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ORIGINAL ARTICLE

Effect of Educatıon and Socıal Anxıety on Acoustıc, Perceptual and Aerodynamıc Parameters of Adult Females

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Abstract In this study, we hypothesized that social anxiety disorder would be more common in women with lower education levels and that this could have a negative effect on acoustic parameters. A total of eighty-eight (88) healthy female volunteers were enrolled into the study. These volunteers were divided into two groups, which were categorized as those with graduation from elementary school or below (Group A, n = 42) and those with graduation from high school or above (Group B, n = 46). Personal anxiety and avoidance for all participants were evaluated using The Liebowitz Social Anxiety Scale. All subjects also underwent acoustic and aerodynamic voice analysis for evaluation of their objective voice quality and function. Additionally, the GRBAS scale was used for perceptual analysis. Social anxiety scores were higher in group A than group B ($p < 0.05$). In aerodynamic sound analysis, maximal phonation time was lower in group A than group B ($p < 0.05$). In perceptual sound analysis, the mean values of the GRBAS parameters for group B were lower than group A ($p < 0.05$). Mean F0 of Group-B was higher than Group-A in acoustic analysis ($p < 0.05$). However, there was no statistical difference in jitter, shimmer, NHR and HNR between the groups ($p > 0.05$). In this study, social anxiety and education has been shown to have an effect on voice in women. As the level of education increases, social anxiety decreases, and both maximum phonation time and fundamental frequency increase.

Keywords Social anxiety · Education · Acoustic paramaters · Maximum phonation time · Fundamental frequency

Introduction

Social anxiety disorder (SAD) is the most common psychiatric disorder in the world. with a prevalence ranging from 6.7% in Europe to 12.1% in USA [1, 2]. SAD has

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been shown to be associated with marked dissatisfaction with many aspects of life [3]. Patients with social anxiety are excessively concerned about deficiencies in their social performance, in turn, they appear anxious and exhibit improper social behaviors [4, 5].

Social anxiety disorder is divided into two subgroups; Generalized-SAD and non-generalized SAD. Generalized Social Anxiety Disorder has an earlier onset and strongly shows familial transition. Non-generalized social anxiety disorder is associated with environmental factors which include low education, unhappy marriages and unemployment [6]. Recently defined "subclinical or subthreshold" anxiety disorder is believed to be due to increased personal burden. Subclinical anxiety disorder is observed in up to 20% of the general population. In addition, it has subclinical social anxiety symptoms that can change the quality of life and the functioning of many life domains [7, 8]. Today, the Liebowitz's Social Anxiety Scale (LSAS) is a commonly used measurement tool for evaluation of social anxiety and phobia [9, 10]. LSAS assesses anxiety and avoidance according to social performance status. Although the total score is frequently used an index of impairment due to social phobia, two subscales; -anxiety and avoidance- can also be calculated [10].

Characteristics of speech and voice are influenced by numerous interrelated complex factors, the most important being personal stress [4, 11] and vocal emotion [12, 13]. The mood of a person, as governed by these factors, reflects on the perceptual and/or objective voice characteristics. In studies conducted on audiences, it has been shown that the changes in tonal attributes arising from different emotional states can be clearly discerned [14]. Moreover, changes in voice characteristics have been observed to influence the presentation of emotional states [15].

Although there may be minor variations, the designated periods constituting the different stages of formal education tend to be fairly similar between countries. In Turkey, formal education starts with 8 years of elementary school, followed by high school and university education. The primary goal of education is to nurture the mental, physical and psychological development of the individual and to prepare him/her for social life. One of the secondary advantages of school education is the self-confidence it generates in students. Self-confidence has been shown to be inversely related to social phobia and anxiety disorders [16].

Social anxiety disorder is associated with low education and it may have an affect on acoustic parameters. In a study by Bleidorn et al. women have been shown to have lower self-esteem than men [17]. For this reason, we planned this study on a population of women to assess the effect of educational self-confidence and anxiety on objective and subjective voice parameters. We hypothesized that social anxiety disorder would be more common in women with lower education levels and that this could have a negative effect on acoustic parameters.

Materials and Methods

This prospective study was carried out between January 2017–December 2018, at Tertiary Education and Research Hospital Otolaryngology Clinic. Ethical approval was received from the ethical committee. Informed consent was obtained from all the participants prior to starting the study.

A total of eighty-eight (88) healthy female adult volunteers, without a history of psychiatric disease were enrolled into the study. The exclusion criteria were as follows; previous history of professional voice performance or any kind of voice training, history of smoking, laryngopharyngeal reflux, history of voice, oral or laryngeal disorders, hypothyroidism or hyperthyroidism, or lung disease. All volunteers underwent a detailed flexible nasopharygoscopic and laryngostroboscopic examination, and those who were determined to have an upper airway infection, allergic rhinitis, laryngitis, vocal cord paralysis or paresis, sulcus vocalis, vocal cord polyps, laryngeal papilloma and Reinke's edema were not included in the study.

These healthy volunteers were divided into two groups according to their educational levels, which were categorized as elementary school graduation or below (Group A, n = 42) and high school graduation or above (Group B, n = 46).

Assessment of Voice Quality and Function

An acoustic voice analysis (fundamental frequency (F0), jitter, shimmer, noise to harmonic ratio (NHR), harmonic to noise ratio (HNR)) and an aerodynamic analysis (maximal phonation time (MPT)) were performed for evaluation of objective voice quality and function. The GRBAS (grade, roughness, breathiness, asthenia, and strain) scale was used for perceptual analysis of the voice quality and function. The Liebowitz Social Anxiety Scale was performed for evaluation of personal anxiety and avoidance. These analyses were performed on all the volunteers from both groups, and the results obtained were compared between the groups.

The recording of speech for the analysis was carried out in a special sound insulated room using a high-quality condense microphone (Dynamic Rode® NT1; Rode, Sydney, Australia) placed at a stable mouth-to-microphone distance of 20 cm. Speech material for the perceptual analysis consisted of a standard phonetically balanced

Turkish text (Jale'nin dunyasi-(Jale's world)), which was read aloud by each subject and recorded. Objective evaluation of voice was performed during the emission of an /a/ sustained for as long as possible after maximal inspiration.

Perceptual Analysis (GRBAS score)

Auditory perceptual assessment that is based on text was performed using the GRBAS (overall grade of hoarseness, roughness, breathiness, asthenia, and strain) rating scale. A score from 0 to 3 was applied to each parameter, where 0 represents the euphonic condition and higher scores indicate worse voice quality. The voice samples were evaluated by a jury of three otolaryngology specialists who have at least 2 years of professional experience in acoustic analysis and were all blinded to the groups. Each listener provided their own scores and the final score was based on the mean of the three scores. Mean values and standard deviations of the five components of the GRBAS score were recorded for all subjects independently for each rater and for each of the two ratings. Inter- and intra-rater reliability coefficients were calculated.

Acoustic Analysis

The mean fundamental frequencies (F0 in Hertz (Hz)), percentage of jitter and percentage of shimmer, noise to harmonic ratio (NHR) and harmonic to noise ratio (HNR) were determined as part of the acoustic analysis. Multidimensional voice and speech analysis was performed with Praat speech processing software (University of Amsterdam, The Netherlands). Spectrography was performed to be sure that the signal was Titze type 1. The initial and final part of the phonation was deleted and only the middle stable part was analyzed.

Liebowitz Social Anxiety Scale

The participants' social anxiety assessments were performed using the Liebowitz Social Anxiety Scale (LSAS). LSAS is a questionnaire consisting of 48 questions. A score from 0 to 4 was applied to the responses of each question, with the total score of each participant being used for evaluation. There is no cutt-off score in the LSAS. It includes two sub-groups that evaluate anxiety and avoidance. LSAS was developed by Liebowitz (1987) and the validated Turkish version was used in this study [18].

Statistical Analysis

SPSS version 20 was used to evaluate the data obtained from the participants. Kolmogorov Smirnov test was applied to assess whether there was normal distribution. Descriptive statistical analyses were performed. Kolmogorov–Smirnov test was used for variance analysis of the data in the study. Chi-square test (or Fisher Exact test) were used for categorical variables. Mann–Whitney U test was used to compare two independent groups with abnormal distribution, and Independent-Sample t Test was used to compare two independent groups with normal distribution. Pearson test was used to examine the relationship between the variables of the different groups that conformed with normal distribution, and Spearman test was applied to examine the variables of different groups that were abnormally distributed. Linear regression analysis was applied to determine the effect of independent variables on the results of acoustic analysis. "Enter" method was selected for linear regression analysis. The level of statistical significance was accepted as $p < 0.05$.

Results

The mean age was 31.47 ± 7.01 years in Group A and 30.4 ± 3.79 years in Group B. No statistically significant difference was detected between the groups ($p = 0.23$).

Acoustic Analysis

The findings of the acoustic analysis (comparison of the mean fundamental frequencies (F0 in Hertz (Hz)), percentage of jitter and percentage of shimmer, NHR, and HNR) for the two groups are presented in Table 1. The Mean F0 in the high education group (group B) was significantly higher than that of the low education group (group A) ($p = 0.04$). There was no significant difference between the two groups in terms of the parameters used for acoustic analysis, percentage of jitter, percentage of shimmer, NHR, and HNR ($p > 0.05$).

Aerodynamic Efficiency Analysis

The Maximum Phonation Times of all participants (MPT) were 17.92 ± 6.82 s. MPT obtained from the groups are shown in Table 1. The MPT in the high education group (group B) was significantly higher than that of the low education group (group A) ($p = 0.014$).

Perceptual Analysis (GRBAS Score)

Inter-rater reliability for the total GRBAS score was 80.3 per cent and the intra-rater reliability was 84.9 per cent.

According to perceptual analysis of voice quality on the basis of the GRBAS scale, there was a significant difference between the groups in the mean scores they obtained, as shown in Table 2. The mean values of the G (Grade), R

Table 1 Values of acoustic and aerodynamic analysis of participants

	Group A Low education n:42 Mean ± Std. Deviation	Group B High education n:46 Mean ± Std. Deviation	*p*-values
Mean F0	228.58 ± 21.49	243.32 ± 24.51	[a]*0.04**
Jitter	0.45 ± 0.21	0.37 ± 0.18	[b]0.07
Shimmer	3.26 ± 1.87	3.53 ± 1.89	[b]0.32
NHR	0.01 ± 0.01	0.01 ± 0.01	[b]0.67
HNR	24.51 ± 3.11	23.86 ± 2.79	[b]0.21
MPT	16.23 ± 6.36	19.61 ± 6.72	[a]*0.01**

F0: Fundamental frequency, NHR: Noice to Harmonic Ratio, HNR: Harmonic to Voice Ratio, MPT: Maximum Phonation Time

[a]Independent Sample t Test, [b]Mann-Whitney U Test, *$p < 0.05$

Table 2 Comparison of the groups according to the auditory perceptual assessments using the *GRBAS* (G: Grade, R: Roughness, B: Breathiness, A: Asthenicity, and S: Strain) scale

		Groups		*p*-Value
		Group A (n:42)	Group B (n:46)	
G	0	25	46	< 0.001*
	1	17	0	
R	0	18	44	< 0.001*
	1	15	2	
	2	9	0	
B	0	32	46	< 0.001*
	1	10	0	
A	0	31	46	< 0.001*
	1	11	0	
S	0	35	46	0.004*
	1	7	0	

Group A Low Education and *Group B* High Education group (0:Normal,1:Mild, 2:Moderate, 3:Heavy)

Fisher's Exact Test *$p < 0.05$

(Roughness), B (Breathiness), A (Asthenia) and S (Strain) parameters for group B were significantly lower than those determined for group A ($p < 0.001$, $p < 0.001$, $p < 0.001$, $p < 0.001$, $p = 0.004$, respectively).

Liebowitz Social Anxiety Scale

The mean scores on the Liebowitz Social Anxiety Scale were significantly different between the groups. The mean anxiety score for group A was 46.61 ± 3.19 and 39.56 ± 7.18 for group B. Additionally, the mean avoidance score for group A was 39.57 ± 2.87 and 33.26 ± 6.07 for group B. The mean anxiety and avidance score values for group B were significantly lower than those obtained by group A ($p < 0.001$, $p < 0.001$ respectively) (Figs. 1 and 2).

Correlation Analysis

Correlation analysis of maximal phonation time with social anxiety scores has shown that there was a negative correlation with anxiety (r =− 0.398, $p < 0{,}001$) and avoidance (r =− 0.474, $p < 0.001$). In addition, MPT was positively correlated with the educational level (r = 0.257, $p = 0.016$). Correlation analysis between Mean F0 and Social Anxiety Scores has shown that there was a negative

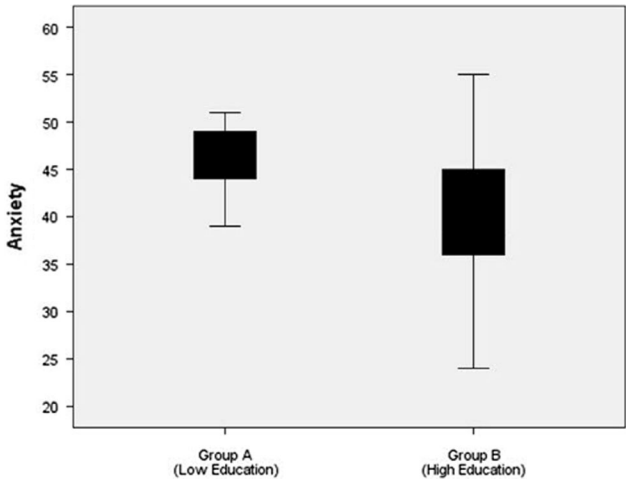

Fig. 1 Comparison of Anxiety (Liebowitz Social Anxiety Sub-scale) between Group-A and Group-B according to educational level ($p < 0.05$)

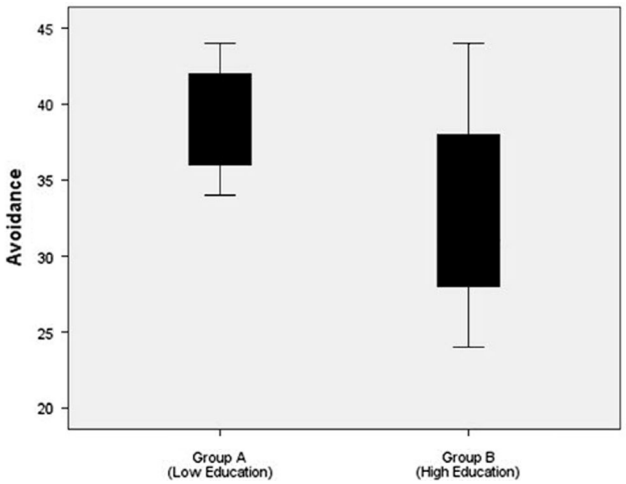

Fig. 2 Comparison of Avoidance (Liebowitz Social Anxiety Sub-scale) between Group-A and Group-B according to educational level ($p < 0.05$)

correlation with anxiety (r =− 0.297, $p < 0.005$) and avoidance (r =− 0.260, $p < 0.014$). In addition, the mean F0 was positively correlated with the educational level (r = 0.307, $p = 0.004$) (Fig. 3).

Effect of Social Anxiety and Education Level on Acoustic Analysis with Linear Regression Model

Linear regression analyzes were performed separately to determine what predicted MPT time and F0. In linear regression analysis performed on anxiety (standardized β coefficient = − 0.47; $P < 0.001$) and avoidance (standardized β coefficient = − 0.37; $P = 0.003$), both were significantly associated with MPT.

In linear regression analysis performed on anxiety (standardized β coefficient = 0.64; $P < 0.001$) and avoidance (standardized β coefficient = 0.60; $P < 0.001$), both were significantly associated with F0.

Discussion

Basic voice characteristics are affected by many factors, including emotional state, self confidence, physiological aspects, such as gender and age, and several diseases, such as diabetes and hypothyroidism [19–21].

Psychological distress caused by lack of self-confidence is clinically reflected as social anxiety and phobia. Changes in voice quality are related to concomitant psychological distress [19]. Anxiety, depression, and other emotional stresses cause voice changes, as internal and external laryngeal muscles are exquisitely sensitive to emotional stress [20]. This incompatibility is reflected on basic voice characteristics. Research on this subject has sought to determine the effects of social anxiety and phobia on voice characteristics. Kreiman et al., identified the effects of certain emotional states, such as fear, happiness, anger and sadness, on voice characteristics [21] Siupsinskiene N. et al., determined that it was more likely for patients with social anxiety to contract benign vocal disorders [22]. Emotional states alter speech function by affecting certain articulators, like the tongue, soft palate, lip and vocal folds [23].

Self-reported vocal symptoms are more frequent in people with high anxiety [24]. Gomes VEFI et al. in their study examined the relationship between anxiety and vocal symptoms. The higher trait anxiety scores, found that related higher scores in the Vocal Symptoms Scale (VoiSS). At the end of the study, anxiety levels were determined as specific vocal risk factors [25]. In our study, we examined the effects of anxiety and education level on acoustic sound analysis with Linear Regression Models. We found that the avoidance and anxiety subscale of Liebowitz Social Anxiety had a statistically significant effect on the Maximum Phonation Time and Fundamental Frequency. Additionally, the effect of education level had a statistically significant effect on the Fundamental Frequency and Maximum Phonation Time.

Education level contributes to the formation of self-confidence. In study of Seema G.B. et al. on adolescents, personal self-confidence was shown to be inversely proportional to social anxiety in a statistically significant manner [26]. Additionaly, Van Ameringen M. et al. found that early school leaving was associated with social anxiety disorders [27]. Education level seems to be inversely related to social anxiety and social phobia disorders. It was observed in a study by Siupsinskiene N. et al. that the

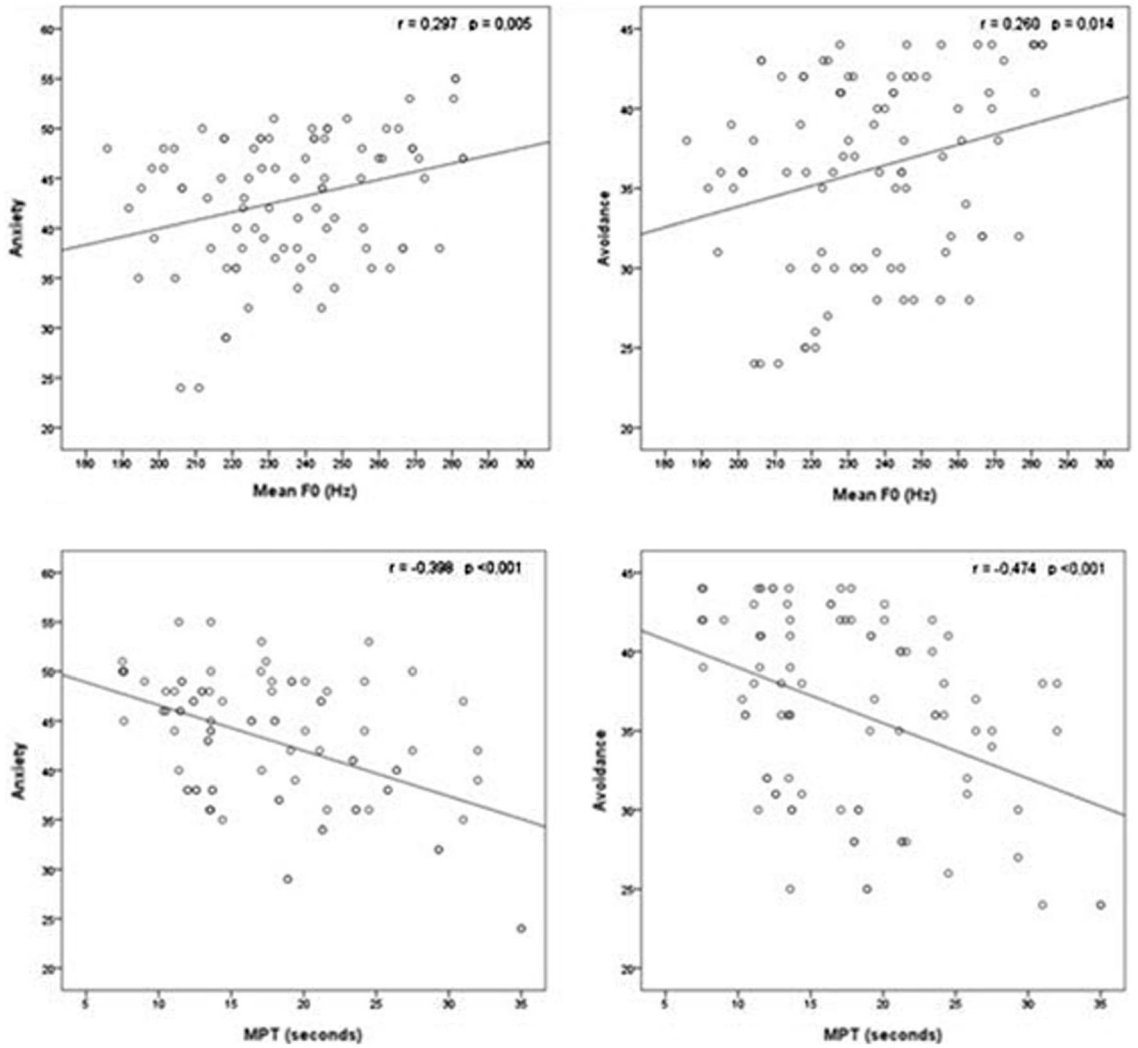

Fig. 3 Correlation between MPT and Mean F0 with Liebowitz Social Anxiety subscale. MPT: Maximum Phonation Time, Mean F0: Fundamental Frequency

anxiety score increased (an indication of higher levels of anxiety) as the educational level decreased [22]. In our study, we have shown that the social anxiety score of the participants with a high educational level was statistically significantly lower than that obtained by those with a low educational level.

Laukka P. et al. determined that frequency F0 falls in relation to low anxiety level [28]. In our study, we investigated the relationship between Anxiety and Mean F0. We found that Mean F0 increased with the increase in anxiety scores. Additionally, when acoustic analyses were conducted based on the educational level of the participants, there was a statistically significant difference between the two groups for mean F0. We have shown that Mean F0 was higher in the group with higher education level. However, there was no statistically significant difference between the two groups for measures such as jitter, shimmer, NHR and HNR.

The aerodynamic vocal analyses conducted as part of our study showed that the maximal time duration of the participants with a high educational level was statistically significantly longer than that of those with a low educational level.

Social anxiety is asssociated with poor speech performance [12, 29, 30]. Perceptual vocal analysis in subjects of our study has shown that parameters such as grade, roughness, breathiness, asthenia and strain were statistically significantly lower in participants with a high educational level.

Our study was limited in two ways. First, the number of patients and controls were relatively small. Second, all individuals of this study were in their early 30 s so further studies are needed for older age groups.

Conclusion

To date, there have been no studies conducted analyzing the effects of education level and social anxiety on voice characteristics. In our study, we have shown that as the level of education increased, social anxiety decreased. Education level and social anxiety both had an effect on acoustical paramaters (Maximum Phonation Time and Fundamental Frequency). Maximum Phonation Time and the Fundamental Frequency (F0) increased and the Perceptual Acoustic Analysis Scores decreased with the increase in educational level.

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Data Availability All data generated or analysed during this study are included in this article and its supplementary material files. Further enquiries can be directed to the corresponding author.

Declarations

Conflict of interest The authors have no conflicts of interest to declare.

Human or Animal Participants All procedures performed in study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Ethical Approval Ethics approval for the study was given by the Umraniye Research and Trainig Hospital Ethics committee(number: 9530 date:19.06.2015).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

References

1. Fehm L, Pelissolo A, Furmark T, Wittchen HU (2005) Size and burden of social phobia in Europe. Eur Neuropsychopharmacol 15(4):453–462
2. Banse R, Scherer KR (1996) Acoustic profiles in vocal emotion expression. J Pers Soc Psychol 70(3):614–636
3. Stein MB, Kean YM (2000) Disability and quality of life in social phobia: epidemiologic findings. Acad Psychiatry 157:1606–1613
4. Voncken MJ, Bögels SM (2008) Social performance deficits in social anxiety disorder: reality during conversation and biased perception during speech. J Anxiety Disord 22(8):1384–1392
5. Murray IR, Baber C, South A (1996) Towards a definition and working model of stress and its effects on speech. Speech Commun 20:3–12
6. Heimberg RG, Holt CS, Schneier FR, Spitzer RL, Liebowitz MR (1993) The issue of subtypes in the diagnosis of social phobia. J Anxiety Disord 7:249–269
7. Stein MB, Walker JR, Forde DR (1994) Setting diagnostic thresholds for social phobia: considerations from a community survey of social anxiety. Am J Psychiatry 151(3):408–412
8. Merikangas KR, Avenevoli S, Acharyya S, Zhang H, Angst J (2002) The spectrum of social phobia in the Zurich cohort study of young adults. Biol Psychiatry 51(1):81–91
9. Liebowitz MR (1987) Social phobia. Mod Probl Pharmacopsychiatry 22(1):147–173
10. Mennin DS, Fresco DM, Heimberg RG, Schneier FR, Davies SO, Liebowitz MR (2002) Screening for social anxiety disorder in the clinical setting: using the Liebowitz Social Anxiety Scale. J Anxiety Disord 16:661–673
11. Rapee RM, Lim L (1992) Discrepancy between self- and observer ratings of performance in social phobics. J Abnorm Psychol 101(4):728–731
12. Stopa L, Clark DM (1993) Cognitive processes in social phobia. Behav Res Ther 31(3):255–267
13. Kessler RC, Berglund P, Demler O et al (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 62:593–602
14 Elfenbein HA, Ambady N (2002) Onthe universality and cultural specificity of emotion recognition: a meta-analysis. Psychol Bull 128(2):203–235
15 Juslin PN, Laukka P (2003) Communication of emotions in vocal expression and music performance: different channels, samecode? Psychol Bull 129(5):770–814
16. de Jong PJ (2002) Implicit self-esteem and social anxiety: differential self-favouring effects in high and low anxious individuals. Behav Res Ther 40(5):501–508
17 Bleidorn W, Arslan RC, Denissen JJ et al (2016) Age and gender differences in self-esteem-A cross-cultural window. J Pers Soc Psychol 111(3):396–410
18. Soykan C, Ozgüven HD, Gençöz T (2003) Liebowitz social anxiety scale: the Turkish version. Psychol Rep 93(3 Pt 2):1059–1069
19. Deary IJ, Scott S, Wilson IM, White A, MacKenzie K, Wilson JA (1997) Personality and psychological distress in dysphonia. Br J Health Psychol 2:333–341
20. Seifert E, Kollbrunner J (2005) Stress and distress in non-organic voice disorders. Swiss Med Wkly 135:387–397
21 Kreiman J, Sidtis D (2011) Foundations of voice studies: an interdisciplinary approach to voice production and perception. Wiley-Blackwell, Chichester, UK
22. Siupsinskiene N, Razbadauskas A, Dubosas L (2010) Psychological distress in patients with benign voice disorders. Folia Phoniatr Logop 63:281–288
23. Fonagy I (1978) A new method of investigating the perception of prosodic features. Lang Speech 21:34–49
24. Almeida AA, Behlau M, Leite JR (2011) Correlação entre ansiedade e performance comunicativa. Rev Soc Bras Fonoaudiol 16(4):384–389
25. Gomes VEFI, Batista DDC, Lopes LW, Aquino R, Almeida AA (2018) Symptoms and vocal risk factors in individuals with high and low anxiety. Folia Phoniatr Logop 71(1):7–15
26. Seema GB, Kumar VG (2017) Self-esteem and social anxiety in adolescent students. Indian J Posit Psychol Hisar 8(3):435–438
27. Van Ameringen M, Mancini C, Farvolden P (2003) The impact of anxiety disorders on educational achievement. J Anxiety Disord 17(5):561–571

28. Lukka P, Linnman C, Åhs F et al (2008) In a Nervous Voice: Acoustic Analysis and Perception of Anxiety in Social Phobics' Speech. J Nonverbal Behav 32:195–214
29. Alden LE, Wallace ST (1995) Social phobia and social appraisal in successful and unsuccessful social interactions. Behav Res Ther 33(5):497–505
30. Baker SR, Edelmann RJ (2002) Is social phobia related to lack of social skills? Duration of skill-related behaviours and ratings of behavioural adequacy. Br J Clin Psychol 41(3):243–252