SELF-FOCUSED ATTENTION IN SITUATIONS OF ACUTE STRESS

By

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Abstract

Previous studies have linked depression and stress to an increase in self-focused attention (Mor & Winquist, 2002). High levels of self-focused attention in depressed individuals has been linked to changes in their cognitive processes, including a higher use of singular first-person pronouns like “I” (Rude, Gortner, & Pennebaker, 2004). Since stress and depression are believed to be associated conditions, the current study hypothesized that individuals experiencing acute stress would show an increase in the use of the I-pronoun. The Trier Social Stress Test was conducted in a virtual setting within Second Life to induce a stress reaction in participants. Recordings for each participant were later transcribed and analyzed using the Linguistic Inquiry and Word Count (LIWC) text analysis software. When the post-task subjective stress measure was compared to the use of “I”, the results showed a significant positive correlation. These results provide support for pronoun use as a method of measuring self-focused attention in situations of acute stress and suggest the possibility of cognitive similarities between individuals experiencing acute stress and those experiencing depression.
Introduction

Ordinarily, self-focused attention is considered to be part of a self-correcting process that allows an individual to compare his or her current state with their goals or expectations. It has been argued that individuals who are not meeting expectations will work to alter their behavior so that they will be able to accomplish a goal or abandon the goal entirely, depending on their judgment about the likelihood for success and their rate of progress towards the goal (Duval, Duval, & Mulilis, 1992). An important part of this goal-reassessment process is how individuals attribute failures and successes because this judgment will determine what type of actions are taken in the future. The success or failure of a goal will be attributed to the self when this attribution is the most plausible in a situation (Duval & Silvia, 2002). Attributing the failure of achieving a goal to the self may act as a motivating factor because it suggests to an individual that the goal can be achieved if the behavior of the individual is modified. On the other hand, attributing failure to an outside source suggests to the individual that the outcome is out of his control.

However, although this self-focused attention can contribute to the development of behavior that will help accomplish goals, there is evidence that a high of amount of self-focused attention can be debilitating. Pyszczynski and Greenberg (1987) proposed that individuals suffering from depression develop a negative self-image as a result of the constant experience of self-focused attention. This higher level of self-focused attention is theorized to develop from the attempt by individuals to reduce a discrepancy between who they were and who they became after losing something or someone that was important to their self-esteem. These losses can range from the loss of a job to the loss of a loved one. In these situations, the loss (e.g. work, loved one) may have been out of the control of the individual but instead of recognizing this, the
individual continues to work towards the goal. Abandoning the goal would be a more effective choice because this would allow the individual to focus on accomplishing other more achievable goals, which makes retaining the current goal maladaptive.

The relationship between self-focused attention has been supported by research after Pyszczynski and Greenberg first introduced their model (Mor & Winquist, 2002). If depressed individuals do in fact differ from others in the degree to which they self-focus, then one implication of this model is that other cognitive differences might also be found in depressed individuals when they are compared to others from a nonclinical population. For example, depressed individuals are more likely to report overgeneral, autobiographical memories during cued recall tasks and this has been linked to worse response to treatments (Brittlebank, Scott, Williams, & Ferrier, 1993; Peeters, Wessel, Merckelbach, & Boon-Vermeeren, 2002). Overgeneral autobiographic memory has been described as memory that is “either generic (referring to an event occurring more than once) or extended (taking place over a period longer than one day)” (Brittlebank et al., 1993). This is important because it is an example of how the overall cognition of depressed individuals can be changed by self-focus and how the influence of the direction of one’s focus is not limited to only one aspect of depression. Further evidence for this is provided by research suggesting that a specific type of self-focus, analytical self-focus (which involves thinking about and analyzing personal experiences), is believed to maintain over-general memory in depressed individuals (Watkins & Teasdale, 2004).

Research has also identified another cognitive process in depressed individuals that is closely linked to self-focused attention. Rude, Gortner, and Pennebaker (2004) identified a higher use of first-person singular pronouns in the written text of individuals who were experiencing depression or were at risk for developing depression. Participants in that study
completed a 20-minute writing task in which they discussed their thoughts and feelings about being in college. The higher I-pronoun use in depressed individuals was believed to be an indicator of self-focused attention. This theory was in part derived from a similar finding that poets who later committed suicide showed a more frequent use of first-person pronouns in their writing when compared to other poets who did not commit suicide (Stirman & Pennebaker, 2001). The link between these two studies is the fact that the negative affect experienced by individuals was linked to an increased in I-use.

Like with depression, research has identified a strong association between increased levels of self-focused attention with increased anxiety and stress. Of particular interest has been the negative effect that self-focus attention is known to have on the performance of individuals, especially those who may suffer from social anxiety (Hope, Gansler, & Heimberg, 1989). For example, stress induced by sporting events has been known to lead to an increase in self-focused attention in athletes, where stress was highest before the event and lower after it had passed (Liao & Masters, 2002). Similarly, self-focused attention has been shown to increase in those suffering from social phobia, even in situations where they are not asked to perform in front of audiences (Woody & Rodriguez, 2000; Woody, 1996). Evidence supporting an increase of self-focused attention when experiencing anxiety and/or stress has been found in many other studies (for a review see Mor & Winquist, 2002; Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990).

The findings mentioned above are important because they demonstrate how the negative effect of self-focused attention on the self is not unique to the experience of depression. If both depression and stress are associated with an increased self-focus, there are likely to be other characteristics that are also shared by the two conditions. One of these shared characteristics could be the increased use of first-person pronouns, specifically the use of “I”, when individuals
experience stress, similar to the previously discussed increase in I-use observed in depressed individuals.

Support for this hypothesis can be found in a case study by Pennebaker and Lay (2002). In this study, the researchers compared multiple speech samples of New York City mayor, Rudolph Giuliani, before and after he experienced a series of personal or public crises and stressors, like his divorce and the attack on the World Trade Center on September 11, 2001. The results showed that following his personal crises (e.g. divorce), Mayor Giuliani’s pronoun use shifted from a mostly first-person plural (i.e. we) to mostly first-person singular (i.e. I) but the balance shifted again after the events of 9/11 when he was forced to take on a greater leadership role within his community. While the methods used in the study prevented the researchers from considering the level of stress that he experienced on his use of “I”, the nature of the events he experienced suggests that stress experienced over long periods of time could lead to the increase of I-pronouns.

Further support can be found in research that has established that stress and depression are highly associated, often comorbid, conditions which further supports the hypothesis that they could lead to similar changes in cognitive processes. A longitudinal study involving female twins found a possible causal relationship in which life stressors (e.g. rape, divorce, loss of a loved one) can lead to episodes of depression when individuals are not genetically predisposed to experiencing stress and depression (Kendler, Karkowski, & Prescott, 1999). Furthermore, while older research suggested that comorbid anxiety does not have an influence on primary major depressive disorder in school-aged children (Kovacs, Gatsonis, Paulauskas, & Richards, 1989), more recent research has implicated stress as a predictor of depression in children and adolescents (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998),
The current study looks at the cognitive processes of individuals undergoing an acute stress situation. It is hypothesized that the use of “I” by anxious individuals in their speech will resemble the frequency of I in the speech depressed individuals and those at-risk for depression. To the author’s knowledge, using “I” as an indicator of self-focus in situations of acute stress has not been used before. Therefore, the results of this study will show further support for measuring self-focus through pronoun use and will provide further insight into how acute stress situations compare to experiences of anxiety and depression in regards to self-focused attention. In order to measure self-focus, the current study employs a similar method to the one used in Rude, Gortner, and Pennebaker (2004) by looking at the use of first-person singular pronouns in the speech of individuals.

Methods

Participants

Sixty-two students from introductory Psychology classes at the University of Arizona participated for class credit during the summer and fall 2013 semesters. Participants were recruited using a departmental recruitment website and the study was promoted using the following description:

“Using a virtual world as a means of social support is a new and significant idea in psychology. The goal of the study is to determine if a virtual world can produce a physiological response and assess the effectiveness of online social support. The outcome of the proposed study will help understand how people respond to and interact within an online virtual world.”

This description was used because the current study is part of a larger study that looks into a variety of responses to the Trier Social Stress Test in a virtual environment. The results for the
The current study comes from fifty participants; the other twelve participants were excluded due to off-topic responses caused by foreign language issues, problems with the voice recording software, and unfinished trials by participants who dropped out of the study.

**Virtual TSST**

The current study used a 3rd person virtual world, Second Life, as the setting for the Trier Social Stress Test (TSST). Second Life was created by Linden Research, Inc. and is an online virtual world where users interact with each other and the virtual world using customizable avatars. Content in this virtual world can be created and edited by users and it is free to download and use. This study was conducted inside a virtual auditorium housed inside a museum on an online owned by the university’s Spanish and Portuguese department.

Previous research has consistently confirmed the TSST’s validity as a tool to induce stress responses in individuals (Kirschbaum, Pirke, & Hellhammer, 1993; Kudielka, Hellhammer, & Kirschbaum, 2007). A virtual environment was used to ensure that each participant was exposed to the same environment and to better control the behavior of the confederate avatars who carried out the role of College of Business professors. The author and two undergraduate research assistants provided the voices for the three confederate professor avatars that were used in the study but only two avatars were present for each trial. Most trials used a male-female professor pair, however, a third of the trials had to be conducted using a male-male pair because of the availability of confederates.

In the TSST, participants are asked to give five-minute speech and a five-minute serial-subtraction task, which involves mentally subtracting a smaller number from a larger number (e.g. 13 from 6,233) out loud, in front of the panel of judges (referred to as professors in the current study). To increase the stress experienced during the trial, the professors provide
feedback during the participants’ performance. Each professor speaks only during one section of
the trial (i.e. during the speech portion or serial subtraction task) and they provided the three
gestures for that section. Gestures, while not part of the traditional TSST design, were
incorporated to remind the participant that professor avatars were controlled by actual people.
Although other studies have carried out the TSST in a virtual environment (Jönsson et al., 2010;
Kelly, Matheson, Martinez, Merali, & Anisman, 2007; Wallergård, Jönsson, Österberg,
Johansson, & Karlson, 2011), this is the first time that, to our knowledge, it has been conducted
using 3rd person perspective.

Procedure

Participants arrived at the lab and were introduced to the study after which they were
asked to consent. They were told that they would be preparing a speech in which they would
discuss their qualifications for a hypothetical job position in front of two professors from the
College of Business. Following the consent process, participants were asked to swab the inside
of their mouths in order to collect the first salivary cortisol sample. Each participant was then
escorted to a separate room where the computer that they would be using during the
experimental task was located. For a three minute period, participants were allowed to write out
their speech on a blank sheet of paper. They would not be permitted to use this sheet during the
actual task.

At the end of the three minute preparation period, participants where shown how to
control their avatar and were given the microphone headset that they would use to speak to the
two professors from the College of Business. Every participant’s performance was voice
recorded. Participants were instructed to maneuver their avatar through two closed doors into a
virtual auditorium where they would then proceed to walk to the stage at the front of the lecture
hall and speak to the two professors from a podium. At the end of the experimental task, participants were asked to provide a second salivary sample and to complete a questionnaire. Two more salivary cortisol samples were collected at 15 and 30 minutes after the end of the experimental task.

To identify the level of self-focus in participants, the section of the recording that corresponds to the speech task was transcribed. These transcriptions were analyzed using the Linguistic Inquiry and Word Count (LIWC) text-analysis software, which calculates the frequency of word categories, including pronouns, in written text. This software works by comparing the words in a text to a list of available words in the program’s dictionary, assessing the categories each word belongs to (a word is counted towards the final frequency count of every category it belongs to), and it provides a final rate of use for each word category (Tausczik & Pennebaker, 2010). After the transcriptions were analyzed with LIWC, the frequency of the use of I was correlated with the subjective stress measures and to the results of scale measures.

**Scales**

At the end of the experimental task, participants completed a series of scales. These scales included: the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R), the UCLA Loneliness Scale, the Experiences in Close Relationships-Revised (ECR-R) Questionnaire, and a set of scales designed to identify the level of yearning of individuals undergoing homesickness, the loss of a loved one, and a break-up called Yearning in Situations of Loss Scale (YSL) (O’Connor & Sussman, 2013).

**Results**
The current study aimed to identify a relationship between acute stress levels and the frequency of I-pronouns in the speech of participants. A description of participant characteristics is found in Table 1. Correlational analyses were used to compare the four subjective stress reports to the frequency of I-pronouns during the speech portion of the TSST. Only the subjective stress report completed immediately after the end of the experimental task showed a positive correlation (see Figure 1) with I-use, $r(48) = .4, p = .004$. This effect was present even after a regression analysis controlled for the effects of depression, $r(48) = .4, p = .002$. There was no correlation between the subjective stress reports completed prior to the start of the experimental task or a correlation between the two final stress reports with the use of I-pronoun. Further analysis of pronoun use also revealed a moderate negative correlation between the use of ‘you’ and the subjective stress rating at the end of the task, $r(48) = -.422, p = .002$, which indicates a decrease in outward focused attention.

Because the current study was interested in learning how depression and yearning could affect the possible relationship between subjective stress and self-focused attention, only the CESD-R and YSL scales are discussed in this section. Prior research has identified an association between the use of I and depression (Rude et al., 2004), however, this correlation was not present in our population, $r(48) = .178, p = .216$. No research has looked at how experiencing
yearning influences or is associated with self-focused attention. Originally, this study predicted that yearning would represent a state of negative affect that would be associated with an increase in self-focused attention since previous research has emphasized that different forms of negative affect, not just depression or anxiety, is associated with self-focused attention (Mor & Winquist, 2002). No correlation was found between the scores on the Yearning in Situations of Loss Scales (N=34) and the use of “I”, $r(32) = .126, p = .476$.

![Figure 1](image)

*Figure 1 Correlation between the post-task subjective stress measure and the frequency of I-pronouns during the speech portion of the TSST.*

**Discussion**

The results of the current study indicate that individuals undergoing an acute stress response are also likely to demonstrate an increase in self-directed attention as indicated by their increased use of the I-pronoun. This is consistent with previous research that has associated high
levels of self-reported stress and anxiety with increased self-focused attention (Mor & Winquist, 2002). One important contribution that this study has made is providing support for utilizing pronoun use as indicator of self-focused attention under acute stress situations. Self-focused attention in anxiety and stress has previously been assessed using scales and questionnaires.

More importantly, these results provide further support for the hypothesis found in the literature that anxiety and depression are associated. Previous research has identified an increase in I-use as a cognitive process that distinguishes individuals at-risk for or experiencing depression from those who have not experienced the disorder in the past (Rude et al., 2004), and this effect in the current study was also present in those participants who reported higher stress levels which suggests that both conditions seem to lead to similar cognitive patterns. This finding suggests a few possible directions for future research.

This first possibility is to look for increased I-use in individuals who suffer from chronic stress or anxiety disorder. Participants in the current study were not screened for these conditions. Since the stress induced in the current study was only experienced for short periods of time it is important to see whether this cognitive pattern is present in more prolonged conditions. By establishing similarities between I-use in situations of acute stress and I-use in individuals with chronic stress, researchers can better consider the possibility of adopting pronoun use as an addition to help predict a future diagnosis of chronic stress or anxiety disorders in individuals who experience a stressful event (e.g. death of a loved, divorce, etc.).

Similarly, since both stress and depression have been strongly linked by past research, it would fruitful to pursue research that aims to assess how this cognitive process in acute stress situations can be used as a tool to predict a future diagnosis of depression. If a past diagnosis of anxiety has been previously linked to a future diagnosis of depression (Cole et al., 1998; Kendler
et al., 1999), perhaps the more frequent use of “I” as an indicator of self-focus, in anxious or stressed individuals could help distinguish those most vulnerable for depression. This question cannot be addressed with the results from the current study but could be addressed by future research.

Limitations

There are limitations to this study. Only correlational results were obtained which means that it is not possible if the level of self-focus in participants was caused by the acute stress, if the subjective rating of stress was caused by a pre-existing level of self-focus for participants, or if something else caused the positive correlation. Future studies could address this problem by identifying the level of self-focus prior to the experimental task by using a neutral writing task and then comparing the level of self-focus in the neutral task to the stress and level of self-focus reported during the experimental task. If the self-focus reported during the neutral task were to be positively associated with the reported stress and similar to the level of self-focus observed during the experimental task, this could instead indicate that that self-focus might influence stress.

Other limitations include the study’s lack of assessment for previous diagnoses of chronic stress and anxiety disorders as well as the absence of a second measure for self-focus.

Conclusion

The current study provides evidence that individuals experiencing stress could have similar cognitive processes as individuals experiencing depression. Since both depression and acute stress are associated with an increase in the use of “I”, future research should look into the implications of this shared cognitive process for a later diagnosis of both chronic stress and depression.
References


