Spring 5-2017

An Exploration of the Effects of Pronoun Usage in Questionnaires on the Measurement of Anxiety Sensitivity

Destiny B. Reynolds
University of Southern Mississippi

The University of Southern Mississippi

An Exploration of the Effects of Pronoun Usage in Questionnaires on the Measurement of Anxiety Sensitivity

by

Destiny Reynolds

A Thesis
Submitted to the Honors College of
The University of Southern Mississippi
in Partial Fulfillment
of the Requirements for the Degree of
Bachelor of Arts
in the Department of Psychology

May 2017

Approved by

_____

Daniel Capron, Ph.D., Thesis Adviser
Associate Professor

_____

D. Joe Olmi, Ph.D., Chair
Department of Psychology

_____

Ellen Weinauer, Ph.D.
Dean of the Honors College

Abstract

Previous research in the psychology of language has found that first- and second-person pronouns have different uses beyond simply referring to different subjects. First-person pronouns are thought to forge a stronger association between self-concept and emotion (Meissener, 2008), while second-person pronouns are inherently self-distancing (Park, Adyuk & Kross, 2015). The present study sought to apply this knowledge to self-report questionnaires to determine whether pronoun usage influenced self-report scores of anxiety sensitivity. Both the ASI-3 and a second-person revised version were given to participants during prescreening, baseline, and post-anxiety-intervention measures and assessed for differences. Prescreen analysis revealed that the revised ASI-3 produced lower scores for anxiety sensitivity than the original ASI-3, keeping in line with predicted results. Baseline and post-intervention analysis, however, showed lower instances of statistical differences between the measures at different times. This study begins to establish a relationship between the pronoun structure of questionnaires and self-report ratings, though further study is needed.

Keywords*: pronoun usage, anxiety sensitivity, self-report, psychometrics*

Dedication

To Alta Watkins, William and Roxanne Reynolds, Patrick DeLancey, and Inez King: Thank you for providing me with the encouragement to pursue my passions and the support to keep me going. I am forever in your debt.

Acknowledgements

I would like to thank my adviser, Dr. Daniel Capron, for his ceaseless efforts to aid in the construction and improvement of this thesis. Without his advice and encouragement, this research would not have been possible. I could not have imagined a more helpful mentor, and I will forever be grateful for all that he has taught me throughout this process. Thank you for believing in me.

Thank you, as well, to the graduate and undergraduate research assistants in the Anxiety and Trauma Research Program for their assistance in conducting this study.

I would also like to thank the faculty in the department of psychology for guiding me on my educational journey. Each professor and staff member brought with them a unique perspective and something new to consider. Thank you for broadening my mind and allowing me to receive a truly spectacular education.

Many thanks also to the Drapeau Center for Undergraduate Research – particularly to the Eagle Scholars Program for Undergraduate Research. Without the SPUR grant, this project could not have been completed. Thank you for providing me with a means to complete my research.

Finally, I would like to extend my dearest thanks to the faculty of the Honors College for creating a support system unlike any other and for providing me with the scholarship that allowed me to come to Southern Miss in the first place. Special thanks go to former Dean Dr. David Davies, current Dean Dr. Ellen Weinauer, and honors coordinators Stacey Ready and Paula Mathis. Without the support of the Honors College I would not be the same person I am today. Thank you for providing me with so many opportunities to grow and succeed.

Table of Contents

List of Figures

List of Abbreviations

API – Acute Panic Inventory

ASI-3 – Anxiety Sensitivity Index 3

ASI-Y – Second person pronoun revised Anxiety Sensitivity Index (ASI-You)

BAI – Beck Anxiety Inventory

CBM – Cognitive Bias Modification

- CBM-A – Cognitive Bias Modification for Attention
- CBM-I – Cognitive Bias Modification for Interpretation

FNE – Fear of Negative Evaluation Scale

ISI – Illness Sensitivity Index

M - Mean

n – Number of participants

p – p-value

r – Pearson correlation

SD – Standard deviation

SONA – Sona Systems research participation system

t – t-value

z – z-value

Introduction

According to the Centers for Disease Control (CDC), anxiety disorders account for the highest percentage of diagnosed mental disorders, with a lifetime prevalence of over 15 percent (CDC, 2013). These disorders have a wide range of impact, causing severe physical, cognitive, and social disabilities. The constellation of anxiety disorders includes the diagnoses: simple phobias (e.g. snake, spider), generalized anxiety disorder, panic disorders, and social anxiety disorder. These disorders have a variety of symptoms such as persistent - and often unnatural or unnecessary - worry, recurring thoughts or rituals, panic attacks, and fear (American Psychiatric Association, 2013).

Anxiety disorders also have substantial economic impact. According to Greenberg (1999), in 1998 the national annual cost of anxiety disorders totaled approximately $63.1 billion, accounting for (in decreasing percentage order) nonpsychiatric medical treatment, psychiatric treatment, pharmaceutical costs, work-related problems, and mortality costs. This amount in 2015 would total over $91 billion after adjusting for inflation using the data provided by the Bureau of Labor Statistics (2015). While diagnostic and treatment procedures have improved over time, a large portion of these costs - to individual well-being as well as national economic burden - could be avoided with earlier diagnosis and more effective and stable treatment.

Concerning early diagnosis, anxiety sensitivity is a known risk factor for anxiety disorders, according to the American Psychiatric Association (2013). Anxiety sensitivity is often colloquially referred to as the "fear of fear". This nonclinical definition proves to

be rather accurate, as the true psychiatric definition is the fear of arousal symptoms and the resulting anxiety experienced when these symptoms occur, often in anticipation of a negative outcome (Schmidt, Lerew & Jackson, 1997). Anxiety sensitivity has previously been viewed as a more unidimensional concept, with concern placed only on physical associations, such as the belief that a racing heart meant one was about to suffer a heart attack. However, it has been found that anxiety sensitivity manifests not only in physical sensations, but also in the social and cognitive domains (Taylor, Zvolensky, Cox, Deacon, Heimberg, Ledley & Cardenas, 2007). Social anxiety sensitivity might manifest in the fear that others can notice an individual's panic and will judge him or her harshly. Cognitive anxiety sensitivity, however, comes in the form of expected negative mental health outcomes, such as the belief that if one loses track of one's thoughts, then one is going insane or is having a mental breakdown (Schmidt, Capron, Raines & Allan, 2014). There are a multitude of studies linking anxiety sensitivity to psychological disorders, with specific emphasis placed on anxiety-related disorders. In a meta-analytic review (Olatunji & Wolitzky-Taylor, 2009), it was found that anxiety sensitivity is significantly higher in clinical anxiety patients when compared with the non-clinical population. Further linking this fear to anxiety disorders is the discovery that anxiety sensitivity is not as prevalent in patients with mood disorders such as depression as it is in patients with anxiety disorders (Olatunji & Wolitzky-Taylor, 2009). Due to this linkage, the treatment of anxiety sensitivity has become an area of high interest in the field of psychology.

A vital aspect of treating anxiety sensitivity is accurately assessing the construct. One of the most common measures is the Anxiety Sensitivity Index 3 (ASI-3). The primary goal of the questionnaire is to measure anxiety sensitivity not as a unitary construct but instead assess levels of physical, social, and cognitive anxiety sensitivity separately (Taylor, 2007). This questionnaire has been reported to be both valid and reliable, able to accurately assess each of the three domains of anxiety sensitivity (Taylor, 2007), though the phrasing of its questions may present issues not investigated until this study.

The existing ASI-3 relies heavily on first-person pronoun usage, with all of its 18 questions containing some variant of the word "I" (Taylor, 2007). This is true of many self-report questionnaires in existence, though using such phrasing may not result in the most accurate measurements. The word "I" and all of its variants serve to name an individual and set it apart from others, but in doing so, it places one's self-concept closer to one's actions and emotions (Meissner, 2008). This closeness is often seen in depressed individuals, as shown by the study by Rude, Gortner, and Pennebaker (2010), which found that first-person pronoun usage, which the ASI-3 relies on, can change depending on a person's mental health. This was measured via an essay-writing exercise which found that depressed and formerly-depressed individuals had significantly higher rates of first-person pronoun usage - specifically "I" usage - especially in regards to negative self-evaluation (Rude, 2010).

Whereas “I” promotes personalization and proximity to action and consequence, second- and third-person pronouns promote self-distancing. This self-distancing, if done properly, can have therapeutic effects as it allows individuals to view situations through the eyes of another rather than through their own biases (Park, Ayduk & Kross, 2015). It has been found that self-distancing can be used as a coping mechanism for anxiety and as a way to deal with future stressors (Kross, Bruehlman-Senecal, Park, Burson, Dougherty, Shablack & Ayduk, 2014). Such self-distancing has also been found to be effective in reducing negative emotions concerning previous traumatic events through depersonalization by allowing an individual to separate his or her self-identity from the event and thus add a layer of objectivity to the event (Park, 2015).

Given these findings, the usage of first-person pronouns in self-report questionnaires - especially ones concerning negative, stigmatized topics such as depression and anxiety - may not be as effective as using second-person pronouns such as “you” and may in fact cause over-reporting of negative traits. In the past, however, studies examining the effects of pronoun usage have focused primarily on depressed individuals (Rude, 2010; Park, 2015) and to my knowledge have ignored individuals high in anxiety or anxiety sensitivity. Given the common comorbidity of anxiety and depressive disorders (Axelson & Birmaher, 2001), it is important to consider the impact pronoun usage can have in anxious individuals and questionnaires relating to anxiety. The goal of this study, therefore, is to assess this claim and determine whether the usage of first-person pronouns versus second-person pronouns makes a significant difference in

the measurement of anxiety sensitivity. In this study, the ASI-3 will be modified to reflect this idea, with all first-person pronouns changed to their second-person variants. All individuals will complete both versions of the ASI-3 and the differences in anxiety sensitivity levels measured by the two questionnaires will be assessed. Based on the previous work on self-distancing, it is hypothesized that the original first-person pronoun ASI-3 will show higher rates of anxiety sensitivity than the modified second-person pronoun ASI-3. It is also hypothesized that these differences will be retained after a brief computerized anxiety sensitivity intervention and that the original ASI-3 will display a more significant change in anxiety sensitivity than the revised version.

Methods

Participants

The SONA prescreen contained 287 individual participants, while the baseline/post-CBM analysis contained 34, with some overlap between these two groups. Participants in the prescreen group included 45 male and 242 female undergraduates, ranging in age from 18 to 52 years (M = 21.48, SD = 5.494). Participants came from a range of cultural backgrounds, including Caucasian/European-American (63.4%), African-American (26.5%), Asian (3.1%), Multiracial (3.1%), Hispanic (1.7%), American Indian (.3%), and other backgrounds (1.7%). Participants were at various stages of their college education, with 33.4% in their freshman year, 20.9% sophomores, 17.4% juniors, and 28.2% seniors.

Individuals who took place in the overall study showed similar demographic characteristics, including 7 male and 27 female participants ranging from 18 to 26 years of age (M = 19.38, SD = 1.741) with varying backgrounds (2.95% Hispanic, 67.65% Caucasian, 20.6% African-American, 5.9% Asian, and 2.95% Other). Because participants in the broader study occasionally included non-students, college classification was not assessed.

Participants were originally screened through introductory questionnaires, and individuals found to score 1.5 SD above the mean on the Anxiety Sensitivity Index 3 (ASI-3) were asked through e-mail to schedule an additional appointment. Individuals currently taking benzodiazepine medications, as well as individuals under 18 years of age, were excluded from the study. Those who participated in the larger in-lab study were offered compensation for their time in the form of extra credit for psychology courses or, in some cases, a $15 Amazon gift card, while those who only took the prescreen measure were only given the extra credit option due to the smaller time commitment.

Measures

It is important to note that measures listed below that are not the original or revised versions of the ASI-3 are used in this study primarily as filler measures to distract participants from the repetition of the measures.

Anxiety Sensitivity Index (ASI-3). In order to gauge baseline measures of anxiety sensitivity for individual patients, the Anxiety Sensitivity Index 3 was administered at the onset of the study. The 18-question self-report questionnaire is a modification on the revised version of the original Anxiety Sensitivity Index (ASI-R) designed to be multidimensional in its measure of anxiety sensitivity. This questionnaire has been shown to efficiently measure anxiety sensitivity not only in the physical realm, but in social and cognitive areas as well. The questions are scored on a five-point scale based on how well one identifies with the prompts, with answers ranging from "Very Little" to "Very Much" (Taylor, 2007).

ASI-3 Revised (ASI-Y). This modified version of the ASI-3 was designed to test the differences in question phrasing concerning pronoun usage. The original 18 questions developed by Taylor et al. were edited, with all occurrences of first-person personal and possessive pronouns, such as "I," "me," and "my," changed to their second-person counterparts, such as "you" and "your". The goal of this revision is to identify whether pronoun usage makes a difference in how an individual rates oneself on negative criteria (i.e. anxiety sensitivity) in a self-report questionnaire. The questions are still scored on the same five-point scale ranging from "Very Little" to "Very Much" and no terminology that would affect the multidimensionality of the questionnaire was changed (Taylor, 2007).

Beck Anxiety Inventory (BAI). This questionnaire will be administered to measure the severity of anxiety in the study participants. The questionnaire features 21

questions designed to determine the severity of anxiety in individuals and has been shown to be reliable and valid. The questions feature various symptoms of anxiety and are scored on a four-point scale from "Not At All" to "Severely" in order to determine the presence and severity of various symptoms of anxiety (Beck, Epstein, Brown & Steer, 1988).

Brief Fear of Negative Evaluation Scale (FNE). This questionnaire measures individuals' fear of negative evaluation by peers and other individuals. Each of the twelve questions presents an aspect of this fear and asks the individual to rate their level of discomfort with each aspect regardless of its presence in everyday life on a five-point scale ranging from "Very Little" to "Very Much". This is a slight modification from the original which asks how characteristic each aspect is (Leary, 1983).

Treatment Conditions

The Active CBM-I condition consisted of a program designed through E-Prime software, similar in content to the one developed by Beard and Amir in their study on interpretation modification (Beard & Amir, 2008). The program displayed a word or short phrase on the screen for one second, followed by a brief sentence with content that could be related to the word. Approximately half of the word/sentence combinations were benign in interpretation, and half were threatening or anxiety-related. Participants were then prompted to respond whether the word and sentence are related or unrelated. The goal of the program was to encourage benign interpretations of arousal symptoms and discourage threat interpretations. To do this, a positive or "Correct" response was

given to a “related” answer for benign interpretations, and a negative or “Incorrect” response was given to a “related” answer for threatening interpretations. “Incorrect” answers were reinforced by a loud “beep”. Forty such trials were completed without reinforcement of answers, forty with reinforcement, and forty unique trials were completed following the previous eighty to measure changes in interpretive bias.

The participants in the control condition received a similar intervention as the one received by the active condition, though in the control condition no threatening interpretations were produced. Instead, the only sentences displayed were benign and unrelated to anxiety disorders. This intervention was designed to impact anxiety sensitivity as little as possible.

Procedure

Individuals were screened in advance through the introductory psychology mass screening provided by USM at the beginning of each semester. Those participants that were not chosen through the mass screening were screened through SONA or Qualtrics surveys. Each survey measured anxiety sensitivity to provide a way to screen out participants, though the SONA screening measure included both the original ASI-3 and the ASI-Y, separated by additional measures such as the BAI, FNE, and ISI. This separation was done keep participants unaware of the connection between the two versions of the ASI, as well as to ensure that repetition of the measures did not confound the study by causing significant rating changes independent of the pronoun changes. The

SONA screening scores for both versions of the ASI were collected and assessed for differences by running Wilcoxon signed-rank tests and paired T-tests through SPSS.

All eligible participants were asked to read and sign a consent form explaining the study prior to moving forward with the study. They were also given contact information for the researchers in case of any questions. They were then asked to provide basic demographic information and complete a pre-intervention assessment including both versions of the ASI, as well as several other self-report measures such as the BAI and the FNE. As previously mentioned, individuals taking benzodiazepine medications, as well as individuals under 18 years of age, were excluded from the study.

The study conducted for the purpose of this thesis took place within a larger study concerning the use of cognitive bias modification for interpretive bias (CBM-I) for anxiety sensitivity. Participants who continued to the broader study were randomly placed in either the active or control CBM-I groups as previously described. The respective interventions were administered to individual participants in private rooms. Following the interventions, a battery of questionnaires identical to the pre-assessment was administered, as well as the straw-breathing behavioral fear challenge. This challenge required participants to breathe through a narrow straw to simulate feelings of anxiety and panic in a low-risk environment. Follow-up measures were given online both one week and one month following the completion of the interventions.

Following the study, the baseline and post-CBM assessments were analyzed for AS differences between the two measures. Both versions of the ASI were also assessed

for convergent validity against the BAI and for divergent validity against the FNE. Correlation measures were run through SPSS, as well as Wilcoxon signed-rank tests and paired T-tests.

Results

SONA Prescreen Analysis

To determine whether there was a significant difference between the original ASI-3 and the ASI-Y, correlational analyses were run, as well as both parametric and nonparametric comparison tests.

Both measures in the prescreen (n = 287) showed high correlations to the Beck Anxiety Inventory, with a slightly higher correlation for the ASI-Y (r = .737) than the original ASI-3 (r = .72). Lower, though still relatively high, correlations were found between the measures and the Fear of Negative Evaluation Scale as well, with the ASI-Y once again showing a marginally higher correlation (r = .647, compared to r = .641). The measures themselves showed an extremely high – though imperfect – correlation with each other (r = .920). For a full list of correlation coefficients, see *Figure 1*.

A Wilcoxon Signed Rank Test found a statistically significant difference in medians between the two scores (z = -7.089, p < .001) and an effect size bordering the recommendations between small and medium (r = 0.297), with the median score decreasing by four points (Md = 20.0 to Md = 16.0) from the original to the revised measures. Further analysis indicated approximately 84.64% shared variance between the measures.

Mean scores also shifted substantially between measures, as indicated by a paired-samples t-test. Anxiety sensitivity mean scores from the original ASI-3 (M = 21.96, SD = 15.04) were higher than scores measured by the ASI-Y (M = 19.60, SD = 15.77), t (286) = 6.442, $p < .0005$ (two-tailed), with a mean decrease of 2.36 at a 95% confidence interval stretching from 1.64 to 3.08. A medium effect size was found between the measures (eta squared = 0.13).

Baseline and Post-CBM Analysis

Results from both before and after the CBM-I intervention were recorded and analyzed to expand upon the previously perceived difference between the two measures, though these groups included a significantly smaller sample (n = 33). Additionally, in some analyses, participant responses had to be excluded due to failure to fully complete the measures. In the control condition (n = 14), only 13 had completely filled out the baseline measure for the ASI-Y, though all other measures were fully recorded for each participant. In the active condition (n = 19), only 18 completed the baseline measure of the ASI-Y, as well as the post-CBM FNE and ASI-Y measures. Additionally, only 16 completed the post-CBM ASI-3 and 15 completed the post-CBM BAI.

Correlational analysis in the control group once again revealed strong correlations between both versions of the ASI and the BAI taken at baseline, with somewhat higher correlations for the ASI-Y (r = .738) than for the ASI-3 (r = .692), as well as for these same measures taken post-intervention, with correlational values once again marginally higher for the ASI-Y (r = .730) than for the ASI-3 (r = .684). In this analysis, however,

the correlations between the two versions of the ASI and the FNE were moderate to low at both baseline and post-intervention measures, and these values did not exceed the threshold for statistical significance.

Compared against each other, the two versions of the ASI used in this study again showed extremely high correlation with each other at the baseline measurement (r = .934), with nearly identical scores at post-intervention measurement (r = .932). Pre-post measures indicate nearly identical correlations between baseline and post-intervention ASI-3 scores (r = .940) and those same measures taken by the ASI-Y (r = .938). Correlations become more disparate when comparing the baseline ASI-3 to the post-intervention ASI-Y scores (r = .886) and comparing the baseline ASI-Y to the post-intervention ASI-3 scores (r = .991). For a more complete picture of control-group correlations, see *Figure 2*.

Active-condition correlational analysis produced slightly different results. The original ASI-3 once again showed high correlations to the BAI (r = .642), as did the ASI-Y (r = .658), and both versions of the ASI displayed very high correlation with each other (r = .932), with these values rising slightly at the post-intervention measures (r = .983).

In this analysis, though, correlations were high and statistical significance was reached when comparing the FNE to both the ASI-3 (r = .659) and ASI-Y (r = .616). Correlations rose when comparing these same measures at post-intervention measurement, with original ASI-3 scores displaying stronger post-treatment correlations to the BAI (r = .861) and the FNE (r = 8.19) than the ASI-Y showed when compared

against those measures (r = .745 and r = .785, respectively). This difference in scores mimics the difference in the control group, though values for the control group – as stated earlier – were not found to be statistically significant when comparing these measures.

Active condition pre-post analysis reveals high correlations between baseline and post-intervention measures of both ASI versions in all directions, though these correlations are, for the most part, weaker than their control-group counterparts. The correlational values for pre- and post-intervention original ASI-3 scores (r = .807) were weaker than those found for pre- and post-intervention ASI-Y scores (r = .884). In addition, correlations between baseline ASI-3 and post-CBM ASI-Y scores (r = .755) were weaker than correlations between baseline ASI-Y and post-CBM ASI-3 scores (r = .914). For a full list of active condition correlation coefficients, see *Figure 3.*

A Wilcoxon signed rank test revealed information contrary to that presented by the prescreen analysis. A statistically significant difference was found between baseline ASI-3 and ASI-Y measures in the active condition (z = -1.969, $p < .05$) with a medium effect size (r = .32) and median scores decreasing from Md = 39.0 (original) to Md = 34.5 (revised), though this difference was not observed in the control condition. In addition, no significant differences between post-intervention ASI's or baseline-to-post-intervention measures were not found in this analysis.

A paired t-test brought forth similar results, with significant results found only for active condition baseline anxiety sensitivity measures, with scores decreasing between the ASI-3 (M = 38.83, SD = 13.44) and the ASI-Y (M = 34.72, SD = 18.17), $t(17)$ =

2.338, $p < .05$ (two-tailed). The mean decrease between measures was 4.11 at a 95% confidence interval ranging from .40 to 6.56 and an eta squared (0.24) that indicated a large effect.

In addition, the analysis found no significant difference in the rate of change from baseline to post-intervention between the two anxiety sensitivity measures.

Discussion

Previous research on pronoun usage indicates that first-person pronouns strengthen the link between self-concept and negative stimuli, especially when concerning mental health (Meissener, 2008; Rude, Gortner & Pennebaker, 2010). Second-person pronouns, on the other hand, are indicative of objectivity (Park, Adyuk & Kross, 2015). While these relationships have been readily established, they have yet to be applied to self-report questionnaires – a knowledge gap that this study sought to address.

Based on the information provided by the prescreen analysis, it is reasonable to assume there is a difference between the original ASI-3 and the ASI-Y. Correlations were high between all measures, providing evidence that the ASI-Y is still valid, though they strengthened slightly when comparing the BAI and the FNE to the ASI-Y as opposed to comparison with the ASI-3. Both the mean and median scores for the two anxiety sensitivity measures shifted downward between ASI-3 and the ASI-Y; one possible explanation for this is the self-distancing theory discussed earlier (Park, Adyuk

and Kross, 2015) acting in combination with the increased negative self-evaluation that often accompanies first-person pronouns (Rude, Gortner & Pennebaker, 2010). In general, participants tended to score slightly lower on the ASI-Y than on the ASI-3, suggesting at least some confirmation of the primary hypothesis.

Baseline and post-intervention analysis, however, revealed some anomalies, only indicating a statistically significant difference between the two measures in the active condition, while baseline-to-post measures and control condition measures showed no significance. In addition, correlations between the two measures and the FNE did not reach statistical significance in the control group analysis, though they did in the active group. One of the primary problems with this data set is the extremely small sample size, due in part to both low participant recruitment rates and the lack of complete responses from participants. Due to the varying significance values, the secondary hypothesis – that the differences between the two anxiety sensitivity measures would be retained after a brief intervention – cannot be confirmed at this time. The final hypothesis concerning the rate of change in the measures from baseline to post-intervention was also voided.

This study had several limitations that should be addressed in future studies. Primarily there is the issue of using undergraduate students, especially those receiving compensation for their participation. Undergraduate samples are not necessarily representative of the general public, and individuals responding to questionnaires for the purpose of receiving compensation instead of out of earnest interest in the study may not be as motivated to provide accurate information. In addition, self-report questionnaires

are inherently flawed in that they rely on participant honesty and accurate self-assessment rather than focusing on observable behaviors or other more concrete material.

Beyond these issues, the repetition of measures may have caused some response bias, as participants may have sought to reproduce their answers from the first assessment. Though prescreen results indicate that this may not have been the case, future studies might benefit from using a between-groups method of analysis for the two measures, rather than the within-groups method employed in this study.

Originally, the anxiety sensitivity measures were to be analyzed both one week and one month following the in-lab intervention; however, due to time constraints and low participant recruitment rates – potentially due to the length (1.5 hours) of the in-lab portion of the study – these measures were not able to be obtained for inclusion in this thesis. Future replications might consider employing these post-intervention measures in order to see if the disparity between the two measures remains after such a length of time.

The present study does indicate at least a mild relationship between pronoun usage and self-report anxiety sensitivity scores; however, further research is necessary in order to establish a concrete link between the two concepts. By bridging this knowledge gap in current psychometric literature, we can work to improve the accuracy of self-report questionnaires and thus advance diagnostic capabilities.

References

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*.

Axelson, D. A., & Birmaher, B. (2001). Relation between **anxiety** and depressive disorders in childhood and adolescence. ***Depression*** *and* ***Anxiety***, *14*, 67–78. doi:10.1002/da.1048

Beard, C., & Amir, N. (2008). A multi-session interpretation modification program: Changes in interpretation and social anxiety symptoms. Behaviour Research and Therapy, 46(10), 1135-1141. doi: 10.1016/j.brat.2008.05.012

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties.Journal Of Consulting And Clinical Psychology, 56(6), 893-897. doi:10.1037/0022-006X.56.6.893

Carleton, R., Park, I., & Asmundson, G. (2005). Fear of physical harm: Revising and confirming the injury/illness sensitivity index. Depression And Anxiety, 22(4), 203-204.

CDC. (2013). Burden of Mental Illness. Retrieved February 14, 2013, from http://www.cdc.gov/mentalhealth/basics/burden.htm

Greenberg, P. E., Sisitsky, T., Kessler, R. C., Finkelstein, S. N., Berndt, E. R., Davidson, J. R. T., . . . Fyer, A. J. (1999). The economic burden of anxiety disorders in the 1990s. *Journal of Clinical Psychiatry*, *60*(7), 427-435. doi: 10.4088/JCP.v60n0702

Kross, E., Bruehlman-Senecal, E., Park, J., Burson, A., Dougherty, A., Shablack, H., & ... Ayduk, O. (2014). Self-talk as a regulatory mechanism: How you do it matters. *Journal Of Personality And Social Psychology*, *106*(2), 304-324. doi:10.1037/a0035173

Leary, M. R. (1983). A brief version of the Fear of Negative Evaluation Scale. Personality and Social Psychology Bulletin, 9, 371-376.

Liebowitz, M. R., Gorman, J. M., Fyer, A. J., Dillon, D. J., & Klein, D. F. (1984). Effects of naloxone on patients with panic attacks. The American Journal of Psychiatry.

Meissner, W. W. (2008). The role of language in the development of the self III: The significance of pronouns. *Psychoanalytic Psychology*, *25*(2), 242-256. doi:10.1037/0736-9735.25.2.242

Olatunji, B. O., & Wolitzky-Taylor, K. B. (2009). Anxiety sensitivity and the anxiety disorders: A meta-analytic review and synthesis. *Psychological Bulletin, 135*(6), 974-999. doi: 10.1037/a0017428

Park, J., Ayduk, Ö., & Kross, E. (2015). Stepping Back to Move Forward: Expressive Writing Promotes Self-Distancing. *Emotion*, doi:10.1037/emo0000121

Rude, S., Gortner, E.M., & Pennebaker, J. (2010). Language use of depressed and depression-vulnerable college students. *Cognition and Emotion, 18(8)*, 1121-1133. doi:10.1080/02699930441000030

Schmidt, N. B., Capron, D. W., Raines, A. M., & Allan, N. P. (2014). Randomized clinical trial evaluating the efficacy of a brief intervention targeting anxiety

sensitivity cognitive concerns. *Journal of consulting and clinical psychology*, *82*(6), 1023.

Schmidt, N. B., Lerew, D. R., & Jackson, R. J. (1997). The role of anxiety sensitivity in the pathogenesis of panic: Prospective evaluation of spontaneous panic attacks during acute stress. *Journal of Abnormal Psychology*, *106*(3), 355-364.

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., ... & Cardenas, S. J. (2007). Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3.*Psychological assessment*, *19*(2), 176.

U.S. Bureau of Labor Statistics. (2015). *CPI Inflation Calculator*. Retrieved from http://www.bls.gov/data/inflation_calculator.htm

Appendix A: Original IRB Approval Letter

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 |
www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

The risks to subjects are minimized.
The risks to subjects are reasonable in relation to the anticipated benefits.
The selection of subjects is equitable.
Informed consent is adequate and appropriately documented.
Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
Appropriate additional safeguards have been included to protect vulnerable subjects.
Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported
to the IRB Office via the "Adverse Effect Report Form".
If approved, the maximum period of approval is limited to twelve months.
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 16011505
PROJECT TITLE: Brief Computerized Stress Intervention for Anxiety
PROJECT TYPE: New Project
RESEARCHER(S): Daniel Capron, Ph.D.
COLLEGE/DIVISION: College of
Education and Psychology DEPARTMENT:
Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 02/02/2016 to 02/01/2017

Lawrence A.
Hosman, Ph.D.
Institutional
Review Board

Appendix B: Consent Form

University of Southern Mississippi
Consent to Participate in a Research Study

Title of Study: Brief Computerized Stress Intervention for Anxiety

Principal Investigator: Daniel Capron, Ph.D.
USM Department: Psychology Department
Phone number: 601-266-4380

Study Contact email: Daniel.Capron@usm.edu

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of this study is to evaluate different treatments designed to help people reduce their anxiety sensitivity, the extent to which individuals believe symptoms of anxiety are potentially harmful.

How long will your part in this study last?

The total time commitment for the current study will be about 1.5 to 2 hours.
The project consists of:

- 1 visit to a lab that will take 1 - 1.5 hours
- 2 very brief follow-up online questionnaires expected to take 5-10 minutes

What will happen if you take part in the study?

The current research study will include the following:

- *Lab visit*
  During this appointment you will be asked to complete a series of questionnaires. Next, you will be randomly assigned to receive either an active computer intervention that targets anxiety-related interpretations or a control program designed to not have any effect on anxiety-related interpretations. This appointment
  will also entail breathing through a narrow straw. This activity may cause you to experience some physical sensation akin to anxiety; however, the sensations
  are momentary and the procedure has been used safely in similar experiments for over 10 years.
- *Online Follow-ups*
  One week and one month after the experiment appointment you will be sent a link to a secure website to fill out a very brief computer questionnaire.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. You may also expect to benefit by participating in this study by receiving either a $15 gift card or up to 4.5 course credits for your Psychology course.

What are the possible risks or discomforts involved from being in this study?

The risks to human subjects in the proposed study are minimal. Nevertheless, precautions will be taken to minimize any risks you may incur in the proposed study. Some individuals may experience slight discomfort describing their thoughts. The straw-breathing challenge can also create a mild level of physical discomfort; however, any discomfort you may experience is completely temporary and will be only momentary. These situations should not be any more anxiety-provoking than situations commonly experienced in day-to-day life. If it is determined that there is an immediate need for assistance, you will be referred to clinicians with whom you may speak about your discomfort or distress. You furthermore have the right to refuse or discontinue participation at any time. There may be uncommon or previously unknown risks. You should report any problems to a member of our research team.

How will your privacy be protected?

Careful measures will be taken to ensure your confidentiality as a participant in this study will be protected to the extent allowed by law. Each participant will be assigned an Identification Code with which all questionnaires and behavioral observations will be labeled. The key associating Identification Codes with participant names will be kept separate from all assessment materials and consent forms in a secured file. You may inquire about referral sources if you wish, and the experimenter will be able to provide you with that information. All other questionnaire data relevant to this project will be destroyed on or before December 31, 2026.

Will you receive anything for being in this study?

You will be receiving either a $15 gift card or 4.5 research credits total for the Introduction to Psychology course. You will receive this credit for today's appointment plus your participation in the brief online one week and one month follow up computer questionnaires.

Will it cost you anything to be in this study?

There will be no costs for being in the study.

What if you are a USM student?

You may choose not to be in the study or to stop being in the study before it is over at any time. This will not affect your class standing or grades at USM. You will not be offered or receive any special consideration if you take part in this research.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

- -

Participant's Agreement:

I have read the information provided above. I have asked all the questions I have at this time. I voluntarily agree to participate in this research study.

_____ _____

Signature of Research Participant Date

_____

Printed Name of Research Participant

If you would like to be contacted to participate in future research studies, please list your email address:

_____

This project and this consent form have been reviewed by the Institutional Review Board of The University of Southern Mississippi, which ensures that research projects involving human subjects follow federal guidelines. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, Box 5147, Hattiesburg, MS 39406, (601) 266-6820. A copy of this form will be given to you, the research participant.

Appendix C: ASI-3

INSTRUCTIONS: Circle the **one phrase** that best represents the extent to which you agree with the item. If any of the items *concern something* that is not part of your experience, answer on the basis of how you think you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience.

1. It is important to me not to appear nervous.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

2.When I cannot keep my mind on a task, I worry that I might be going crazy.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

3. It scares me when my heart beats rapidly.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

4. When my stomach is upset, I worry that I might be seriously ill.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

5. It scares me when I am unable to keep my mind on a task.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

6. When I tremble in the presence of others, I fear what people might think of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

7. When my chest feels tight, I get scared that I won't be able to breathe properly.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

8. When I feel pain in my chest, I worry that I'm having a heart attack.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

9. I worry that other people will notice my anxiety.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

10. When I feel "spacey" or spaced out, I worry that I may be mentally ill.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

11. It scares me when I blush in front of people.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

13. When I begin to sweat in social situations, I fear people will think negatively of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

14. When my thoughts seem to speed up, I worry that I might be going crazy.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

15. When my throat feels tight, I worry that I could choke to death.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

16. When I have trouble thinking clearly, I worry that there is something wrong with me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

17. I think it would be horrible for me to faint in public.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

18. When my mind goes blank, I worry that there is something terribly wrong with me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

Appendix D: ASI-Y

INSTRUCTIONS: Circle the **one phrase** that best represents the extent to which you agree with the item. If any of the items *concern something* that is not part of your experience, answer on the basis of how you think you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience.

1. It is important to you not to appear nervous.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

2. When you cannot keep your mind on a task, you worry that you might be going crazy.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

3. It scares you when your heart beats rapidly.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

4. When your stomach is upset, you worry that you might be seriously ill.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

5. It scares you when you are unable to keep your mind on a task.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

6. When you tremble in the presence of others, you fear what people might think of you.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

7. When your chest feels tight, you get scared that you won't be able to breathe properly.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

8. When you feel pain in your chest, you worry that you're having a heart attack.

   VERY LITTLE A LITTLE SOME MUCH VERY MUCH

9. You worry that other people will notice your anxiety.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

10. When you feel “spacey” or spaced out, you worry that you may be mentally ill.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

11. It scares you when you blush in front of people.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

12. When you notice your heart skipping a beat, you worry that there is something seriously wrong with you.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

13. When you begin to sweat in social situations, you fear people will think negatively of you.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

14. When your thoughts seem to speed up, you worry that you might be going crazy.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

15. When your throat feels tight, you worry that you could choke to death.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

16. When you have trouble thinking clearly, you worry that there is something wrong with you.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

17. You think it would be horrible for you to faint in public.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

18. When your mind goes blank, you worry that there is something terribly wrong with you.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

Appendix E: FNE

Mark the appropriate answer corresponding to the one phrase that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience, answer on the basis of how you think you might feel if you had such an experience. Otherwise, answer all items on the basis of your own experience.

1. Sometimes I think I am too concerned with what other people think.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

2. I worry about what kind of impression I make on people.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

3. I am afraid that people will find fault with me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

4. I am concerned about other people's opinions of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

5. When I am talking to someone, I worry about what they may be thinking of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

6. I am afraid that others will not approve of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

7. I am usually worried about the kind of impression I make.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

8. I am frequently afraid of other people noticing my shortcomings.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

9. I worry what other people will think of me when I know it doesn't make any difference.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

10. It bothers me when people form an unfavorable opinion of me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

11. I often worry that I will say or do the wrong things.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

12. If I know that someone is judging me, it tends to bother me.

VERY LITTLE A LITTLE SOME MUCH VERY MUCH

Appendix F: BAI

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by choosing the answer that best fits.

	Not At All	Mildly (It did not bother me much.)	Moderately (It was very unpleasant, but I could stand it.)	Severely (I could barely stand it.)
1. Numbness or tingling.				
2. Feeling hot				
3. Wobbliness in legs.				
4. Unable to relax.				
5. Fear of the worst happening.				
6. Dizzy or lightheaded.				
7. Heart pounding or racing.				
8. Unsteady.				
9. Terrified.				
10. Nervous.				
11. Feelings of choking.				
12. Hands trembling.				

13. Shaky.				
14. Fear of losing control.				
15. Difficulty breathing.				
16. Fear of dying.				
17. Scared				
18. Indigestion or discomfort in abdomen.				
19. Faint.				
20. Face flushed.				
21. Sweating (not due to heat).				

Appendix G: Sample Word-Sentence Pairings

Control Related

Blank……..….Nothing was written on the page.

Can’t focus……..…The camera couldn’t find a focal point.

Control Unrelated

Blank……The leaves are green.

Can’t focus……Seven is a number.

Active Benign

Blank…….It is nice to take a break sometimes.

Can’t focus……I should rest after such a long day.

Active Threatening

Blank…….Something is wrong with my thoughts.

Can’t focus……I think I am going insane.

Appendix H: Tables

Table 1

Prescreen Correlations

Variables	1	2	3	4
1. Total ASI-3	-			
2. Total BAI	.726**	-		
3. Total FNE	.641**	.551**	-	
4. Total ASI-Y	.920**	.737**	.647**	-
M	21.96	16.15	22.50	19.60
SD	15.04	13.11	14.42	15.78

**p<.01

Table 2

Correlations Between Measures in Control Condition

Variables	1	2	3	4	5	6	7	8
1. Baseline ASI-3	-							
2. Baseline BAI	.692** *n*=14	-						
3. Baseline FNE	.401 *n*=14	.218 *n*=14	-					
4. Baseline ASI-Y	.934** *n*=13	.738** *n*=13	.261 *n*=13	-				
5. Post-CBM ASI-3	.940** *n*=14	.650* *n*=14	.355 *n*=14	.991** *n*=13	-			
6. Post-CBM BAI	.654* *n*=14	.903** *n*=14	.308 *n*=14	.793** *n*=13	.684** *n*=14	-		
7. Post-CBM FNE	.436 *n*=14	.190 *n*=14	.777** *n*=14	.308 *n*=13	.405 *n*=14	.189 *n*=14	-	
8. Post-CBM ASI-Y	.886** *n*=14	.637* *n*=14	.489 *n*=14	.938** *n*=13	.932** *n*=14	.730** *n*=14	.324 *n*=14	-
M	39.29	27.21	30.43	39.15	39.00	22.14	34.07	37.07
SD	14.23	13.09	18.40	15.38	17.23	15.17	17.79	16.21

*p<.05 **p<.01

Table 3

Correlations Between Measures in Active Condition

Variables	1	2	3	4	5	6	7	8
1. Baseline ASI-3	-							
2. Baseline BAI	.642** *n*=19	-						
3. Baseline FNE	.659** *n*=19	.372 *n*=19	-					
4. Baseline ASI-Y	.932** *n*=18	.658** *n*=18	.616** *n*=18	-				
5. Post-CBM ASI-3	.807** *n*=16	.639** *n*=16	.719** *n*=16	.914** *n*=16	-			
6. Post-CBM BAI	.830** *n*=15	.872** *n*=15	.631* *n*=15	.839** *n*=14	.861** *n*=13	-		
7. Post-CBM FNE	.668** *n*=18	.558* *n*=18	.908** *n*=18	.763** *n*=17	.819** *n*=16	.674** *n*=15	-	
8. Post-CBM ASI-Y	.755** *n*=18	.545* *n*=18	.663** *n*=18	.884** *n*=17	.983** *n*=16	.745** *n*=15	.780** *n*=18	-
M	38.74	26.95	38.95	34.72	35.06	22.73	37.39	33.11
SD	13.06	11.16	11.10	18.17	19.91	12.36	12.37	18.96

*p<.05 **p<.01