical support for facilitating behavior change in a manner that emphasizes personally meaningful values and goals: MI/MET (Miller & Rollnick, 2002; Lundahl and Burke, 2009) and ACT (Hayes, Strosahl, & Wilson, 1999). Given brief online delivery, we did not aim to deliver full MI/MET or ACT, but rather to design online motivational exercises based on MI/MET and ACT principles.

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[1] We considered basing our intervention on another such model of behavior change, the Transtheoretical Model (TTM)/Stages of Change Model (Prochaska & DiClemente, 1983). However, research has challenged the validity of sequential movement through the TTM stages (e.g., Littell and Girvin, 2002), including relevant previous studies (Buckner and Schmidt, 2009; Maltby and Tolin's, 2007) that found group differences in treatment-seeking behavior in the absence of differences in TTM stages. We thus focused on the TPB as a better-matched model of behavior change within the current context.

This randomized trial evaluated the following *a priori* indices of feasibility and acceptability: (a) ability to recruit online the targeted sample size of socially anxious adults for the trial (see *Power Analysis*) and retain at least 70% through 1-month follow-up (FU), (b) have the majority of participants attend to content and adequately complete the online interventions, and (c) have participants report at least moderate satisfaction with the interventions (operationalized as a mean of 2.83 on the modified Client Satisfaction Questionnaire-8 at Post).[2] The clinical trial also evaluated the following efficacy hypotheses: (a) both interventions would improve treatment seeking attitudes, behavioral intentions, and perceived behavioral control from Pre to Post and with gains maintained at FU, but *Education+Motivation* would lead to greater improvement than *Education*; and (b) *Education+Motivation* would improve SAD treatment seeking behavior by FU more than *Education* alone, though this was exploratory as the study was not fully powered to detect change in behavior.

Method

Participants

We recruited a U.S. sample of socially anxious adults ($N = 267$) online through Amazon Mechanical Turk (MTurk) between June and August 2016. A brief description of our study, expected duration, and study payment were presented alongside other MTurk tasks and studies (see *Supplemental Materials* for additional MTurk recruitment and compensation details). Chandler and Shapiro (2016), including empirical work by Shapiro and colleagues (2013), demonstrate that MTurk-recruited research study participants are similarly honest, attentive, and

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[2] See *Method* for details. Mean of 2.83 or higher corresponds to a score indicating that neutral or positively valenced choices were selected on all items (note: only one item offered a neutral choice; five offered only negative or positive).

reliable compared to non-MTurk samples, and that MTurk is particularly well suited to reaching

populations with social anxiety symptoms.

Of these participants, 195 completed the one-month FU. Eligibility criteria included (1)

high social anxiety, per scoring >30 on the Social Phobia Inventory (SPIN; Connor et al., 2000),

(2) age 18 or older, (3) fluent in English, (4) not currently enrolled in CBT, bibliotherapy, or

online treatment for social anxiety, (5) did not indicate that they would "never consider"

treatment for social anxiety on a screener (see below), and (6) on MTurk: had a 95% or greater

HIT approval rate, had not attempted to do the study previously (enforced using TurkGate), and

were listed as U.S. residents. Participants resided in diverse locations across the U.S. (see

Supplemental Figure 1) and ranged in age from 18 to 66 (see *Table 1* for additional

sociodemographic and baseline clinical characteristics). Figure 1 presents a CONSORT diagram.

Design

This study was an RCT comparing two single-session online interventions: *Education*

versus *Education+Motivation.* Outcomes were assessed at Pre (prior to randomization), Post

(immediately following the intervention) and FU (one month after Post). The study was

approved by the University of Colorado Boulder Institutional Review Board and all participants

provided informed consent. The study was retroactively registered on ClinicalTrials.gov

(identifier NCT04196296) and early documentation of study hypotheses is available upon

request in the form of a dissertation proposal that was presented and defended to the dissertation

committee.

Procedure

Recruitment and Screening

Interested MTurk participants completed a screening consent followed by a brief

screening survey (below). Eligible participants were provided with study details and invited to

voluntarily provide informed consent; once consented, they completed a demographic survey.

Participants began the study one week later and at that point were randomized 1:1 to condition,

allowing for 1) re-administration of the SPIN to assure that scores remained above cutoff, and 2)

minimization of post-randomization attrition in MTurk, per recommendation of experts in

MTurk research ("Assessing Attrition Bias", 2013; J. Chandler, personal communication, May

2016). Participation was discontinued for individuals whose SPIN scores did not remain above

eligibility threshold at re-administration ($n = 65$; Figure 1). There were no significant differences

on sociodemographic variables between participants who began the second screen ($n = 334$) and

those who did not respond to the invitation for the second screen ($n = 85$) (see *Supplemental*

Materials for full statistical reporting).

Online Intervention Session

The interventions were implemented using Qualtrics. Exercises were highly interactive

(e.g., write-in responses, drag and sort, rank order) both to increase engagement and as an

attention/manipulation check. Participants in both conditions were first informed that their

responses indicated clinically significant social anxiety symptoms. At the end of both

interventions, all participants received identical treatment referral information (see *Referral*

Information). The following subsections describe the intervening content by condition.

Education. Education included descriptions of social anxiety symptoms/SAD and CBT

for the treatment of social anxiety, interactive exercises to reflect on symptoms and promote

engagement, and referrals to various forms of CBT treatment (see *Referral Information*). Median

time to complete the Education condition was 37 minutes ($M = 41$, $SD = 16$ minutes)[3].

Education+Motivation. In addition to the same *Education* content, this condition

included interactive MI/MET- and ACT-style exercises that drew on participants' personal

reflections and experiences. Exercises included reflecting on personal values and how untreated

SAD symptoms intruded on living aligned with those values, considering benefits and barriers to

seeking treatment, and weighing the roles of short- versus long-term challenges and goals in

considering treatment seeking. MI/MET and ACT exercises were adapted from previous

interventions (see *Supplemental Materials*). Intervention content was further refined according to

feedback from participants in two rounds of pilot testing on MTurk (see *Supplemental Materials*

for details). The median *Education+Motivation* condition duration was 69 minutes ($M = 77$, *SD*

$= 30$ minutes)[4]. Additional information regarding intervention content can be found in

Supplemental Table 1.

Referral Information. At the end of both interventions, participants received identical

referral information for evidence-based treatment, which included general resources and specific

recommendations for finding in-person, book-based, and online CBT treatments appropriate for

participants living in locations throughout the U.S., national mental health emergency hotlines,

and brief guidance (e.g., "what to expect"). Attention to referral information was enforced by a

required minimum time duration spent on the page (determined per pilot testing, below) before

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[3] There were two participants whose intervention duration exceeded 200 minutes, indicating a high likelihood that the intervention session was not completed in a single sitting (i.e., without a same-day break). We therefore excluded these participants from the duration descriptive statistics but included them in all subsequent analyses, as completion with break did not violate study procedures.

[4] See previous footnote. Six participants were excluded from the Education+Motivation duration descriptive statistics (only) due to durations exceeding 200 minutes.

being able to advance to the next page, and self-report (via checkbox: "I certify, honestly, that I have read this page").

Follow-Up Session

One month after Post, all participants who completed the online intervention session were sent a message through MTurk inviting them to participate in the FU session within the next week. Up to three additional messages were sent within the week to non-responders. The FU session lasted approximately 20 to 30 minutes and consisted of re-administering the outcome measures.

Timing of participant flow through the study is depicted in *Supplemental Figure 2*. Direct contact between study personnel and participants occurred only in rare cases when answering logistical questions (e.g., clarifying how to access study links) via email.

Measures

Screener and Basic Clinical Characteristics

At Pre, the 17-item SPIN (Connor et al., 2000) assessed social anxiety symptoms including fear, avoidance, and physiological symptoms, baseline $\alpha = .82$. A cutoff of 19 has been previously shown to distinguish individuals with SAD from non-clinical and clinical non-SAD samples (Connor et al., 2000). We used a conservative eligibility cutoff of 30+ based on prior SAD research (e.g., Moscovitch, Rodebaugh, & Hesch, 2012; Moser, Hajcak, Huppert, Foa, & Simons, 2008). To characterize the sample more fully, participants also completed the following two well-accepted measures of broad anxiety and depression symptoms (respectively) at Pre: The Overall Anxiety Severity and Impairment Scale (OASIS; Norman, Hami Cissell, Means-Christensen, & Stein, 2006), Pre $\alpha = .62$; and The Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), Pre $\alpha = .86$. The order of Pre measures was randomized to

reduce order effects.

Feasibility and Acceptability Measures

In addition to recruitment and retention rates, we tracked attention to intervention content via attention checks and careful visual examination of written responses. We also employed the Client Satisfaction Questionnaire (CSQ-8; Attkisson & Zwick, 1982) at Post ($\alpha = .89$) to assess acceptability.

Motivation for Treatment

No established measures based on the TPB have been developed for mental health treatment seeking. We thus built on Kwan and Bryan's (2010) application of the TPB (Ajzen, 1991) to measure a specific domain of behavior, as well as common approaches for assessing TPB variables of attitudes, perceived behavioral control, and behavioral intentions (Fishbein & Ajzen, 2010), to measure these variables in the context of SAD treatment seeking. We also followed recommendations for assessing complex behaviors such as treatment seeking (A. Bryan, personal communication, April 2016; Griffiths, 2013) by including in the intentions and perceived behavioral control scales each preparatory "step" of the treatment seeking process rather than simply "seeking treatment" (specific steps were drawn from Coles, Turk, Jindra, and Heimberg (2004)'s identification of "critical points" in the "path to initiation of treatment" for social anxiety (see *Supplemental Materials* for items). Thus, we thoughtfully built upon both previous measurement approaches for adapting TPB to a specific domain and expert recommendations for assessing the behaviors involved in treatment seeking.

Attitudes. Participants evaluated their attitudes toward seeking treatment for social anxiety according to seven semantic differential scale items (e.g., "harmful"/"beneficial"). The

complete scale is available in the *Supplemental Materials*. All responses were combined to compute a total score for use in analyses. Cronbach's α's = .88 - .91 across timepoints.

Intentions. Participants rated their degree of intention to seek treatment for social anxiety within the next month on one to seven Likert scales. Items assessed intentions for each recommended treatment modality (in-person therapy, bibliotherapy, online). In addition to the items assessing each preparatory step in the treatment seeking process (see above), we included one general item and one item assessing medication, resulting in 13 total intentions items (see *Supplemental Materials*). Medication was included because it is another evidence-based treatment for social anxiety. However, it was not included in the total score as it was not specifically recommended by the intervention. For the total score (in-person therapy, bibliotherapy, and online therapy) Cronbach's α's = .94 - .96 across timepoints.

Perceived Behavioral Control. Participants rated their degree of perceived ability to engage in treatment seeking for social anxiety within the next month with 14 items on a one-seven Likert scale (see *Supplemental Materials*). Items paralleled the behavioral intentions items (i.e., each step within each treatment modality assessed separately) plus three "general" items to assess perceived behavioral control in the face of barriers, which is theoretically relevant to ACT principles. Cronbach's α's = .94 - .95 across timepoints.

Behavior

We adapted previously established questionnaire items from Buckner and Schmidt (2009) to assess treatment seeking since the intervention (see *Supplemental Materials* for items), resulting in a checklist of 10 sequential treatment seeking "steps" (listed in *Supplemental Table 2*). Behavior was assessed at FU to allow time for treatment seeking to occur. Behavioral outcomes included the grand total and within-treatment category sums of steps taken.

Exploratory Outcomes

Those who took any steps toward seeking treatment were asked *when* they took the first step toward each endorsed category (i.e., same day as the online intervention, within two days of the intervention, within [1, 2, 3, or 4] week(s) of the intervention), and whether the treatment was "CBT or related" ("yes," "no," or "unsure").

Data Processing and Statistical Approach

Prior to analysis, participant data was attention-checked via visual examination of written responses and systematic examination of self-report questionnaire data. Per Figure 1, six participants were removed for blatantly inappropriate responses to open-ended questions (e.g., responding "I'm bored" to a question about social anxiety). One participant was removed for content-invariant responding on questionnaires.

Analyses were performed using R and SPSS. To evaluate condition differences in demographic and clinical measures at Pre, we used univariate ANOVAs for continuous variables, chi-squared tests for categorical variables and Wilcoxon-Mann Whitney tests for ordinal variables. Chi-squared tests examined condition differences in attrition at each study step following randomization and logistic regression examined whether client satisfaction with the interventions predicted likelihood of attrition. Linear regressions tested condition differences in intervention satisfaction and treatment seeking behavior at FU.

To analyze treatment seeking motivation outcomes (attitudes, intentions, and perceived behavioral control), we constructed multilevel models evaluating condition differences over time in outcomes (e.g., condition by time interactions in predicting outcomes) using the R *lmerTest* package (Kuznetsova, Brockhoff, & Christensen, 2017). Predictors included the main effects of condition and time (Pre, Post, FU) and their interaction. Linear and quadratic effects of time

were evaluated via contrast coding and random effects were allowed to covary. Two-level

multilevel models were used to account for motivation outcomes measurements nested within

participants by estimating a random intercept and random slope of time for each participant.

These models were also run with orthogonal contrast codes for time that specifically evaluated

Pre to Post and Post to FU condition differences in outcomes. Effect sizes were estimated for

time by condition interactions according to the method described by Feingold (2009) for

multilevel models.

Power Analysis

The study was powered to detect condition differences in change over three time points in

the treatment seeking motivational outcomes (i.e., the condition by time interactions). Although

the study assessed treatment seeking behavior at FU, it was not fully powered *a priori* to detect

condition differences in this FU outcome[5].

As approaches for conducting *a priori* power analysis for multilevel models remain

debated and typically require estimation of numerous parameters (Hox, 2010) that were

unknown for the present study, we conducted an *a priori* power calculation using G*Power

(Faul, Erdfelder, Lang, & Buchner, 2007) by conservatively assuming a repeated-measures

analysis of variance design to estimate the necessary sample size. To detect a small-to-medium

effect size ($d = .3$) with a two-tailed significance level of .05, at 95% power, a total of 116

participants (58 per group) were required at FU. Prior research on MTurk using multiple time-

points (Chandler & Shapiro, 2016) suggested that we recruit at least 30% more participants to

account for attrition. We thus conservatively planned to enroll another 50 participants to account

for attrition and incomplete or unusable data, resulting in a minimum target sample size of 166

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[5] To detect a medium effect size ($d = .3$) independent samples group difference with a two-tailed significance level of .05 at 80% power would require a total of 352 participants (176 per group) at follow-up.

participants beginning the intervention. As clinical samples can accrue quickly on MTurk

(Chandler & Shapiro, 2016), we kept the study open for a set period of time (16 days), during

which we permitted the sample size to exceed this minimum. Once the final sample size was

known, we conducted *post hoc* power analyses for the multilevel models using the R package

SIMR (Green & MacLeod, 2016), which are presented in the *Supplemental Materials*.

Results

Sample Characteristics

Table 1 presents the baseline demographic and clinical data for participants who

completed the online intervention session. There were no condition differences in age, gender,

race/ethnicity, education, income, depression (PHQ-9), overall anxiety (OASIS), or social

anxiety symptoms (SPIN), ps $\geq$ .09. However, the *Education+Motivation* condition reported

higher household income than the *Education* condition (Table 1), Wilcoxon-Mann Whitney $U =$

6207.00, $p = .05$, $r = .02$. As income can be associated with treatment seeking in anxiety

disorders (Wang et al., 2005b), we included it as a covariate in subsequent analyses[6]. To account

for SAD symptom severity, we also included Pre SPIN score as a covariate.

Attrition

As depicted in Figure 1's CONSORT diagram, more participants initiated but did not

complete the *Education+Motivation* intervention (11%) than the *Education* intervention (3%), χ^2

$= 4.63$, $p = .03$, Cramer's $V = .12$, likely due to its longer length. However, the groups did not

differ in attrition from Post to FU, $\chi^2 = 0.25$, $p = .62$, Cramer's $V = .02$.

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[6] We reconducted all analyses without income as well. Between group results remained unchanged for attitudes, perceived behavioral control, and intentions, and remained in the same direction and approached significance ($p = .08$) for treatment-seeking behavioral steps.

Feasibility and Satisfaction Outcomes

Feasibility

The data indicated that it was feasible to use MTurk to recruit and retain participants.

Within the 16-day recruitment period, the study's recruitment goal was exceeded. Data quality

was high; only seven participants were removed due to inadequate or inappropriate responding

(per extensive visual inspection of responses, see above). We retained 73% of participants from

randomization through FU (see Figure 1), approximating the ~70% retention rate in other MTurk

psychology research (see Chandler & Shapiro, 2016). Post-randomization attrition was

minimized by the additional eligibility assessment session (see *Method*), as 65% occurred prior

to randomization. As noted earlier (see *Recruitment and Screening*), attrition between the first

and second screening was not predicted by sociodemographic characteristics.

Satisfaction

Participants were generally satisfied with the intervention, as assessed by the CSQ-8 at

Post ($M = 3.07$, $SD = 0.46$) and FU ($M = 2.86$, $SD = 0.61$), with no condition differences at Post,

$t(237) = 1.11$, $p = .27$, $\eta_p^2 = .005$. Satisfaction at Post did not predict the likelihood of attrition

prior to FU, $b = 0.31$, $p = .40$, $z = 0.85$. However, at FU, those in the *Education+Motivation*

condition ($M = 2.98$, $SD = 0.55$) reported greater satisfaction than those in the *Education*

condition ($M = 2.73$, $SD = 0.64$), $t(191) = 3.07$, $p = 0.002$, $\eta_p^2 = .05$.

Treatment Seeking Outcomes

Attitudes

Overall, attitudes toward SAD treatment seeking increased significantly over time from

Pre through FU both linearly, $b = 0.27$, $t(229.94) = 3.31$, $p = .001$, and quadratically, $b = 0.23$,

$t(238.40) = 6.93$, $p < .001$, see Figure 2. We decomposed the quadratic effect by examining

change from Pre to Post and Post to FU. Pre to Post differences revealed condition differences

for improvement in attitudes, $b = 0.48$, $t(239.00) = 9.167$, $p < .001$, $d = 0.33$ CI$_{95\%}$ [0.15, 0.51],

such that attitudes improved more in the *Education+Motivation* (Pre: $M = 4.47$, $SD = 1.17$; Post:

$M = 5.14$, $SD = 1.17$), $b = 0.67$, $t(239.00) = 8.98$, $p < .001$, than the *Education* condition (Pre: M

$= 4.64$, $SD = 1.11$; Post: $M = 4.93$, $SD = 1.23$), $b = 0.29$, $t(239.00) = 3.96$, $p < .001$. Attitudes

somewhat decreased from Post to FU overall, $b = -0.21$, $t(224.53) = -2.87$, $p = .005$, $d = -0.18$

CI$_{95\%}$ [-0.30, -0.06], and there was no difference in this decrease between conditions

(*Education+Motivation* FU: $M = 4.99$, $SD = 1.18$; *Education* FU: $M = 4.65$, $SD = 1.27$), $b = .05$,

$t(224.51) = 0.34$, $p = .74$.

Intentions to Seek Treatment

Per Figure 3, treatment seeking intentions improved over time from Pre through FU, both

linearly, $b = 0.22$, $t(219.12) = 2.51$, $p = .01$, and quadratically, $b = 0.42$, $t(230.46) = 11.27$, $p <$

.001. Conditions did not differ in the linear or quadratic change in intentions over time (p's $>$

.15) but did show marginally different rates of change from Pre to Post, $b = 0.24$, $t(239.00) =$

1.88, $p = .06$, $d = 0.18$ CI$_{95\%}$ [0, 0.36], such that intentions improved more in the

Education+Motivation (Pre: $M = 2.80$, $SD = 1.39$; Post: $M = 3.66$, $SD = 1.50$), $b = 0.86$,

$t(239.00) = 9.41$, $p < .001$, than *Education* condition (Pre: $M = 2.75$, $SD = 1.35$; Post: $M = 3.37$,

$SD = 1.54$), $b = 0.61$, $t(239.00) = 6.85$, $p < .001$. Intentions significantly decreased from Post to

FU across both conditions, $b = -0.51$, $t(211.82) = -6.70$, $p < .001$, $d = -0.34$, CI$_{95\%}$ [-0.43, -0.24],

and there was no difference in this decrease between conditions (*Education+Motivation* FU: $M =$

3.19, $SD = 1.47$; *Education* FU: $M = 2.93$, $SD = 1.51$), $b = -0.05$, $t(211.80) = -0.32$, $p = .75$.

Perceived Behavioral Control

Per Figure 4, perceived control over SAD treatment-seeking behavior improved over time

from Pre through FU, both linearly, $b = 0.46$, $t(225.99) = 4.91$, $p < .001$, and quadratically, $b =$

0.14, $t(241.16) = 3.44$, $p < .001$. However, conditions did not significantly differ in the linear or

quadratic effect of time (p's $> .30$). Perceived control improved from Pre to Post, $b = 0.44$,

$t(239.00) = 7.03$, $p < .001$, but this effect did not differ significantly by condition

(*Education+Motivation:* Pre: $M = 4.05$, $SD = 1.46$; Post: $M = 4.55$, $SD = 1.46$; *Education:* Pre:

$M = 3.98$, $SD = 1.31$; Post: $M = 4.35$, $SD = 1.38$), $b = 0.14$, $t(239.00) = 1.10$, $p = .27$, $d = 0.10$,

$CI_{95\%}$ [-0.08, 0.28]. There was no significant change in perceived control from Post to FU

(*Education+Motivation* FU: $M = 4.63$, $SD = 1.46$; *Education* FU: $M = 4.33$, $SD = 1.36$), $b =$

0.02, $t(227.11) = 0.21$, $p = .83$, $d = 0.01$, $CI_{95\%}$ [-0.11, 0.14].

Treatment-Seeking Behavior

Overall, 70% of participants at FU reported taking at least one step toward seeking

treatment for their social anxiety. The median time to taking the first treatment-seeking step was

within one week of completing the intervention. At FU, participants in the

Education+Motivation condition took significantly more treatment-seeking steps ($M = 2.37$, SD

$= 2.15$) than those in the *Education* condition ($M = 1.84$, $SD = 1.99$), $F(1, 191) = 4.13$, $p = .04$,

$\eta_p^2 = .02$ $CI_{90\%} = [.00 .07]$. Descriptive statistics for participants' reported steps taken toward

different types of treatment-seeking behavior are presented in *Supplemental Table 2*. Overall,

alternative treatments (44.10% took first step), bibliotherapy (38.46% took first step), and online

treatment (30.77% took first step) appeared more common, with a smaller portion of participants

taking steps toward seeking in-person therapy (17.44% took first step).

Discussion

To our knowledge, this study represents the first investigation of an online intervention to

facilitate treatment seeking for SAD symptoms and the largest randomized trial to date to

evaluate a treatment seeking intervention for adults with significant anxiety symptoms of any type. The data supported the study hypotheses regarding online recruitment and intervention feasibility and acceptability. The findings also supported the interventions' initial efficacy at improving treatment-seeking attitudes, intentions, perceived control, and behavior. Finally, the data found partial support for hypotheses regarding differences between conditions, with differences in attitude change toward treatment and actual treatment-seeking behavior favoring the *Education+Motivation* condition over *Education*-only.

The online intervention appeared feasible and acceptable. Specifically, we readily recruited a large sample of socially anxious adults and retained 70% from randomization through FU. The vast majority attended to intervention content, completed their assigned intervention, and reported at least moderate satisfaction at Post.

The intervention efficacy hypotheses were also largely supported, in that treatment seeking attitudes, behavioral intentions, and perceived behavioral control improved from Pre to both Post and FU across conditions. Thus, the interventions succeeded in improving motivation to seek treatment, and these improvements were largely still apparent at FU one month later. Regarding group differences, attitudes toward seeking treatment were improved more by the *Education+Motivation* condition than by *Education* alone, although improvement across both conditions declined slightly by one-month FU. Behavioral intentions to seek treatment increased only marginally more through Post by the *Education+Motivation* condition than the *Education* condition, and this difference did not endure through FU. Finally, increases in perceived behavioral control did not differ between conditions, possibly indicating that this variable was affected by the provision of practical referral information common across both conditions,

whereas attitudes and to a lesser extent behavioral intentions were affected by exercises unique

to the *Education+Motivation* condition.

Finally, the interventions and particularly the *Education+Motivation* intervention

successfully increased treatment seeking behavior. Most participants took at least one step

toward seeking treatment for social anxiety in the month following completion of the

intervention. The exploratory hypothesis was supported in that participants in the

Education+Motivation condition took more steps toward treatment seeking than participants in

Education alone. This difference reflected a small to medium effect size, and included steps

taken toward treatment in general rather than only those specifically recommended by the

intervention. Whether the interventions increased CBT-seeking behavior specifically is

unknown, as many participants were uncertain whether the treatment they sought was CBT (see

Supplemental Table 3). Future research should consider a stronger focus on distinguishing

seeking CBT from less evidence-based forms of therapy for SAD, such as general supportive

therapy, perhaps by providing more examples of CBT content and strategies. In addition,

condition differences in intervention satisfaction favoring the *Education+Motivation* condition

emerged at FU, perhaps because these participants had taken more steps toward treatment.

Comparison to Existing Literature

In their pilot study ($N = 82$) of psychoeducation plus motivation versus attention control

online interventions, Griffiths and colleagues (2017) similarly found that the psychoeducation

plus very brief motivation condition led to greater improvement in treatment seeking attitudes

and MHL than the attention control condition. However, they did not follow participants beyond

Post and thus did not assess treatment-seeking behavior. Intentions to seek treatment for SAD

also improved in their study but did not significantly differ by condition – paralleling the current

study's finding. The present study differs however, in that it was much larger, evaluated

participants at FU, and found differences in treatment seeking behavior and marginal post-

intervention differences in treatment seeking intentions.

This study is consistent with Buckner and Schmidt's study (2009) in that both found that

motivational interventions were effective at increasing treatment-seeking for SAD or social

anxiety symptoms. Their study was embedded in a clinic and the outcome was attending a CBT

appointment in that clinic for SAD. Their intervention's higher intensity, potency, and

directedness reflect its multi-session, individual, one-on-one sessions with mental health trainees

and use of on-site treatment referrals. The present study thus extends their findings by using a

single-session online intervention within a larger online sample, increasing the intervention's

reach and scalability. The present study also had better retention at follow-up despite Buckner

and Schmidt's substantially higher compensation. These differences are perhaps in part due to

the facilitative effect of the online format for socially anxious individuals in particular, which is

congruent with Shapiro and colleagues' (2013) finding that adults with clinically noteworthy

social anxiety were less comfortable disclosing clinical information in-person than less socially

anxious individuals, but no less comfortable disclosing online.

The current study's findings cannot be directly compared to Peters and colleagues'

(2019) large RCT ($N = 186$) of MI versus supportive counseling pretreatment for adults

presenting at a clinic for CBT treatment of their SAD, given our focus on treatment seeking

rather than CBT outcomes and use of a sample not already presenting for SAD treatment. Still,

we highlight their findings that MI facilitated SAD symptom improvement amongst those higher

in functional impairment but dampened improvement amongst those higher in change readiness.

Motivational interventions are perhaps best matched to getting socially anxious individuals to

seek treatment (per the present study and Buckner & Schmidt, 2009) and after they have

committed to treatment, to individuals with more functional impairment (per Peters et al., 2019).

Our findings also generally align with Gulliver and colleagues' (2012) review of

randomized interventions aiming to facilitate mental health help seeking in general samples and

Brijnath, Protheroe, Mahtani, and Antoniades's (2016) review of online interventions to improve

MHL. However, they found that psychoeducation was insufficient to improve help seeking

behavior whereas we found that most participants reported taking at least one step toward

treatment seeking even in the *Education* only condition.

Study Strengths, Limitations, and Future Directions

The present study's brief, single-session, and online nature enhances its potential for

scalability, dissemination, and cost efficacy. Recruiting and intervening online appears to be a

good match for socially anxious adults, given their fears of live social interaction but not of

online interaction, and their strong presence online, including on MTurk (Caplan et al., 2007;

Shapiro et al., 2013). The present study's brevity and lack of contact with providers, though

strengths from a scalability perspective, may have nonetheless limited the current intervention's

power to impact behavior change. The current use of broader referrals rather than connecting to

providers at a specific clinic enhanced applicability across varied U.S. locations (see

Supplemental Figure 3) and the ability to seek preferred forms of treatment. Still, future

iterations should consider more geographically or personally tailored approaches to treatment

referral to simplify the process of seeking in-person therapy.

The two interventions were not matched for length of contact, given our aim to conduct a

study examining the respective contribution of treatment seeking motivational enhancement

content over and above psychoeducation, which was held constant between the two conditions.

This trial is similar in design both to dismantling trials as well as to hundreds of others in which

both conditions have access to usual care (paralleling psychoeducation in the current trial) but

only one is given the intervention of interest (motivational enhancement in the current trial). Like

all such trials, condition differences should be interpreted with some caution as the effect of

motivational content is confounded with prolonged participation. That stated, the conditions

were both matched for being delivered entirely online without provider contact. Further, the

current comparison is externally valid, as the *Education* condition was designed to reflect what a

patient might hear from an informed provider about treatment options, thus reflecting usual care

for individuals examining potential treatment for social anxiety. Still, future work should unpack

the respective contributions of content and length of contact.

      Likewise, the lack of a no-intervention control condition limits our ability to conclusively

state that treatment seeking behavioral steps were induced by the interventions as opposed to by

the passage of time. However, poor recognition of SAD as a disorder and as a treatable condition

and low awareness of effective treatments (Coles et al., 2014; Ruscio et al., 2008), very low rates

of SAD-focused treatment seeking generally (Iza et al., 2013), and among the minority who seek

treatment for SAD, a median of 16 years before treatment (Wang et al., 2005a), renders this

explanation unlikely. Contradicting these findings, this explanation would imply that individuals

with significant SAD symptoms are indeed aware that their symptoms are treatable and are likely

to spontaneously begin seeking treatment despite not seeking treatment prior (a study inclusion

criteria). Though unlikely, to definitively rule-out such interpretations, future work in this

domain would benefit from including a no-intervention control condition.

      Several additional factors limited our study. First, the findings must be contextualized by

our recruitment of an incentivized participant sample. However, as noted, research reviewed by

Chandler and Shapiro (2016), including empirical work by Shapiro and colleagues (2013), illustrates that MTurk workers are comparably honest, attentive, and reliable compared to non-MTurk samples, and that MTurk is well suited to reaching populations with clinically relevant symptoms. Second, we relied on self-reported SAD symptoms for study eligibility, and thus cannot fully generalize our findings to those with SAD based on diagnostic assessment. However, we used a conservative, frequently used cutoff on a measure that correlates well with SAD diagnosis. Third, the study was not fully powered to detect changes in behavior at follow-up and was not powered to test for group differences in specific treatment modalities (e.g., in-person therapy vs. bibliotherapy vs. alternative treatments). Additionally, despite our large sample size compared to existing literature, *post hoc* power analyses (see *Supplemental Materials*) suggested that our multilevel models only achieved 60-72% power to detect linear (Pre vs. FU) change in outcomes. Thus, larger future studies are warranted. Similarly, the popularity of bibliotherapy and alternative treatments warrants further study, particularly in light of the fact that the data were collected several years ago and the coronavirus pandemic may have further increased many people's openness to online and bibliotherapy treatment options. The cost-effectiveness, flexibility, independence, and lack of requiring in-person contact of bibliotherapy may have appealed to participants. Lastly, the study was only retrospectively registered on ClinicalTrials.gov, as preregistration was not standard practice for internally funded studies at the time of data collection.

This study was in some ways also constrained by limitations in the field, as the literature lacked a single comprehensive measure of motivation for treatment seeking. We drew from existing data and theory by adapting established measures to this specific type of behavior. Similarly, the central theoretical model on which to base treatment seeking interventions is

underdeveloped (Gulliver et al., 2012), highlighting the need to identify specific modifiable

barriers to treatment seeking in SAD.

Summary and Conclusions

To our knowledge, this is the largest randomized study to date to evaluate the

acceptability, feasibility, and initial efficacy of an anxiety-focused treatment seeking intervention

(relative to an education-only intervention control) and the first to use online interventions to

facilitate treatment seeking for adults with significant social anxiety symptoms. The promising

findings align with recent recommendations to employ online modalities and direct-to-consumer

strategies to improve treatment dissemination generally (e.g., Gallo, Comer & Barlow, 2013;

Kazdin & Blase, 2011). This study provides a promising approach for addressing barriers to

treatment seeking for socially anxious adults and warrants a larger trial that is powered to detect

change in distinct forms of treatment seeking and to clarify the intervention's broader public

health potential.

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Table 1

Post-Intervention Sample Characteristics: Demographic and Baseline Clinical Variables

|	Education + Motivation (*n* = 119)	Education (*n* = 122)	Total sample (*n* = 241)	Between group comparison		
		Mean (*SD*) or *n* (%)		Test statistic	*p*	η_p^2 or Cramer's *V*
Demographic						
Age (years)	34.44(10.38)	33.23 (10.16)	33.83 (10.26)	0.91	.36	η_p^2 = .003
Gender				4.93	.18	*V* = .14
Male	31 (26.05%)	39 (31.97%)	70 (29.05%)			
Female	85 (71.43%)	82 (67.21%)	167 (69.29%)			
Transgender & Non-Binary	3 (2.52%)	1 (0.82%)	4 (1.66%)			
Race/Ethnicity				6.07	.30	*V* = .16
White/Caucasian	98 (82.35%)	91 (74.59%)	189 (78.42%)			
Black/African-American	9 (7.56%)	7 (5.74%)	67 (27.80%)			
Hispanic/Latino(a)	2 (1.68%)	8 (6.56%)	10 (4.15%)			
Asian/Asian-American/ Pacific Islander	5 (4.20%)	10 (4.15%)	15 (6.22%)			
Native American/Alaskan Native	1 (0.84%)	2 (1.64%)	3 (1.24%)			
Biracial	4 (3.36%)	4 (3.28%)	8 (3.32%)			
Highest Education				4.80	.57	*V* = .14
Some HS	0 (0%)	2 (1.64%)	2 (0.83%)			
HS diploma/GED	10 (8.40%)	14 (11.48%)	24 (9.96%)			
Some college	34 (28.57%)	39 (31.97%)	73 (30.29%)			
2-yr college degree	14 (11.76%)	12 (9.84%)	26 (10.79%)			
Bachelor's degree	45 (37.82%)	42 (34.43%)	87 (36.10%)			
Graduate degree	16 (13.45%)	12 (9.84%)	28 (11.62%)			
Other	0 (0%)	1 (0.82%)	1 (0.41%)			
Household Income[a]				6207.00	.05	*r* = .02
< $10,000	2 (1.68%)	16 (13.11%)	18 (7.47%)			
$11,000 - $20,000	16 (13.45%)	11 (9.02%)	27 (11.20%)			
$21,000 - $30,000	18 (15.13%)	17 (13.93%)	35 (14.52%)			
$31,000 - $40,000	17 (14.29%)	15 (12.30%)	32 (13.28%)			
$41,000 - $60,000	18 (15.13%)	32 (26.23%)	50 (20.75%)			
$61,000 - $80,000	17 (14.29%)	12 (9.84%)	29 (12.03%)			
$81,000 - $100,000	17 (14.29%)	7 (5.74%)	24 (9.96%)			
$100,000 - $150,000	10 (8.40%)	9 (7.38%)	19 (7.88%)			
> $150,000	4 (3.36%)	3 (2.46%)	7 (2.90%)			
Clinical Characteristics	Mean (SD)					
SPIN	46.85 (8.51)	46.96 (8.27)	46.90 (8.38)	-0.10	.92	η_p^2 < .001
OASIS	1.93 (0.64)	2.05 (0.62)	1.99 (0.64)	-1.43	.16	η_p^2 = .008
PHQ-9	1.21 (0.63)	1.29 (0.72)	1.25 (0.68)	-0.86	.39	η_p^2 = .003
Baseline Medication Status						
For social anxiety	15 (12.61%)	12 (9.84%)	27 (11.20%)	0.46	.50	*V* = .03
For other mental health	15 (12.61%)	12 (9.84%)	27 (11.20%)	0.46	.50	*V* = .03

Note. Post-intervention sample includes all participants who were randomized to condition and successfully completed intervention session. T-tests were used for continuous data, chi square for categorical, U for ordinal. [a] Wilcoxon-Mann Whitney test used due to ordinal nature of the variable.
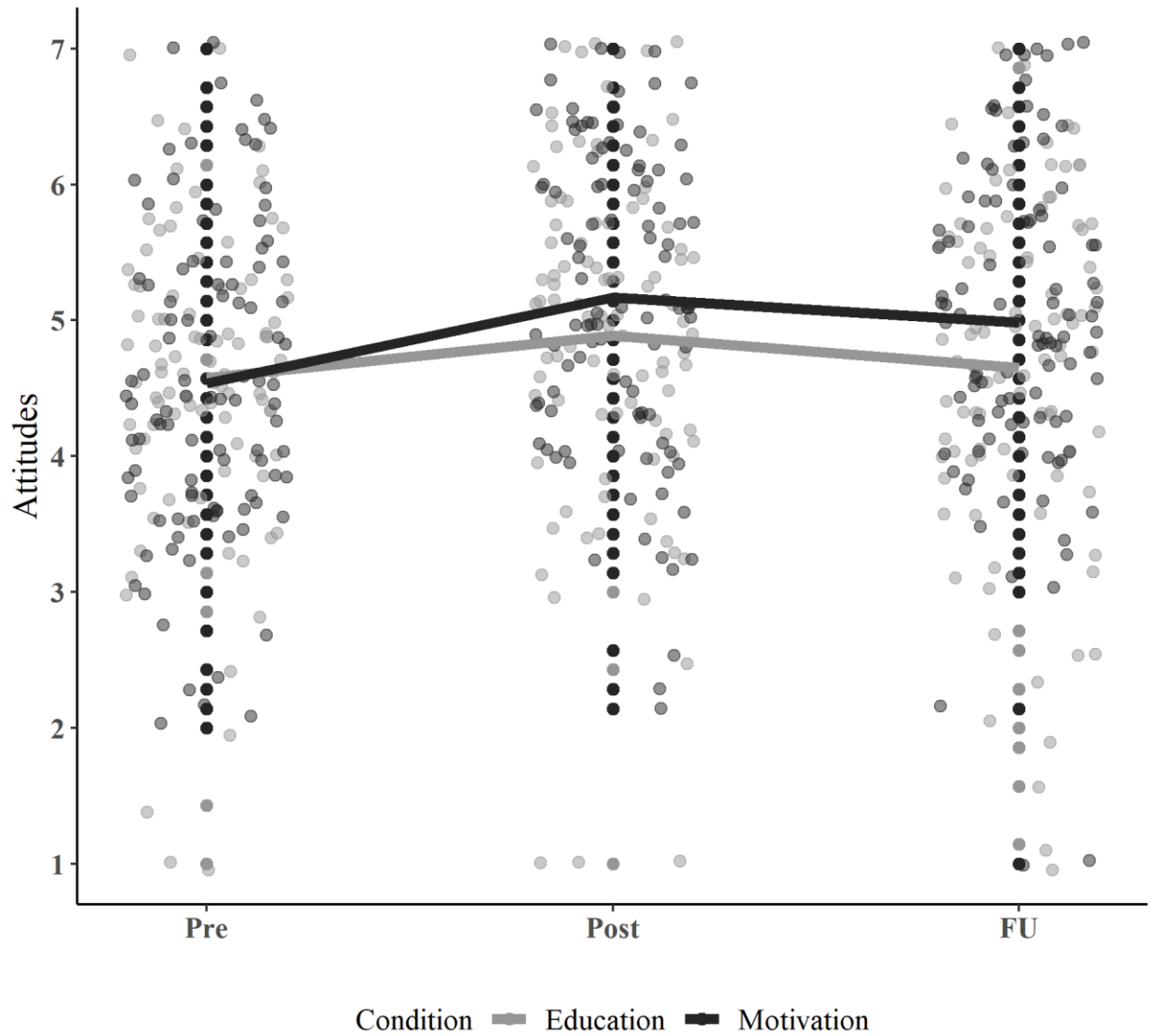
Figure 1

CONSORT Diagram Detailing Participant Flow Through Study
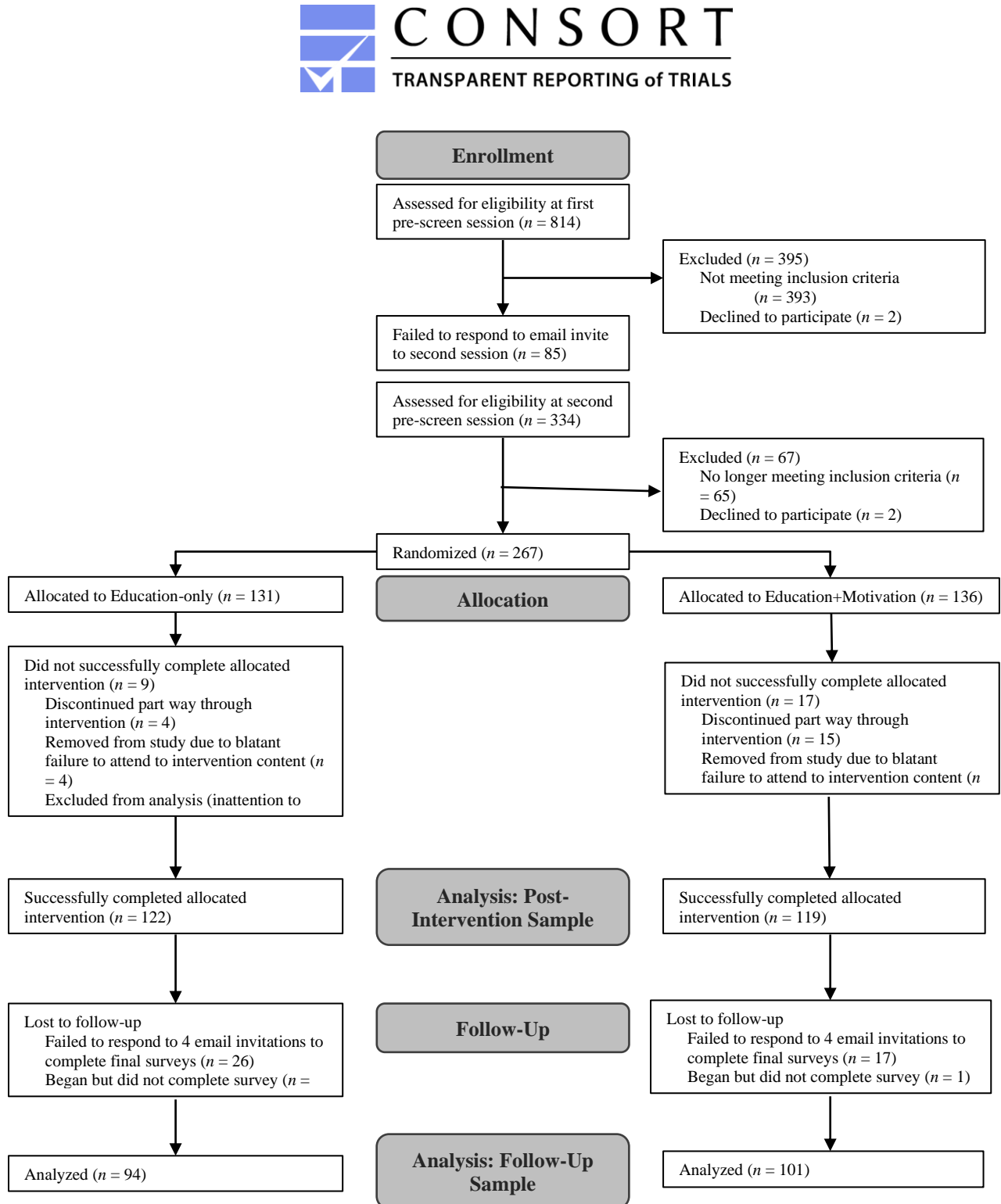
Figure 2

Attitudes Toward Seeking Treatment for SAD by Condition Over Time.

Note. Attitudes significantly improved from Pre to FU in the *Education+Motivation* ($p < .001$) but not *Education* ($p = .68$) treatment condition (see *Results*). Attitudes were measured using a seven item seven-point semantic differential scale in which higher scores correspond with more favorable attitudes toward seeking treatment for SAD (see *Method*).

Figure 3

Intentions to Seek Treatment for SAD by Condition Over Time
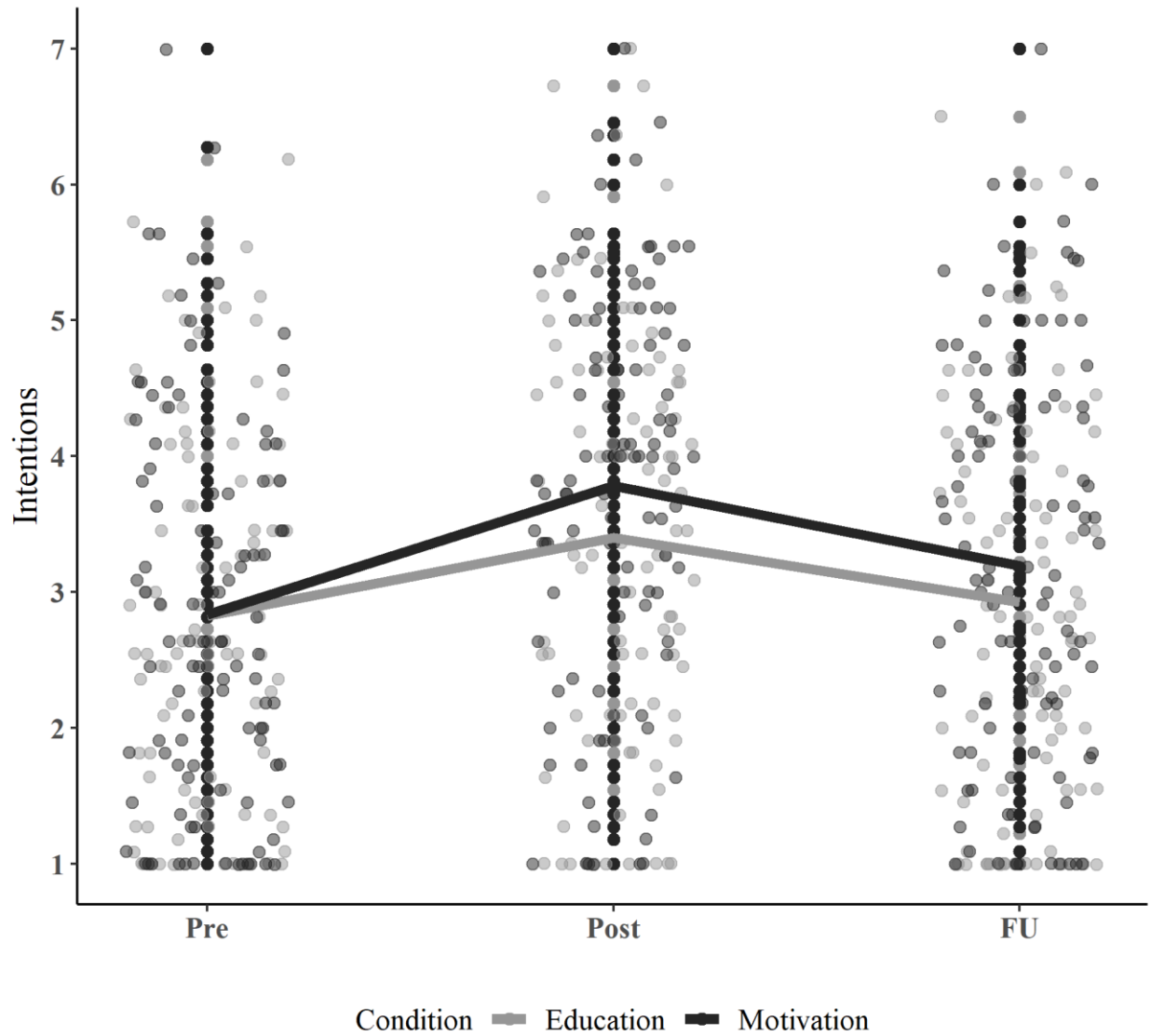
Note. The Pre-FU improvement in intentions did not significantly differ between treatment groups ($p = .34$), but the Pre-Post improvement was marginally greater ($p = .06$) in the *Education+Motivation* than *Education* condition. Intentions were measured using a 13 item 1-7 Likert scale measure in which higher scores represent greater intentions to seek treatment for SAD (see *Method*).

Figure 4

Perceived Behavioral Control for Seeking Treatment for SAD by Condition Over Time
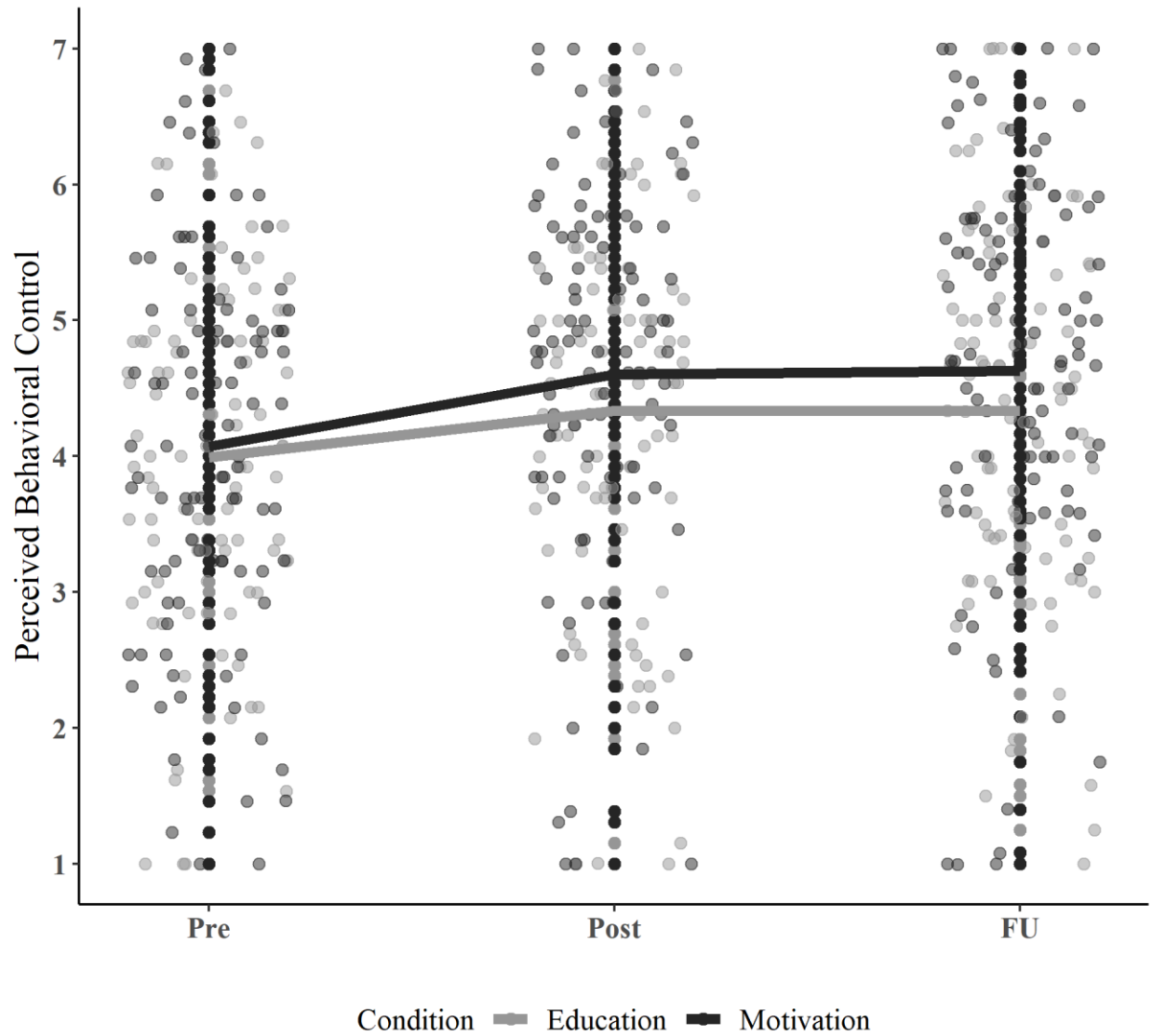
Note. Perceived behavioral control significantly improved from Pre to both Post and FU (*p*'s < .001), but there was no significant difference in this improvement between treatment conditions (*p*'s ≥ .27) (see *Results*). Perceived behavioral control was measured using a 13 item 1-7 Likert scale measure in which higher scores represent higher perceived behavioral control over seeking treatment for SAD (see *Method*).