Voice Quality, Pragmatics and Psychosocial Functioning in Schizophrenia: An Exploratory Study

Joana Rocha †, Luis M. T. Jesus ‡, Pedro M. Sá-Couto ††, Rosa L. Coimbra ‡‡ and Carlos F. Silva ††

† Universidade Fernando Pessoa, Porto, Portugal; e-mail: jrocha@ufp.pt
‡ Escola Superior de Saúde da Universidade de Aveiro, and Instituto de Engenharia Electrónica e Telemática de Aveiro, Aveiro, Portugal; e-mail: lmtj@ua.pt
†† Departamento de Matemática, Universidade de Aveiro, Portugal; e-mail: p.sa.couto@ua.pt
‡‡ Departamento de Línguas e Culturas, Universidade de Aveiro, Portugal; e-mail: rlcoimbra@ua.pt
†‡ Departamento de Ciências da Educação, Universidade de Aveiro, Portugal; e-mail: csilva@ua.pt

DGPPN Kongress 2008 (Annual Congress of the German Society of Psychiatry) 26-29 November 2008, Berlin

INTRODUCTION

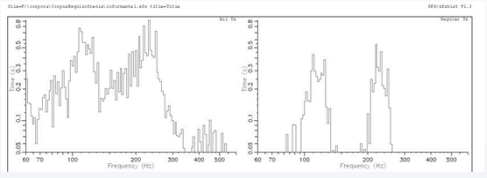
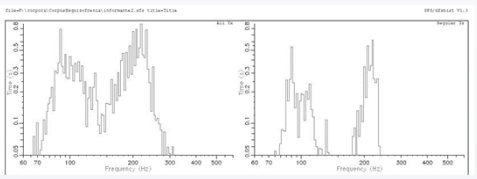
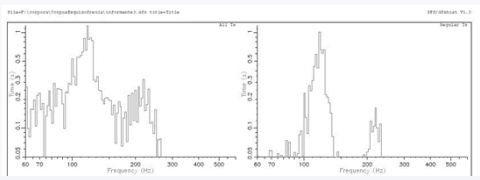
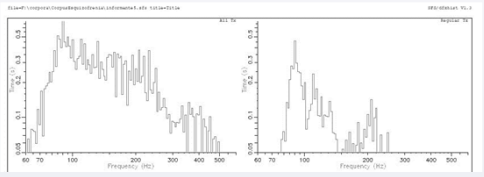
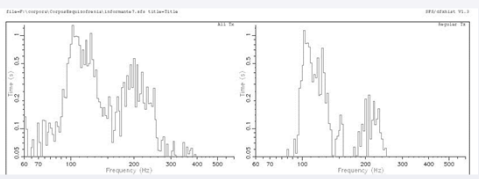
Few studies have dealt with the relationship between psychopathology and voice (Tolkmitt et al., 1989; Wallbott, 1989), but it has been suggested (Todt & Lowell, 1980; Andreason et al., 1981; Leff & Abberton, 1981; Stein 1993; Louth et al., 1998) that voice quality in Schizophrenia can be an important indicator of diagnosis. Some studies do not probe into the nature of speech anomalies, although there are some efforts in correlating acoustic properties of speech with some schizophrenic symptoms (Stassen et al., 1995).

METHOD

Nine adult male patients diagnosed with Schizophrenia, were recorded onto a Sony-MZR35 minidisk. Portions of their speech samples were presented to three Speech and Language Therapists to perceptually evaluate the voice quality based on the GRBAS scale (Hirano, 1981: 83-84). Results were related to data collected using the Pragmatics Protocol- PP (Prutting & Kirschner, 1987), the Global Assessment of Functioning (GAF) scale (APA, 1994), and acoustic parameters extracted with SFS and Praat. Statistical analysis was performed using SPSS.

RESULTS

Fundamental frequency (F0) histograms (produced with SFS) presented two modes of vocal fold oscillation for five patients (speakers 1, 2, 3, 5 and 7).

Pragmatics Protocol (PP)	GAF r / p
Verbal Aspects	0,869 / p<0.05
Paralinguistic Aspects	0,665 / p>0.05
Non-verbal Aspects	0,941 / p<0.05
Total score	0,957 / p<0.05

						SFS		Praat							
	G	R	B	A	S	Duration (s)	Regularity (%)	Median F0 (Hz)	Mean F0 (Hz)	F0 St. Dev. (Hz)	Jitter - ppq5 (%)	Shimmer - apq11 (%)	Mean HNR (dB)	Total PP	GAF
Speaker 1	0	0	0	0	1	36,149	33	111	116	32	3,425	14,133	6,316	19,00	60
Speaker 2	1	1	0	0	1	28,082	39	101	102	25	1,215	11,093	7,847	19,00	55
Speaker 3	2	2	2	1	1	35,109	41	116	140	90	1,895	19,883	4,922	8,00	51
Speaker 4	1	1	0	0	1	32,058	46	139	145	35	1,231	11,616	7,314	29,00	80
Speaker 5	1	2	0	0	1	43,308	31	98	139	104	1,949	17,191	4,417	6,00	25
Speaker 6	1	1	0	1	0	24,122	34	96	111	55	1,556	16,404	4,608	27,00	75
Speaker 7	1	1	0	1	1	41,872	49	109	114	19	1,585	17,945	6,128	8,00	27
Speaker 8	0	1	0	0	0	30,387	35	110	114	37	1,608	22,789	4,836	19,00	60
Speaker 9	2	0	1	2	0	32,884	51	118	124	34	1,120	20,072	7,804	7,00	50

G – Grade; R – Rough; B – Breathy; A – Asthenic; S – Strained
0 – Normal; 1 – Slight; 2 – Moderate; 3 – Extreme

DISCUSSION AND CONCLUSION

Spearman's correlation coefficients calculated between the Pragmatics Protocol and GAF presented high correlations (verbal aspects: r= 0.869, p<0.05; non-verbal aspects: r =0.941, p<0.05; total score: r =0.957, p<0.05) with the exception of paralinguistic aspects (r =0.665, p>0.05), indicating that these two scales are strongly related. Spearman's correlation coefficients calculated between the GRBAS and GAF scales and between the selected acoustic parameters and GAF showed low and not statistically significant correlations, respectively.

Most (six) patients showed slight to moderate dysphonia. Results showed highly irregular patterns of voicing and F0 histograms presented two modes of vocal fold oscillation for five patients. Median F0 range values (96-139 Hz) were higher than those that characterise a creaky phonation (7-78 Hz), previously (Covington et al., 2005: 90) used to describe voice quality in Schizophrenia. Standard deviation range of F0 was extremely high (55-104 Hz) for three speakers, and jitter range (1-3%) and shimmer range (11-23%) values were well above what is considered to be normal. Jitter values are within the ranges that are typical for depressed and near-term suicidal patients (Silverman et al., 2006). Considerable variations in F0 (jitter) and amplitude of the speech signal (shimmer), were observed in our data, and could be used as indicators of levels of anxiety.

REFERENCES

APA (1994). Global Assessment of Functioning Scale. Diagnostic and Statistical Manual of Mental Disorders, 4th ed. Washington: American Psychiatric Association.
Andreasen, N., M. Alpert & M. Martz (1981). Acoustic analysis: an objective measure of affective flattening. Archives of General Psychiatry 38(3): 281-285.
Covington, M., C. He, C. Brown, L. Naçi, J. McClain, B. Fjordbak, J. Semple & J. Brown (2005). Schizophrenia and the structure of language: The linguist's view. Schizophrenia Research 77: 85-98.
Hirano, M. (1981). Clinical examination of voice. Wien: Springer-Verlag.
Leff, J., & E. Abberton (1981). Voice pitch measurements in schizophrenia and depression. Psychological Medicine 11(4): 849-52
Louth, S., S. Williamson, M. Alpert, E. Pouget & R. Hare (1998). Acoustic distinctions in the speech of male psychopaths. Journal of Psycholinguistic Research 27(3): 375-384.
Prutting, C. & D. Kirschner (1987). A clinical appraisal of the pragmatic aspects of language. Journal Speech and Hearing Disorders 52: 105-119.
Silverman, S., A. Ozdas & M. Silverman (2006). Method for analysis of vocal jitter for near-term suicidal risk assessment. United States Patent No. US 7,139,699 B2.
Stassen H., M. Albers, J. Püschel, C. Scharfetter, M. Tewesmeier & B. Woggon (1995). Speaking behavior and voice sound characteristics associated with negative schizophrenia. Journal of Psychiatric Research 29(4):277-96.
Stein, J. (1993). Vocal alterations in schizophrenic speech. Journal of Nervous and Mental Disease 181: 59-62.
Todt, E. & R. Lowell (1980). Vocal cues as indices for schizophrenia. Journal of Speech Hearing Research 23: 517-526
Tolkmitt, F., H. Helfrich, R. Standke & K. Scherer (1982). Vocal indicators of psychiatric treatment effects in depressives and schizophrenics. Journal of Communication Disorders 15(3): 209-22.
Wallbott, H. (1989). Vocal behavior and psychopathology. Pharmacopsychiatry 22 (1): 13-6.