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RELATIONS BETWEEN SELF-EVALUATION OF PUBLIC SPEECH AND EMOTIONS EMERGING DURING VISUALIZATION OF THEIR PERFORMANCE

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ABSTRACT

The objective of this pilot study was to associate the participants' emotions while viewing footage of themselves, giving a public presentation and sociodemographic characteristics with the self-assessment when speaking in public. The Self Statements during Public Speaking Scale was applied. The level of significance adopted in the tests was $p<0.05$. A significance trend was considered when $p<0.08$. The sample consisted of 30 medical students with a mean age of 20.3 years (±1.6). The total score obtained was 37.8 (±5.9). These findings showed the self-assessment when public speaking was adequate and moderately high. The anger emotion was shown to be associated with gender and contempt with the year of the undergraduate course. Gender, happinessand religion influenced the self-assessment.

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INTRODUCTION

Public speaking, as the term itself implies, is a way to turn public someone's ideas, to share them, and to influence other people (Lucas, 2014). It promotes human interaction and the audience's understanding of the information transmitted through words, acts and gestures, thus, to be a remarkable communicator, it is necessary to believe that communication is synonymous with exchange and comprehension and not with agreement, which presupposes preparation and training (Lucas, 2014; Ribeiro, 1993). Learning to speak adequately to groups of people provides benefits other than the mere ability to deliver formal speeches in public, as this training pervades self-confidence (Carnegie, 2010). Public speaking is an activity that does not seem to cause discomfort, especially when the speaker is someone who has skills in oral communication and mastery of the subject. However, many people show the difficulty and lack of ability when speaking in public (Andrade & Gorenstein, 1998). Some bodily reactions may occur at the time of public speaking, such as tachycardia, severe sweating, tremors and speech changes. These symptoms are related to anxiety, worry, fear and even fantasies about terrible situations of embarrassment and failure.

Fear and anxiety in public speaking are consequences of the exposure and self-assessment in which negative situations can compromise and limit the individuals in their environment (Douglas, Cunha & Spina, 2013). Epidemiological studies have shown that the fear of public speaking is the most prevalent in the general population, with its prevalence being independent of gender, ethnicity and age. This specific fear depicts a relevant psychosocialstressor because it arouses a high degree of insecurity, fear and anxiety (Faria et al., 2013; Osório, Crippa & Loureio, 2008). Public speaking anxiety is reported as prevalent in 15% to 30% of the general population (Pull, 2012). A study with Swedish university students found a prevalence of social anxiety of 16.1%, comparable to the prevalence in the general population. The disorder was uncommon among students after a university teaching program (Tillfors & Furmark, 2007). Tejwani, Ha, and Isada (2016) found that approximately 17% of residents and medical students had symptoms of anxiety when speaking in front of other people. At many times in academic life it is possible to come across situations of public presentations. University surveys show that 80% to 90% of students enrolled in oratory courses suffer from nervousness, anxiety and fear regarding the possibility of speaking in public at the beginning of the

classes (Carnegie, 2010). Therefore, the study proposed to analyse the emotions and perception of the public speaking of medical graduate students, considering that in the future area of action, interpersonal communication and public speaking will be important tools in the doctor-patient relationship, in the doctor's interaction with the rest of the health team and in the presentation of research results. This research was proposed to associate the participants' emotions while viewing footage of them selves, giving a public presentation and sociodemographic characteristics with the self-assessment when speaking in public.

MATERTIALS AND METHODS

An analytical pilot study was performed with students from an undergraduate medical course of a Higher Education Institution (HEI) of São Paulo state, Brazil. Medical studentsover the age of 18 years met the inclusion criteria. Two questionnaires were used: one instrument to characterize the participants and the Self Statements during Public Speaking (SSPS) scale. The characterization instrument contained 12 variables: age, gender, origin, marital status, religion, year of undergraduate course, classification of the research theme (positive/negative/neutral), whether the participant already spoke in public, how shy he/she considers him/herself and feelings and signs of anxiety that emerge during a public presentation. The SSPS scale was translated and adapted to Brazilian Portuguese, following internationally recommended steps, being approved by the authors of the original version. The scale evaluates the self-perception of the performance in the specific situation of public speaking, valuing cognitive aspects related to fear and anxiety as stressors. It is a brief instrument that is self-explanatory and easy to understand and apply. It contains ten statements measured on a Likert-type scale of 6 points (from 0 to 5 points) where only the two extreme scores are mentioned: 0 represents completely disagree, and 5 completely agree with the statement. The intermediate values (2-4) are graded, but not classified according to the author of the scale. Items 2, 4, 7, 8 and 10 represent a negative self-assessment and should be re-coded for the total score. Items 1, 3, 5, 6 and 9 represent a positive self-assessment. The maximum total score is 50 points, which is the sum of the items. Higher scores equate to better self-assessments of the public speaking (Osório, Crippa & Loureio, 2008).

The students of the medical school were recruited through the list of the disciplines of Genetics and Microbiology of the HEI and the list of students who would participate in the Forum of Scientific Initiation of the HEI. In these academic situations, the proposal was a poster presentation. The data collection period was from August 2016 to April 2017. Data collection was performed through three approaches. In the first approach, the student was approached individually in the class interval and in a reserved place. The study was explained, and the consent form was signed by the participants that agreed to take part in the study. These students then completed the characterization instrument and the SSPS. At a second moment, the filming of the presentations took place, using a Nikon Coolpix® AW110 Digital Camera, with a top half crop. The investigator used an average distance of three meters from the participants during the filming in an attempt to interfere as little as possible and leave them more at ease. The third approach occurred at a pre-scheduled time and in a reserved place. The medical students watched their presentation footage and their facial expressions recorded. The strategy of viewing the student's performance when public speaking was thinking to capture better the emotions with a focus on the face of student and by tendency of expression of the same emotions when the public speech is performed or observed. The facial expressions during the viewing the student's performance when public speaking was decoded with *Atlas TI® software*. It allows the visualization of videos and manual marking of the codes selected by the researchers for later analysis. Thus, two researchers validated the decoding of the emotions. Nonverbal signs of facial expressions were classified into nine categories of emotions: happiness (real smile with lips upward and with wrinkling of the eye region), false smile (lips upwards and WITHOUT wrinkling of the eye region), anger (wrinkled eyebrows), sadness (lowering of the lips and/or lifting of the inside of the eyebrow), shame (tilting head down or diagonally), surprise (opening of the mouth, lifting of the eyebrows), fear (lifting of the nose, lifting of the upper part of the mouth) and contempt or disdain (lifting only one corner of the mouth). These emotional categories were based on the work of Paul Ekman and are known as "basic emotions" or "universal emotions" (Ekman, 2010). The data were analyzed using the SPSS® - Statistical Package for the Social Science - version 21 statistical software (IBM®, Chicago, USA). Descriptive and inferential analysis was performed. Spearman's Correlation Test was used in the correlation of the quantitative variables with the SSPS scores, the Mann-Whitney test in the association of the categorical variables with the SSPS scores and Pearson's Chi-square test in the association between categorical variables. The level of significance adopted in the tests was 0.05. Due to the sample size, the authors considered a significant trend when $p<0.08$.
The study was carried out according to the national and international standards of research ethics involving human subjects: Declaration of Helsinki (Asociación Médica Mundial, 2013) and Nacional Resolution number 466/2012 (Brasil, 2012), was approved by the Research Ethics Committee of Faculty of Medicine of Jundiaí (authorization number 1.625.312) and all participants signed the informed consent form.

RESULTS

The study sample consisted of 30 medical students. Of these, 18 were recorded in the Genetics discipline, 8 in the Forum of Scientific Initiation and 4 in the Microbiology discipline. The mean time of the filming of facial expressions and emotions was 173.70 seconds. The mean age was 20.3 years (±1.6), with 50% males. Higher frequencies of students were from Jundiaí (n=12; 40%) or Greater São Paulo (n=9; 30%). The majority were Catholic (n=16, 53.3%), without partners (n=9, 30%) and were in the first year of the undergraduate course (n=22, 73.3%). Regarding public speaking, the majority had already performed this (n=29; 96.7%), and the experience was classified as positive (n=28; 93.3%). Regarding shyness, most of the students were evaluated between slightly (n=12; 40%) or very (n=12; 40%) shy. The majority of the students reported anxiety when speaking in public. The signs of anxiety perceived by the participant during a public presentation were hand tremors, sweating, uttering lexical sounds (groans, coughing, stuttering) and foot tremors. The predominant emotion during the visualization of their performance was the false smile. However, other emotions were evident such as happiness, anger and surprise (Table 1).

Table 1. Description of the feelings and signs of anxiety reported by the participants during public speaking

Feelings that arose when speaking in public	*N*	%	Signs of anxiety perceived by the participant	*N*	%	Emotion	*N*	%
Calmness	2	6.7	Increase in the tone of voice	5	16.7	Happiness	14	46.7
Security	5	16.7	Decrease in the tone of voice	5	16.7	False smile	21	70.0
Confidence	4	13.3	Utterance of lexical sounds	9	30.0	Anger	13	43.3
Motivation	3	10.0	Blushing	4	13.3	Sadness	0	0.0
Fear	0	0.0	Hand tremors	10	33.3	Shame	11	36.7
Insecurity	7	23.3	Foot tremors	9	30.0	Surprise	13	43.3
Anxiety	19	63.3	Sweating	10	33.3	Fear	2	10.0
Embarrassment	1	3.3	Accelerated rhythm of speech	4	13.3	Disgust or aversion	0	0.0
			Others*	5	16.7	Contempt or disdain	6	20.0
Total	41	**→	Total	62	**→	Total	80	*→

Note. (N = 30) *Other signs of anxiety: tachycardia, dry throat, excessive gesticulation and laughter. **More than one feeling, a sign of anxiety or emotion were decoded in each participant; therefore, the number and percentage of these values exceeds 30 and 100%. However, each feeling, sign or emotion was recorded only once for each participant. Source: Own elaboration.

Table 2. Description of the items of the Self Statements during Public Speaking Scale (SSPS)

Item	Statements	Mean	Standard-Deviation
5	Even if things don't go well, it's no catastrophe	4.0	0.9
9	Instead of worrying I could concentrate on what I want to say	3.9	0.8
3	This is an awkward situation, but I can handle it	3.5	0.9
1	What do I have to lose? It's worth a try	3.2	1.2
6	I can handle everything	2.9	1.1
10	I feel awkward and dumb; they're bound to notice	1.8	1.5
7	What I say will probably sound stupid	1.0	0.9
4	A failure in this situation would be moreproof of my incapacity	0.7	0.8
8	I'll probably "bomb out" anyway	0.7	0.8
2	I'm a loser	0.5	0.7

Note. (N = 30). The items are listed by descending mean value. Reverse-coded items were not yet recoded in this table. Source: Own elaboration.

Table 3. Description of the total score and domain scores of the Self Statements during Public Speaking Scale (SSPS)

SSPS	No. of items	Variation of the score	Mean	Standard Deviation	Minimum	Median	Maximum
Negative self-assessment	5	0-25	20.4	4.4	9	21.0	25
Positive self-assessment	5	0-25	17.5	3.2	4	18.5	23
TOTAL	10	0 - 50	37.8	7.7	13	40.0	48

Note. (N = 30). Reverse-coded items have been recoded in this table. Source: Own elaboration.

Table 4. Correlations of domains of the Self Statements during Public Speaking Scale (SSPS) with age and between the SSPS domains

	Age	
	r	P-value
Negative self-assessment	-0.08	0.67
Positive self-assessment	0.16	0.40

Note. (N = 30). Spearman's correlation test. Source: Own elaboration.

Table 5. Statistically significant associations or those with significance trend, of the emotion with the characteristics of the participants

*	Anger			**	Contempt		
Sex	Yes	No	Total	Year of undergraduate course	Yes	No	Total
Female	9	6	15	1	2	20	22
Male	4	11	15	2	2	3	5
Total	13	17	30	3	1	0	1
				4	0	1	1
				5	1	0	1
				Total	6	24	30

Note. (N = 30). Pearson's Chi-square test *Association with significance trend (p=0.06). **Statistically significant association (p=0.02). Source: Own elaboration.

Considering the SSPS, the highest mean was obtained in item 5 and the lowest in item 2. This data shows that the participants had a perception that if public speaking fails, it does not represent a catastrophe, and they do not feel failure with poor performance (Table 2). The total score obtained was 37.8 (±5.9), above the midpoint of the instrument (25), which indicates that the participants present some fear when speaking in public, however, in general, they face the situation more positively (Table 3). There was no statistically significant correlation between the SSPS factors and age (Table 4). The cross-tabulated data showed that the female participants presented more anger than the males during the visualization of their public speaking performance. In this same situation, contempt was proportionally more evident in the students who were attending the 2nd year of the undergraduate course (Table 5). The associations of gender, degree of shyness and year with the other emotions were not statistically significant.

There was a statistically significant association between happiness and the positive self-assessment factor (p=0.02). There were significant trends in the associations of gender with the positive self-assessment factor (p=0.05) and religion with the negative self-assessment (p= 0.07).

Table 6. Associations of the SSPS domains with the characteristics of the participants or emotions

	Positive self-assessment				Negative self-assessment			
	Mean	*N*	*SD*	*P*-value	Mean	*N*	*SD*	*P*-value
Gender				0.05**				0.46
Female	16.13	15	4.73		19.27	15	5.55	
Male	18.93	15	3.22		21.47	15	2.56	
Origin				0.55				0.53
Jundiaí	17.42	12	5.09		19.92	12	5.47	
Greater São Paulo	18.89	9	3.06		19.56	9	4.16	
São Paulo state	16.00	7	4.54		21.14	7	2.97	
Other state	17.50	2	0.70		24.00	2	0.00	
Marital status				0.96				0.79
With partner	17.00	9	5.61		19.00	9	6.56	
Without partner	17.76	21	3.62		20.95	21	3.09	
Religious beliefs				0.25				0.91
Yes	17.12	25	4.50		20.24	25	4.63	
No	19.60	5	1.14		21.00	5	3.24	
Religion				0.40				0.07**
None	19.6	5	1.14		21.00	5	3.24	
Catholic	17.5	16	4.22		21.94	16	3.06	
Evangelical	16.44	9	5.15		17.22	9	5.54	
Happiness				0.02*				0.33
Yes	15.71	14	4.80		19.29	14	5.27	
No	19.13	16	2.97		21.31	16	3.34	
False smile				0.82				0.79
Yes	17.29	21	4.70		20.43	21	4.65	
No	18.11	9	2.98		20.22	9	3.96	
Anger				0.34				0.90
Yes	16.85	13	4.79		19.62	13	5.71	
No	18.05	17	3.80		20.94	17	3.11	
Sadness				---				---
Yes	0.00	0	0.00		0.00	0	0.00	
No	17.53	30	4.22		20.37	30	4.39	
Shame				0.64				0.52
Yes	18.45	11	3.24		21.18	11	3.57	
No	17.00	19	4.22		19.89	19	4.83	
Surprise				0.62				0.41
Yes	17.54	13	5.14		19.54	13	4.91	
No	17.53	17	3.54		21.00	17	3.98	
Fear				0.84				0.90
Yes	18.00	2	5.66		20.00	2	7.07	
No	17.50	28	4.24		20.39	28	4.34	
Disgust				---				---
Yes	0.00	0	0.00		0.00	0	0.00	
No	17.53	30	4.22		20.37	30	4.39	
Contempt				0.82				0.32
Yes	18.50	6	2.26		19.17	6	3.92	
No	17.29	24	4.59		20.67	24	4.53	

Note. (N = 30). *Statistically significant association. **Association with significance trend. ***In this table, the items in the negative Self-evaluation domain have been recoded, so there is an inverted interpretation of the mean. Source: Own elaboration.

These associations reveal a more positive self-evaluation by the males and those who did not show happiness in visualizing their performance when speaking in public. Catholics presented a higher mean score in the negative self-assessment of the public speaking experience. However, since this factor has reverse coding, this indicates that the Catholics felt more comfortable and positive. Associations of origin, marital status, year of undergraduate course and degree of shyness with the SSPS factors were not statistically significant (Table 6).

DISCUSSION

The students in this study reported anxiety, hand tremors, and sweating when speaking in public. Anxiety and these physiological reactions were also reported in study realized by Tejwani, Ha and Isada (2016) in which the authors concluded that public speaking is a potentially stressful situation for university students and can trigger social phobia symptoms. The participants reported presenting autonomic (tachycardia, blushing, tremors and sweating), behavioral (avoidance, freezing and escape) and cognitive symptoms (negative evaluation and humiliation), compatible with the diagnosis of social phobia during academic presentations (Figueredo & Barbosa, 2008). Westenberg et al. (2009) also found thata speech prepared at home and given in front of a pre-recorded audience created a moderate stress response in adolescents. The participants reported, during the speech, feeling more nervous and having higher heart rate and sweatiness of the hands than at baseline or recovery. Likewise, heart rate and cortisol activity were higher during the speech than at baseline or recovery. Nevertheless, this physiological response to anxiety can be graded and different from one individual to another. Witt et al. (2014) examined the relationship between public speaking anxiety and physiological stress indicators at different milestones or stages in the delivery of a public speech. They found significant differences in both the magnitude and the patterns of somatic responses between high- and low-trait-anxiety groupings. The state anxiety is positively associated with higher levels of anxiety sensitivity and is also positively correlated with higher levels of trait anxiety. Studies realized by Marinho et al. (2017) and Souza (2007) have shown that public speaking is a source of anxiety and can arouse negative feelings, impacting students' personal and academic lives. A survey of 1,135 undergraduate students aimed to identify the prevalence of fear in public speaking and

the association of sociodemographic and voice-related variables. The data analysis evidenced an association of students that had a negative self-perception of their voice with fear in public speaking. The researchers found that 63.9% of the university students reported fear of public speaking. A total of 89.3% of the students wanted their undergraduate program to include classes to improve public speaking (Marinho et al., 2017). Academic speech in a public presentation can cause fear and insecurity. Factors that complicate these situations are lack of communication skills, lack of mastery over the subject and negative self-image (Souza, 2007).

Tarkowski (2017) have highlighted that preparation and knowledge are crucial in minimizing anxiety and nervousness, which may manifest as a trembling voice, wheezing, and loss of concentration. This is because students are not taught to present. This situation must begin to be remedied in undergraduate programs in order to make the student's future professional communication clear, compelling and intelligent.
In the present study, a mean total score of 37.8 was found in the SSPS, which is similar to the mean found by the authors of the validation study of the SSPS (Osório, Crippa & Loureiro 2008) with a population of 2,314 students from several courses of two Brazilian public and private universities of the state of São Paulo. Students completed the instrument individually in the classroom after group instruction, and the total mean obtained in the SSPS was 37.24. The item with the highest mean (Even if things don't go well, it's no catastrophe) was the same in both studies, with a mean of 3.8 in the study described by authors and 4.0 in the present study. There was also consistency in the scores of the item with the lowest mean (I'm a loser), in which the study described by researchers found a mean value of 0.72, with a mean of 0.50 obtained in the present study. In the present study, more emotions of anger were found in women during the visualization of their performance. This data can be justified by the more marked self-criticism in females. Formiga (2006) reinforces this finding. The author measured emotions such as anger, happiness, and sadness in 350 high school and elementary school students in the 15-22 age group and found that the female students had a higher mean in anger compared to the males. The study volunteers responded to a range of emotional prototypes that assessed how individuals represent the three types of emotions (happiness, sadness, and anger) by verifying the typical or characteristic elements of each emotion. According to the results of the study above, the women presented a reactive instrumentality, demonstrate a requirement regarding respect and revealed in many of the results symptoms of stress, primarily demonstrated by anger.
Through the current study, it was also possible to infer higher positivity in the self-assessment of the public speaking of the male participants. This was also found in the study realized by Frischknecht (2014), in which the predictive relationship in self-confidence in young athletes of a similar age group was evaluated. Male athletes presented statistically significant higher self-confidence levels than female athletes.

Andrade & Gorenstein (1998) used the SSPS and identified differences between the genders in the SSPS scores. The women presented a mean higher in the positive score of 18.6% than the men 17.8%. While in the negative score, the women scored slightly less, 20.4%, compared to the men, 21.3%, suggesting that women see more negative elements than men and are probably more critical in the anticipatory assessment of a public speaking situation. The predominant emotion during the visualization of medical students' performance was the false smile. The smile with muscular activity around the eyes reveals positive emotions. The false smile appears and disappears very quickly, where there is an asymmetry of the face. The masked or false smile involves the facial musculature of the mimic involved in the basic emotions of discomfort, fear, aversion, contempt, sadness or anger (Freitas-Magalhães, 2015). Indeed, intense emotions emerged in the visualization of the public speaking, a situation in which most individuals became tense and uncomfortable. Considering the problem, Tejwani, Ha & Isada (2016) also claim that public speaking anxiety can affect the competence of the interpersonal and communication skills of the future professional. Therefore, they suggest that managers and educators in the medical area incorporate the improvement of public speaking skills into the medical course curriculum.
Researchers realized a study to compare changes in scores on measures of self-perceived confidence, competence, and apprehension associated with public speaking after two types of courses: one focused on knowledge of the vocal mechanism and mastering vocal characteristics (pitch, volume, rate, quality), and one addressing general communication theory and public speaking. No differences were found between the two courses.However, both succeeded in reducing public speaking apprehension and increasing feelings of confidence and competence for these undergraduate students (Hancock et al., 2010).

Montes, Heinicke & Geierman (2019) found that a modified habit reversal procedure, including awareness training alone or combined with competing for response training, was effective in decreasing speech disfluencies for college students. Stupar-Rutenfrans, Ketelaars & Van Gisbergen (2017) examined the effect of a new Virtual Reality Exposure Therapy (VRET) strategy, that incorporates 360° live recorded virtual reality environments, on the reduction of public speaking anxiety. The researchers found that speaking anxiety significantly decreased after the three training sessions, and the decrement was the strongest in participants with initially high speaking anxiety baseline levels. These findings can be used in the academic environment. The limitations of this study refer to the cross-sectional approach, which only allows for associations and does not establish causality; the small size sample collected at one HEI, which, according to the proposed associations, could have been higher. Notwithstanding, this study features a well-structured evaluation regarding emotional awareness and public speaking during initial medical education. Implications arising from these results contribute to reflections about this problem, not as a common-sense phenomenon or something transient, but a relevant issue that needs further intervention and training during since undergraduate courses of health professionals.

Conclusion

The self-assessment when public speaking of the students was adequate and moderately high, even though the majority had done this before, and the experience was positive. The predominant emotion during the visualization of the medical students' performance was the false smile, showing the discomfort of the participant when seeing him/herself in this situation. The anger emotion was shown to be associated with gender, disdain with the year of the undergraduate course of the participant and happiness was associated with self-confidence. Considering the characteristics of the participants

and the self-assessment when speaking in public, the gender and facial expressions of happiness impacted on the positive self-assessment factor. Religion impacted on the negative self-assessment factor when speaking in public.

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