

Supplementary online materials for “Evidence of Delayed, Recursive Benefits of Self-Affirmation on Anxiety in Socially Anxious University Students”

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Supplementary Material

The following supplementary materials are presented in the order in which they appeared within the study. Please see Appendix A for a visual representation of the phases and the materials that were presented during each phase.

Screening

During regularly scheduled introductory psychology classes at the University of Manitoba, students were invited to complete a set of screening measures in the classroom using bubble sheets to record their responses in exchange for course credit. Those who chose not to participate were given other options to obtain the credit. Fourteen different classes participated, varying in size from approximately 50 to 200 students. Students were invited to supply contact information if they were willing to be contacted for possible future research participation. As part of this screening, students completed the Social Phobia Inventory (SPIN; Connor et al., 2000).

Social Phobia Inventory. SPIN is a 17-item self-report instrument designed to measure the fear, avoidance, and somatic symptoms of social anxiety. Individuals are asked to evaluate each item (e.g., I avoid talking to people I don't know) with reference to the previous week and to rate how much they experienced, or were bothered by, each symptom using a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). An evaluation of the scale in a clinical sample found it to have excellent internal consistency ($\alpha = .95$ for the scale as a whole, and .91, .88, and .79 for the fear, avoidance, and somatic subscales respectively), good test-retest reliability over a period of one to three weeks ($r = .86$ for the scale as a whole, and .84, .83, and .78 for the fear, avoidance, and somatic subscales), good sensitivity to changes in social anxiety following intervention, good convergent and discriminant validity and to be successful in distinguishing

between those with social anxiety and those with other anxiety disorders (Antony et al., 2006). The SPIN has been used in several samples of randomly selected university students to screen for those with sub-clinical and clinical social anxiety, using a cut-off of 19 and 24 respectively (Baptista et al., 2012; Osório et al., 2010; Ranta et al., 2007). In this study a cut-off of 23 was used, which captures the very top end of the subclinical range and the entire clinical range. An analysis of the SPIN data obtained showed that internal consistency was excellent ($\alpha = .90$ for the scale as a whole, and .80, .80, and .69 for the fear, avoidance, and somatic subscales). In the Canadian Psychiatric Association's Clinical Practice Guidelines (Canadian Psychiatric Association, 2006), the SPIN is recommended as an appropriate tool for measuring response to treatment for SAD.

Of the 2218 students who provided complete useable data in the screening phase, 1015 scored 23 or higher on the SPIN, meeting criteria for participation in this study. This cut-off score ensures that the sample includes only individuals with at least moderately elevated levels of social anxiety symptoms (Ranta et al., 2007). Of these 1015 students, 900 provided permission to be contacted for further research. As there were more students who met criteria than were needed for this study, batches of approximately 60 students were quasi-randomly selected and sent an email-invitation to participate in the baseline phase until a sufficient number of students ($n = 200$) had signaled their interest in participation by clicking on the baseline phase study link contained in the invitation.

Baseline phase

This phase took place entirely online, two to four weeks after the screening phase. By clicking on the study link, students were taken first to an online consent form that described the current phase of the study and informed them that providing complete baseline data would make

them eligible to participate in the social stress and follow-up phases of the study. Those who chose to participate ($n = 194$) completed the following self-report material, in the order in which it is described.

The Kutcher Generalized Social Anxiety Disorder Scale for Adolescents (K-GSADS-A; Brooks & Kutcher, 2004). The K-GSADS-A is a clinician-rated instrument containing 32 items divided into three sections including: (a) Section A where participants rate a number of behaviors according to the distress and the avoidance associated with each behavior; (b) Section B where the clinician prompts for the three situations the individual finds most distressing; and (c) Section C which measures somatic distress. For the purposes of this study, only Section A was used. Section A is comprised of a list of social behaviors which are often avoided by, or that elicit discomfort/anxiety/distress (hereinafter shortened to distress) in, adolescents with social anxiety. For use with an adult university student population, Section A was modified in two ways. First, it was completed as a self-report scale as it was assumed university students would not need clinician help in rating the items. Second, three items in Section A that did not typically apply to most university students were deleted (e.g., attending overnight group activities such as camps, school trips, etc.; showering in a common locker room; writing your name in public), one item was divided into two (speaking up, answering questions in class/participating in class discussions was divided into (1) speaking up, answering questions in class and (2) speaking up, participating in class discussions, and four items considered important for successful interpersonal functioning at university were added (e.g., making eye contact with friends; making eye contact with acquaintances or strangers; sharing your own ideas, opinions, thoughts, and preferences when in a group; and speaking with professors/instructors in your classes). The final scale had 20 items. Participants first reported how much distress they felt over the last

month with regard to each behavior listed and then reported how much avoidance they felt in response to the same list of behaviors, using a scale from 0 (*never*) to 3 (*severe*) for the distress rating and from 0 (*never*) to 3 (*total avoidance*) for the avoidance rating.

In a review of scales used to assess child and adolescent social anxiety, the behavior section of the K-GADS-A was reported to have excellent internal consistency ($\alpha = .96$), good content validity, adequate construct validity and to be sensitive to treatment effects (Tulbure et al., 2012). In the present study, the modified K-GSADS-A Behaviour distress and avoidance ratings together had excellent internal consistency ($\alpha = .90$ at baseline and $.94$ at follow-up). Looking at the distress and avoidance ratings of the modified K-GSADS-A Behaviour separately, both sets of ratings showed good internal consistency. The distress ratings had an alpha of $.81$ at baseline and $.88$ at follow-up and the avoidance ratings had an alpha of $.81$ at baseline and of $.89$ at follow-up.

The items of the modified K-GSADS-A Behaviour were also used to measure engagement in potentially anxiety-producing social behaviors by asking participants to report how many times they did engage in each of the 20 behaviors that are part of the measure in this study (hereinafter referred to as behavior frequency). A positive change in behavior frequency between baseline and follow-up phases was used as a behavioral index of increased social engagement.

Demographics. Participants then completed a series of demographic questions including gender, age, and ethnicity. Responses to these questions were used to describe the participants, to assess for equivalency of conditions on these descriptors, and to inform the discussion of the generalizability of the study. The 75 participants in the final data set are reasonably representative of the 1015 Introduction to Psychology participants who completed the screening

and who scored at or above the cut-off of 23 on the SPIN. A comparison of the final data set with the screening data set showed no significant difference in mean age, $t(81.76) = 1.16, p = .25, d = 0.16$, equal variances not assumed, in gender composition, $\chi^2(1) = 0.36, p = .55, \phi = .018$ or in SPIN scores, $t(1088) = 0.46, p = .65, d = 0.06$. The final data set was not representative of the Introduction to Psychology student body in terms of country of birth. In the screening, the ratio of Canadian-born to non-Canadian born was just under 3:1 whereas in the final data set, it was approximately 3:2, $\chi^2(1) = 4.14, p = .04, \phi = .063$.

Response Validity. Finally, participants completed two validity questions that asked all participants to rate themselves on a 5-point Likert scale, from 1 (*not at all*) to 5 (*completely*), as to their level of honesty and attentiveness. Self-report data from participants with honesty ratings less than 4 were considered unreliable and data from participants scoring in this range were deleted from the final data set ($n = 2$). A participant's data was also considered unreliable if the attentiveness rating was less than 4 and the data was suspect (e.g., every item in a scale given the same rating). No data was deleted on these grounds.

Social stress phase

Participants who provided complete baseline data received an email invitation to participate in the social stress phase, an in-person lab-based phase. Because of the demanding nature of the social stress phase and to encourage participation in the follow-up phase of this study, participants were informed that in addition to course research credit, they would have the chance to enter a draw at the completion of this phase for a chance to win an Apple iPod Touch, 5th generation or one of eight \$20 gift certificates to a favorite coffee shop or the UM bookstore.

Those who chose to participate were instructed to click on a Doodle Poll link where they were able to choose a day and time to come to the lab that fit their schedule. Available time slots

allowed for at least four weeks between this phase and the follow-up phase. Up to four participants were able to register in each time slot. This resulted in 16 time slots with four participants and nine time slots with three participants ($n = 91$). Participants were able to see if someone else had already registered in a particular time slot but they were not able to see the name of that registrant.

The social stress task used in this phase was the Trier Social Stress Test for Groups (TSST-G; Kirschbaum et al., 1993; von Dawans et al., 2011). The TSST was chosen as a recent meta-analysis of 208 studies found this task to be the best standardized method of inducing stress in the laboratory, as measured by cortisol response (Dickerson & Kemeny, 2002). The group version was chosen as it is a more time efficient way to administer the TSST and still elicits the desired significant increases in both physiological and psychological stress responses (von Dawans et al., 2011).

Once all participants in a particular time slot had arrived at the computer lab, adapted from the TSST-G design of Kirschbaum, Pirke, & Hellhammer (1993), the participants were verbally reminded that they would be asked to give an impromptu speech followed by a mental arithmetic task. They were then asked to sit at their randomly assigned laptops and complete the following self-report measures:

Affirmation Manipulation. Participants completed a Values Questionnaire (Allport et al., 1960) in which they ranked 11 values and characteristics (e.g., sense of humor, social skills, athletics) in terms of personal importance. This was followed by a writing task, which directed those in the self-affirmed condition to write about why their top-ranked value from the Values Questionnaire was important to them (Cohen et al., 2000) and then to list the top two reasons for choosing that value as their top-ranked value and to describe to what extent it has influenced

their life and is an important part of their self-image (Stinson et al., 2011). Those in the non-affirmed condition, following a commonly used control condition for examining the effects of affirmation (McQueen & Klein, 2006), were asked to write about why their 11th ranked value on the Values Questionnaire might be important to someone else. As this writing task was expected to take significantly less time than the writing task of those in the self-affirmed condition, to help equalize writing time across the two groups, the participants in the non-affirmed condition were also asked to "Please describe as accurately as possible the route you take to come to the university, whether you walk, drive, take the bus, car pool, or cycle. Note the street names that you remember, landmarks, etc."

Participants in both conditions were represented in all time slots through Qualtrics programming which randomly assigned the two writing tasks to participants with the restriction of keeping the number of participants in each time slot and each condition equal (or near equal). All research assistants were blind to condition.

Affirmation Manipulation Check. To assess whether the affirmation manipulation was effective, participants completed five items designed to measure awareness of, and concern with, self. This affirmation manipulation check was devised by Napper and colleagues (2009, Study 1) and was shown to have good sensitivity to experimental manipulation. In this study, the five items had good internal reliability ($\alpha = .80$).

Anticipatory Stress Appraisal: Participants' perception of threat associated with the upcoming social stress task was assessed with a series of questions asking participants to rate how stressful, difficult, and threatening they expected each of the two tasks, speech and arithmetic, to be. Ratings were done using a 7-point Likert scale ranging from 0 (not at all) to 7 (extremely). These questions were taken from a previous study (Blascovich & Tomaka, 1996)

and have been shown to be sensitive to experimental manipulation (Creswell et al., 2005). In this study, the mean inter-item correlation was .30 for the speech stress items ($r = .31, p = .01$ for stress and threat, $r = .51, p < .000$ for stress and difficulty, $r = .07, p = .53$ for threat and difficulty) and .62, for the arithmetic stress items ($r = .51, p < .001$ for stress and threat, $r = .86, p < .001$ for stress and difficulty, $r = .51, p < .001$ for threat and difficulty).

Current Distress. The final measurement before the social stress task was the Subjective Units of Distress Scale (SUDS; Wolpe, 1988), which is a visual analogue scale traditionally used with exposure treatment and behavioral assessment to measure subjective units of anxiety, disturbance, or distress. Following Rodebaugh and Shumaker (2012), participants were asked to mark how anxious they felt in the current moment on a line with five anchor points ranging from 0 (*no anxiety, calm, relaxed*) to 100 (*Very severe anxiety, worst ever experienced*).

TSST-G. Following the completion of the self-report measures, participants were then told that the speech task involved giving a short speech, 2 minutes in length, on a randomly selected topic that is controversial in Canada (e.g. capital punishment, religion in schools, space exploration, or cloning) in front of an audience of two speech evaluators as well as two video cameras. They were also informed that the speech evaluators were experts in non-verbal communication. They were, in fact, research associates wearing white lab coats. Participants were told that the speeches would be videotaped in order to be evaluated later by independent speech evaluators for overall quality. Participants were then invited, in quasi-random order, to choose a piece of paper from a bowl on which was uniquely written the four speech topics. They were asked to please include their name, where they were from, and their program of study at university in their speech and were advised that the order in which they would give their speech would be random. They were reminded of the mental arithmetic task but not given further

description at this time. Participants then left the computer lab, walked up two flights of stairs and down a hallway to the speech lab, giving them approximately three minutes to prepare their speech. They were asked to refrain from talking with each other and making eye contact during this time.

Participants then entered the speech lab where two research assistants posing as non-verbal speech evaluators wearing white lab coats were seated. There were also two working video cameras present. Participants were instructed to stand in the position that corresponded to their computer position, position 1, 2, 3, or 4. Hanging dividers between each position prevented the participants from being able to make eye contact with each other but allowed each participant to easily see the evaluators and the video cameras. See Figure 1 for the room arrangement.



Figure 1. Configuration of speech lab for the TSST. Fabric dividers prevented participants from having eye contact with each other during the TSST.

Speech evaluator #1 gave the instructions for the speech, letting participants know that the order in which they presented would be random and they had up to two minutes to speak. Speech evaluator #1 also told each participant “you still have some time left” if the participant stopped before the two-minute limit. If a participant stopped a second time before the limit, the time at which they chose to stop was recorded. Speech evaluator #1 also recorded the number of

the required speech elements each participant remembered to include. Speech evaluator #2 rated each participant as to warmth and eye contact as well as noted any unusual behaviors of the participants (e.g., fidgeting with hands, hands in pockets, crossing arms). The speech task was followed by a mental arithmetic task in which participants were asked to count backwards from a given number by 16, out loud as quickly as possible, for two minutes. Each participant within a time slot was given a different starting number in order to prevent learning effects. If a participant made a mistake, they were notified and asked to start over.

In the standard TSST, the speech evaluators are asked to maintain a disapproving facial expression, give stern admonishments to “keep talking” if the participant should end before the allowable time, and to “go faster” at the halfway mark of the mental arithmetic task. However, since it has been found that a less stressful speech task (Beidel et al., 1989) is effective in eliciting significant physiological and psychological stress responses for those with SAD (Moscovitch & Hofmann, 2006; Price & Anderson, 2011; Schmidt et al., 2012), in this study speech evaluators were instructed to keep a neutral facial expression instead of a disapproving one and there were no stern admonishments in either task. Written instructions as to procedures to be followed were given to each of the speech evaluators.

Following completion of the TSST-G, the researcher returned and asked the participants to follow her back to the computer lab. She let them know there were a was short on-line measures to complete (a second SUDS following the TSST-G) and that she would explain a bit about this study and share some information that might be useful for anyone experiencing social anxiety or social phobia.

Partial Study Debrief. Participants were given a partial debrief of the study informing them that the primary aim was to examine the effect of an intervention on the negative effects of social stress for those who report some level of social anxiety. It was emphasized that they had not been

diagnosed by this study with social anxiety but that at least some of their responses on one of the screening measures they completed were consistent with response given by individuals who did experience social anxiety and so some information about social anxiety would be shared in case it might be helpful.

Social Anxiety Psychoeducation. The researcher then provided a brief psychoeducational description of social anxiety (see Appendix B), similar to what might be given in a clinical therapy session with a socially anxious client. It was emphasized that the Trier Social Stress Test is stressful for everyone and that it is designed to be that way.

Finally, each client was given a list of free or low-cost social events taking place on campus or in the City of Winnipeg over the coming month as examples of social activities in which they may wish to participate. Participants were also given a list of free mental health resources they could contact for support, noting that this was general policy at the University of Manitoba whenever there was a possibility of lingering distress following study participation.

Performance items. Participants' performance in this phase was assessed with four separate items. The first was a mental math score, calculated by counting how many times each participant was successfully able to subtract 16 from one of four starting points: 4878, 3850, 3842, and 4834. In each time slot, participants were uniquely and randomly assigned one of the four starting points. The second was a required items score which is the number of the required items (name, where they are from, and program of study at the university) each person remembered to include in their speech. The third was a subjective rating of eye contact and the fourth was a subjective rating of the perceived warmth or friendliness of the participant during the speech task. In addition to ratings made by the #1 speech evaluator, eye contact and warmth ratings were also made by four independent coders who individually watched video recordings of the speeches. All eye contact and warmth ratings were made using visual analogue scales

with anchor points of 0 (none/inadequate) to 100 (ample/excellent) for eye contact and 0 (cool/distant) to 100 (warm/personable) for warmth. The four coders were psychology students hired as research assistants (RA) for this aspect of the study. Each coder was given written coding criteria and individually trained in its use. Coders were instructed to use their subjective experience or response to the participant as the basis for their ratings.

Due to the subjective nature of this rating, meant to represent a subset of the variety of subjective responses people would have regarding the quality of the eye contact and warmth of interaction of the participants, no attempt was made to require agreement among coders. Instead, an average of eye contact and warmth ratings of the five coders was used in the analysis.

Intraclass correlation one-way random analysis (ICC-1; Landers, 2015) showed the mean eye contact rating of the five coders explained 71% of the variance in eye contact ratings, $F(64, 260) = 3.46, p < .001, 95\% \text{ CI } [0.58, 0.81]$. The mean warmth rating explained 70% of the variance in the five coders rating of warmth, $F(63, 256) = 3.38, p < .001, 95\% \text{ CI } [0.57, 0.80]$. Intraclass correlation one-way random analysis was chosen as the best method of assessing interrater reliability in the current data given that there was more than one rater and not all raters rated all participants. Choosing one-way random gives the most conservative estimate of reliability.

According to Cicchetti (1994), these levels of agreement fall at the upper end of "good" and are just below "excellent".

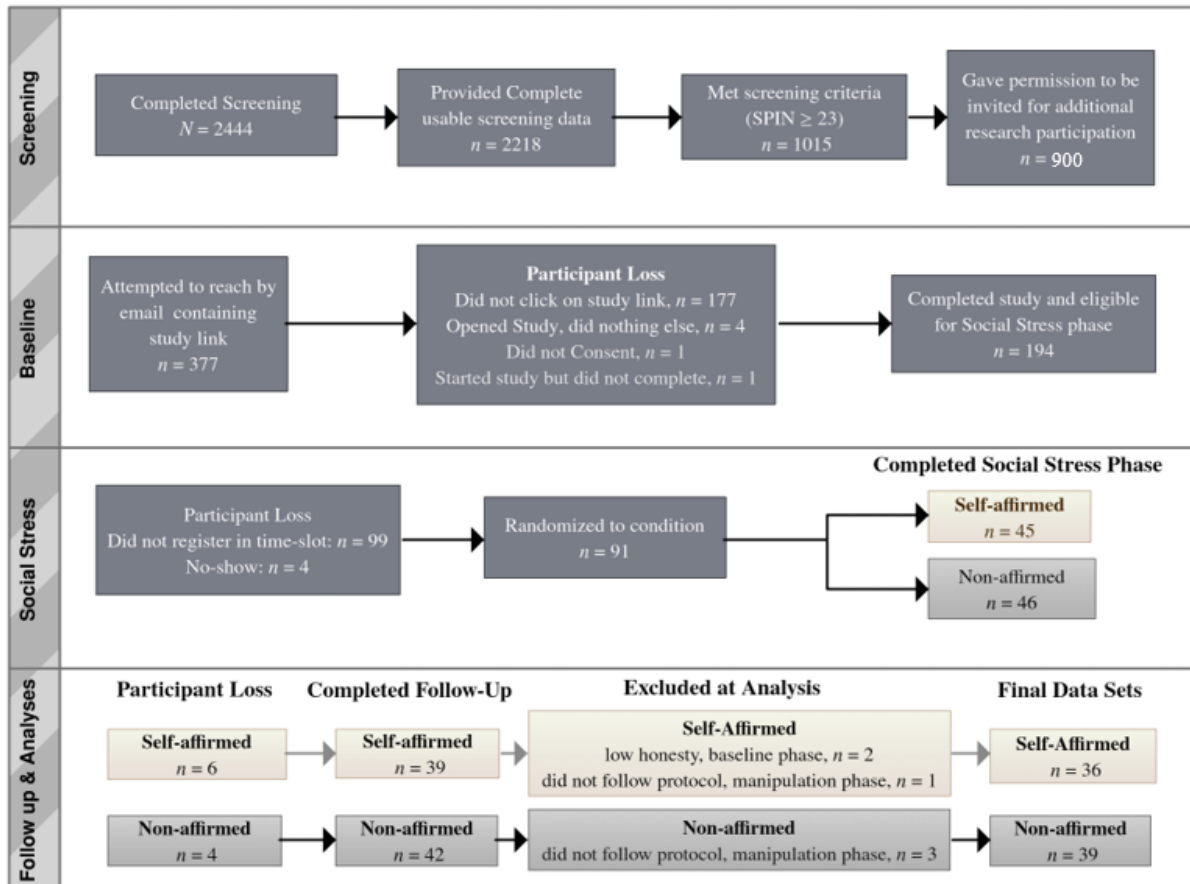
Follow-up phase

Participants who completed the social stress phase were sent an email invitation to participate in the follow-up phase. This phase was entirely online and took place the last week of the fall term, approximately four weeks after the completion of the social stress phase. By clicking on the study link embedded in the email invitation, participants were taken first to an

online consent form which described the current phase of the study (Appendix A). Those who chose to participate ($n = 81$) then completed the following measures on-line, in the order listed: SPIN, K-GSADS-A (sec. A), and the baseline validity check questions. Approximately two weeks later, participants who participated in any phase of the study were emailed a final and complete debrief.

Appendix A – Participant Flow

Participant flow, from initial screening through to analyses.



Appendix B

Background information on social phobia/social anxiety:

Social anxiety is different for everyone, but there are features that are common amongst the people who experience significant levels of it. If you experience many of the items on this list, then you may be experiencing high levels of social anxiety. Not all of them will apply to all people who are finding social situations difficult.

- Feeling very self-conscious in some or most normal social situations.
- Constantly worrying about what others think of you.
- Tending to look back over social situations and ruminate about things you think you did wrong, and then feeling anxious or embarrassed about them.
- Having strong fears about opening up to people and expressing your personality to them.
- Finding it uncomfortable to make eye-contact with people.
- Avoiding a lot of social situations and people in general.
- Finding it difficult to speak to people in positions of authority.
- Feeling very self-conscious about eating, drinking, or writing in front of other people.

Exposure to feared situations as effective treatment:

- "**Exposure** therapy is defined as any treatment that encourages the systematic confrontation of feared stimuli, which can be external (e.g., feared objects,

activities, situations) or internal (eg, feared thoughts, physical sensations). The aim of exposure therapy is to reduce the person's fearful reaction to the stimulus."

(Kaplan & Tolin, 2011)

- Although **exposure is not easy** for most people with social phobia, over time the uncomfortable feelings will become less -- this is a fundamental reality of exposure to feared or avoided situations. -- and a reality of **avoiding** the situations is that social phobia or social anxiety is very likely to **get worse**. (e.g., example of exercise and fitness).
- **Important to avoid safety behaviour** -- ie. to not only "show up" but be active participants, to say something, look people in the eye -- *you have to **be present** and actually engage in the interaction so new learning can take place.*