Published in final edited form as:

Cogn Emot. 2012 ; 26(4): 720–726. doi:10.1080/02699931.2011.602048.

Linguistic Correlates of Social Anxiety Disorder

Stefan G. Hofmann,
Boston University

Philippa M. Moore,
Boston University

Cassidy Gutner, and
Boston University

Justin W. Weeks
Ohio University

Abstract

The goal of this study was to examine the linguistic correlates of social anxiety disorder (SAD). Twenty-four individuals with SAD (8 of them with a generalized subtype) and 21 nonanxious controls were asked to give speeches in front of an audience. The transcribed speeches were examined for the frequency of negations, *I*-statements, *we*-statements, negative emotion words, and positive emotion words. During their speech, individuals with either SAD subtype used positive emotion words more often than controls. No significant differences were observed in the other linguistic categories. These results are discussed in the context of evolutionary and cognitive perspectives of SAD.

Keywords

Social anxiety disorder; linguistics; appeasement; safety behaviors; social anxiety

Appeasement behaviors occupy an important function in social interactions in both humans (Keltner, 1995) and primates (De Waal, 1986). These behaviors may further be of central importance for individuals with social anxiety disorder (SAD), a common mental health problem that is characterized by excessive fear of negative evaluation by others. Specifically, it has been proposed that appeasement behaviors in humans are coping responses in order to inhibit aggression from peers with the goal to protect the individual's standing in the social hierarchy (Trower & Gilbert, 1989). These behaviors have been termed *safety behaviors* in cognitive-behavioral models of SAD (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997).

The verbal correlates of appeasement behaviors can be measured by analyzing the human speech (Pennebaker, & King, 1999) with the Linguistic Inquiry and Word Count program (LIWC; Pennebaker et al., 2001). The LIWC processes texts, such as transcribed speeches, by counting and coding targeted words from psychologically relevant categories. An earlier study used the LIWC program to compare the essays of currently-depressed, formerly-depressed, and never-depressed students in the frequency of negative emotion words and

Please address correspondence to Stefan G. Hofmann, Ph.D., Department of Psychology, Boston University, 648 Beacon Street, 6th Fl. Boston, MA 02215, USA; Tel: 617 353 9233; Fax: 617 353 9609; shofmann@bu.edu.
Contact Information: Stefan G. Hofmann, Ph.D., Professor of Psychology, Department of Psychology, Boston University, 648 Beacon Street, 6th Fl., Boston, MA 02215, USA; Tel: 617 353 9233; Fax: 617 353 9609; shofmann@bu.edu

number of *I*-statements as an indicator of self-focused attention (Rude, Gortner, & Pennebaker, 2004). The study found that the currently-depressed participants used *I*-statements and negative emotion words significantly more than the never-depressed group.

In order to examine the linguistic correlates of SAD, we followed a similar approach by comparing individuals with SAD (with either a generalized and nongeneralized subtype) and non-anxious controls in their transcribed speeches in the frequencies of *I*-statements, *we*-statements, negative emotion words (e.g. hurt, ugly, nasty), positive emotion words (e.g. love, nice, sweet), and negations (e.g. no, not, never) as possible correlates of verbal appeasement behaviors. We examined the frequencies of *I* and *we*-statements, because individuals with SAD are expected to reduce conspicuousness and tend to avoid being the center of attention. Furthermore, we examined negations as well as negative and positive emotion words because these words may serve an appeasement function. We based this hypothesis on the assumption that individuals with SAD are more likely to use positive emotion words as a sign of ingratiation and fewer negations in order to increase conformity to a social group. In addition, there is precedence in the literature to link those word categories to psychopathology (Rude et al., 2004).

Social anxiety disorder, as currently defined in the DSM-IV, is a heterogeneous diagnostic category. In an attempt to capture this heterogeneity, the DSM-IV assigns individuals who fear most or all social situations to the generalized subtype (e.g., Hofmann, Heinrichs, & Moscovitch, 2004). Similarly, personality psychologists have observed a considerable degree of heterogeneity among shy individuals. Specifically, Buss (1986) distinguished between a *self-conscious* and a *fearful* subtype of shyness. The self-conscious subtype has been characterized by excessive self-awareness of public aspects of one's self, whereas the characteristic feature of the fearful type is linked to autonomic reactivity. Similarly, Hofmann and Barlow (2002) distinguished between a *fearful* and an *anxious/self-conscious* subtype of SAD. The *fearful* subtype is more likely to be linked to specific, circumscribed social situations, whereas individuals with a self-conscious subtype are likely to fear multiple situations. Therefore, it is reasonable to assume that relatively more individuals with generalized SAD avoid using *I*-statements and negations than patients with nongeneralized SAD or controls.

In sum, we hypothesized that individuals with a generalized subtype of SAD are the most likely to use *we*-statements (reflecting concerns about being the center of attention), the least likely to use *I*-statements (an indicator of self-focused attention), as well as negations and positive emotion words (as indicators of verbal appeasement behaviors) during their speech. We further examined the frequency of negative emotion words, but did not formulate specific hypotheses about group differences.

Method

Participants

The sample consisted of 46 college undergraduates who received course credits for their participation in the study. Participants were predominantly female (65.2%), Caucasian (91.3%), and Christian (56.5%) with a mean age was 19 (range: 18-21, *SD*: .92). All participants listed English as their primary language. Based on an initial diagnostic interview, 24 out of the total 46 participants had social anxiety disorder (SAD). Of these, 8 met criteria for a generalized subtype. The majority of SAD participants ($n = 22$) were primarily speech anxious.

Procedure

An advertisement for a study of “social attitudes and behaviors” was posted at Ohio University. Prior to the study, participants were not informed that the focus of the study was social anxiety. During a pre-screening, the Social Phobia Scale (Mattick & Clarke, 1998), which is designed to assess fear of public scrutiny, was administered to 768 students over the course of 1 year. Of these students, a total of 46 was selected and invited to participate in the present study (8 participants with generalized SAD, 16 with non-generalized SAD, and 22 non-socially anxious controls). Due to missing data, the analyses were based on 8 individuals with a generalized subtype of SAD, 16 individuals with non-generalized subtype of SAD, and 21 controls with complete data.

As part of the experiment, participants were asked to give a speech on any topic of their choice for a total of 4 minutes. Participants were instructed that an experimenter would urge them to continue even if they did not know how to continue until the period of 4 minutes had elapsed. Participants performed for one audience member (the experimenter) and were recorded on a video camera that was placed directly in front of them on a conference table. During the speech, participants stood at a podium at the opposite end of the conference table to deliver their speeches into a microphone that was mounted onto the podium. Participants were informed that a panel of judges would conduct a post-rating of their speech in regards to poise, social self-confidence, and general presentation skills. In actuality, this did not occur but was stated to induce an increased sense of social and evaluation anxiety.

A speech test has a number of advantages over other social challenge procedures (Hofmann & Barlow, 2001). First, the speech test is by far the most prevalent fear in both the general population (Pollard & Henderson, 1988) and among social phobic individuals (Mannuzza et al., 1995; Pollard & Henderson, 1988). Second, the speech task shows good reliability (Beidel, Turner, Jacob, & Cooley, 1989), and it has, unlike social role play tests, high face validity for measuring anxiety during a public speech.

The debrief informed participants that the study addressed the broad research topic of social anxiety and that analyses would be conducted on their vocal performance, as taken from the recordings. The speeches were transcribed into a simple text format, which the LIWC program (Pennebaker et al., 2001) then processed in order to receive an output of the variables.

Measures

Task administration was counter-balanced (speech task vs. clinical interview/questionnaires completed first) to control for potential ordering effects. There was a time delay of approximately 15 minutes between the speech and the time of the interview and questionnaires.

Anxiety Disorders Interview Schedule for DSM-IV-Lifetime Version, Social Phobia subsection (ADIS-IV-L-SP; DiNardo, Brown, & Barlow, 1994)—The ADIS-IV-L is one of the most widely used semi-structured diagnostic interviews among clinicians in the area of anxiety disorders, and includes a section on social anxiety disorder (social phobia). It is based on the most recent diagnostic criteria.

Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987)—This is a frequently used clinician-administered scale for SAD and its subtypes. It measures fear and avoidance across 24 commonly encountered social and performance situations. Studies support this scale’s psychometric properties (e.g., Heimberg et al., 1999).

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)—The PANAS is comprised of two 10-item scales designed to assess positive affect and negative affect, respectively. The PANAS was administered both prior to and following the speech task – Participants were instructed to indicate the extent to which they experienced the various positive and negative feelings listed in the PANAS in anticipation of, and following, the speech task, respectively. Responses to the PANAS were examined as a means of evaluating the effect of our impromptu speech task on affect. The PANAS-N and PANAS-P subscales demonstrated excellent internal consistency in the present sample at both pre- and post- speech (all α s > .90).

Results

Internal Validity

The three study groups (generalized SAD, non-generalized SAD, and controls) were different in their level levels of social anxiety as measured with the LSAS (total), $F(2, 43)$, 18.02, $p < .001$. The generalized SAD group showed higher scores (M : 47.88; SD : 19.21) than the non-generalized SAD group (M : 30.82; SD : 13.21), which in turn had higher scores than controls (M : 18.36; SD : 7.39) (all group comparisons showed $ps < .02$)

There were no effects of order of task administration (speech task vs. clinical interview/questionnaires completed first) in any of the reported analyses, all $ps > .6$. These findings suggest that the results were unlikely due to order effects.

Following study completion, participants were asked whether they had suspected that deception had been utilized in the study to assess the validity of the procedure. Of the 45 participants who were included in the present analyses, only 3 participants (6.7%) reported a general suspicion of deception regarding the study. These participants reported that they had participated in previous studies which utilized deception, so wondered whether this could have been the case in the present study. However, none of the participants reported that they specifically suspected that their speeches would not be rated by an expert panel. Thus, the manipulation was evidenced to be believable to the participants.

Effect of Speech on Affect

To assess the effect of the impromptu speech task on affect, we examined whether individuals with generalized SAD ($n = 8$), nongeneralized SAD ($n = 16$), and controls ($n = 20$) differed on affect in response to the speech. The three study groups showed a significant multivariate Group effect, $F(2, 41) = 5.57$ (Roy's largest root), $p = .006$, partial eta-square: .22. This effect was due to group differences in the PANAS-N, $F(2, 41) = 5.00$, $p = .011$, partial eta-square: .20. Follow-up comparisons revealed that the generalized SAD participants obtained significantly higher scores on the PANAS-N in comparison to the non-anxious controls ($p = .003$; all other $ps > .07$).

Comparison in Linguistic Categories

We conducted two sets of analyses using general linear models. In the first set, we tested whether the combined group of individuals with SAD ($n = 25$) differed from controls ($n = 20$) in the five linguistic categories (*I*-statements, *we*-statements, negations, positive emotions, and negative emotions). In the second set, we examined whether the individuals with a generalized subtype ($n = 8$), those with a nongeneralized subtype ($n = 16$), and controls ($n = 21$) differed in these categories.

The results of the first test showed a non-significant multivariate group effect (SAD vs. controls), $F(5, 39) = 2.37$ (Roy's largest root), $p = .057$, partial eta-square: .23. The results

of the second test showed that the three study groups (non-generalized subtype of SAD, generalized subtype of SAD, controls) showed a significant multivariate group effect, $F(5, 39) = 3.24$ (Roy's largest root), $p = .015$, partial eta-square: .29. Post-hoc analyses showed that this effect was due to group differences in positive emotion words $F(2, 42) = 4.58$, $p = .016$, partial eta-square: .18. We also observed a trend for negations, $F(2, 42) = 3.13$, $p = .054$, partial eta-square: .13. The hypothesized effect for *I*-statements was not significant ($p > .92$, partial eta-square: .004). All other effects showed p 's $> .08$, partial eta-square $< .12$. As shown in Table 1, both SAD subgroups reported more positive emotion words than controls.

Discussion

It has been proposed that people with SAD tend to adopt a subordinate position in the hope of remaining in social situations with decreased levels of distress while minimizing the risk of a hostile response from others (Gilbert et al., 1996). This evolutionary account is consistent with a cognitive perspective of SAD (Hofmann, 2007; Clark & Wells, 1995), suggesting that safety behaviors are adopted to prevent individuals from critically evaluating the feared outcomes and catastrophic beliefs. Consistent with this notion is a study by Alden and Bieling (1998) that found that socially anxious individuals who participated in a getting-acquainted task used more safety behaviors and elicited more negative responses from others when they were led to believe that others were particularly likely to appraise them negatively, compared with individuals who engaged in positive appraisal. Exposure interventions with specific instructions to abandon safety behaviors have been found to be more efficacious than exposure therapy without instructions to refrain from such behaviors (Wells et al., 1995). These studies provide support for the notion that safety behaviors, such as verbal appeasement, are important maintaining factors in SAD.

We used the LIWC computer program to measure the linguistic correlates of SAD. We hypothesized that individuals with a generalized subtype of SAD are the least likely, and controls the most likely to use *I*-statements (an indicator of self-focused attention) and negations (an indicator of verbal appeasement and safety behaviors) during their speech. The speech test was a successful manipulation to decrease positive affect in all individuals. In addition, individuals with generalized SAD had higher negative affect than the non-anxious controls, and negative affect decreased more for the generalized SAD group from pre- to post-speech than for the non-generalized SAD group and the non-anxious controls. These results suggest that the speech manipulation led to an overall decrease in positive affect and to greater negative affect in the generalized SAD group than in the other groups. Moreover, the results suggest that the experimental manipulation was believable because only 3 of the 45 participants reported a general suspicion of deception regarding the study. In general, these results suggest that the study was internally valid and the manipulation successful.

A comparison between the combined SAD group (generalized and nongeneralized) and the control group revealed a non-significant trend. However, the group effect became apparent when separating the generalized subtype of SAD from the non-generalized subtype. This group effect was associated with interesting differences in the linguistic categories. No differences were observed in *I*-statements and negative emotion words, both of which distinguished people with and without depression (Rude et al., 2004). However, we observed a trend ($p = .054$, partial eta square: .13) for negations, suggesting that both SAD groups used negations less frequently than controls. This non-significant trend is consistent with an evolutionary and cognitive perspective of SAD. The strongest group difference, however, was observed for the frequency of positive emotion words. Although we did not hypothesize this difference, this result could also be interpreted as a form of linguistic appeasement behavior, because positive emotion words typically target social threat by putting the audience at ease. It is possible that the use of positive words is intended to orient

the audience to a positive frame of mind in general. Thus, it could be akin to a safety behavior by attempting to steer the audience away from negative mindsets during social threat. It might further be seen as a soothing behavior, similar to grooming, in line with the psychoevolutionary approach. However, this explanation is highly speculative and additional research is clearly necessary. No significant differences were observed in the other linguistic categories. Furthermore, no differences were observed in the two SAD subtypes.

In sum, our results suggest that subjects with SAD, regardless of diagnostic subtype, more often use positive emotion words. Furthermore, a non-significant trend was observed for negations, suggesting that individuals with SAD tend to use negations less frequently than non-anxious controls. Future research should directly compare SAD with other clinical groups in relevant linguistic parameters. Furthermore, future research should examine whether the linguistic appeasement behaviors correlate with other, non-verbal forms of appeasements, such as body posture and vocal pitch (e.g., see Weeks, Heimberg, & Heuer, in press).

Limitations of the study include the small sample size, the limited range of linguistic categories that were considered, and the lack of a clinical control group. Therefore, this study should only be considered as a preliminary step toward identifying linguistic correlates of SAD and its diagnostic subgroups. This limitation could be improved in a future study with a greater sample and additional diagnostic groups.

However, despite these limitations, our preliminary study provides an example for testing concrete predictions from evolutionary and cognitive models with direct relevance for clinical and emotion research (Cosmides & Tooby, 1999; Nesse & Ellsworth, 2009).

Acknowledgments

This study was conducted as part of a work for distinction project at Boston University directed by Ms. Moore. The study was supported by university funds awarded to Dr. Weeks. Dr. Hofmann is a paid consultant by Schering-Plough and supported by NIMH grant 1R01MH078308. We thank Dr. Pennebaker for analyzing our transcripts with the Linguistic Inquiry and Word Count program.

References

- Alden LE, Bieling PJ. Interpersonal consequences of the pursuit of safety. *Behaviour Research and Therapy*. 1998; 36:53–65. [PubMed: 9613016]
- Beidel DC, Turner SM, Jacob RG, Cooley MR. Assessment of social phobia: Reliability of an impromptu speech task. *Journal of Anxiety Disorders*. 1989; 3:149–158.
- Buss, AH. Two kinds of shyness. In: Schwarzer, R., editor. *Self-related cognition in anxiety and motivation*. Hillsdale, NJ: Erlbaum; 1986. p. 65-75.
- Clark, DM.; Wells, A. A cognitive model of social phobia. In: Heimberg, RG.; Liebowitz, MR.; Hope, DA.; Schneier, FR., editors. *Social Phobia: Diagnosis, assessment and treatment*. New York: Guilford Press; 1995. p. 69-93.
- Cosmides L, Tooby J. Toward an evolutionary taxonomy of treatable conditions. *Journal of Abnormal Psychology*. 1999; 108:453–464. [PubMed: 10466269]
- DiNardo, PA.; Brown, TA.; Barlow, DH. *Anxiety Disorders Interview Schedule for DSM-IV: Lifetime Version (ADIS-IV-L)*. Graywind Publications Incorporated; 1994.
- Gibert P, McEwan K, Bellew R, Mills A, Gale C. The dark side of competition: How competitive behavior and striving to avoid inferiority are linked to depression, anxiety, stress and self-harm. *Psychology and Psychotherapy: Theory, Research and Practice*. 2009; 82:123–136.

- Heimberg RG, Horner KJ, Juster HR, Safren SA, Brown EJ, Schneier FR, Liebowitz MR. Psychometric properties of the Liebowitz Social Anxiety Scale. *Psychological Medicine*. 1999; 29:199–212. [PubMed: 10077308]
- Hofmann SG. Cognitive factors that maintain social anxiety disorder: A comprehensive model and its treatment implications. *Cognitive Behaviour Therapy*. 2007; 36:195–209.
- Hofmann SG, Heinrichs N, Moscovitch DA. The nature and expression of social phobia: Toward a new classification. *Clinical Psychology Review*. 2004; 24:769–797. [PubMed: 15501556]
- Hofmann, SG.; Barlow, DH. Social phobia (social anxiety disorder). In: Barlow, DH., editor. *Anxiety and Its Disorders: The Nature and Treatment of Anxiety and Panic*. 2nd Edition. New York: Guilford Press; 2002. p. 454–476.
- Keltner D. Signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality and Social Psychology*. 1995; 68:441–454.
- Liebowitz MR. Social phobia. *Modern Problems of Pharmacopsychiatry*. 1987; 22:141–173. [PubMed: 2885745]
- Mannuzza S, Schneier FR, Chapman TF, Liebowitz MR, Klein DF, Fyer AJ. Generalized social phobia. Reliability and validity. *Archives of General Psychiatry*. 1995; 52:230–237. [PubMed: 7872851]
- Mattick RP, Clarke JC. Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*. 1998; 36:455–470. [PubMed: 9670605]
- Nesse RM, Ellsworth PC. Evolution, emotions, and emotional disorders. *American Psychologist*. 2009; 64:129–139. [PubMed: 19203145]
- Pennebaker JW, King LA. Linguistic styles: Language use as an individual difference. *Journal of Personality and Social Psychology*. 1999; 77(6):1296–1312. [PubMed: 10626371]
- Pennebaker, JW.; Francis, ME.; Booth, RJ. *Linguistic inquiry and word count*. Mahwah (NJ): Erlbaum; 2001. (LIWC 2001)
- Pollard CA, Henderson JG. Four types of social phobia in a community sample. *The Journal of Nervous and Mental Disease*. 1988; 176:440–445. [PubMed: 3411314]
- Rapee RM, Heimberg RG. A cognitive behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*. 1997; 35:741–756. [PubMed: 9256517]
- Rude SS, Gortner E, Pennebaker JW. Language use of depressed and depression vulnerable college students. *Cognition and Emotion*. 2004; 18:1121–1133.
- Trower P, Gilbert P. New theoretical conceptions of social anxiety and social phobia. *Clinical Psychology Review*. 1989; 9:19–35.
- Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*. 1988; 54:1063–1070. [PubMed: 3397865]
- Weeks JW, Heimberg RG, Heuer R. Exploring the role of behavioral submissiveness in social anxiety. *Journal of Social and Clinical Psychology*. (in press).
- Wells A, Clark DM, Salkovskis P, Ludgate J, Hackmann A, Gelder M. Social phobia: The role of in-situation safety behaviors in maintaining anxiety and negative beliefs. *Behavior Therapy*. 1995; 26:153–161.

Table 1

Comparison between individuals with social anxiety disorder (SAD) and controls in linguistic parameters.

	Generalized SAD (<i>n</i> = 8)	Non-generalized SAD (<i>n</i> = 16)	Controls (<i>n</i> = 21)
Positive Emotion Words	3.99 (1.38)a	3.61 (1.70)a	2.57 (0.91)b
Negative Emotion Words	0.63 (0.30)	0.81 (0.54)	0.99 (1.17)
<i>I</i> -statements	4.11 (3.09)	4.58 (3.90)	4.31 (3.50)
<i>We</i> -statements	2.08 (2.50)	0.88 (1.20)	0.73 (1.07)
Negations	1.02 (0.59)	1.00 (0.56)	1.70 (1.20)

Note: The Table shows the mean percentage of words (percentage out of total number of words used in the speech) of individuals with a generalized subtype of social anxiety disorder (SAD), those with a nongeneralized subtype, and controls. Different subscript letters indicate significant pairwise group differences at $p < .05$.