CLASSIFICATION OF STUTTERING PATTERNS BY COMPUTATIONAL MEANS

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Abstract

This paper aims at using the computer for classifying patterns of stuttering on the basis of observations of cases noted at different times under different conditions.

These different conditions and observations of stuttering peculiarities are punched on cards and processed according to the program outlined in this paper.

The results obtained enable one to group cases in different ways for 'Group Therapy'. Marked stuttering under different conditions could be isolated for being handled through what is called 'Condition oriented therapy'.

1.0 Introduction

A descriptive classification of the stuttering patterns is attempted to facilitate the development of efficient therapeutic methods. The theoretical formulations that are in existence do not speak of a cohesive classification of the stuttering problem. Certain terms like primary stuttering, secondary stuttering and tertiary stuttering have been in use (Van Riper 1963), pertaining to age of onset. But they have not yet been brought into general conventional use. A broad categorization based on learning principles has not yet been done. The accumulation of knowledge on therapeutic approaches based on learning principles calls for the descriptive behaviour of the case. After the descriptive data are obtained, the therapeutic reliability and validity have to be established to confirm the generalisation of the corrected behaviour in all situations.

Here an attempt is made to classify the stuttering patterns in all their multi-dimensional aspects, viz., the conditions under which stuttering manifestations are observed, the modes of stuttering, the types of the primaries and secondaries, occurrence of the types of stuttering and lastly the severity of the problem.

Such an extensive table would facilitate a comparison between any two cases and also make it possible to evaluate the efficiency of the therapeutic approaches usually adopted at present.

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2.0 *Methodology*

General: A table prepared including all the above mentioned criteria would be extensive in itself and would provide for the inclusion of further delimiting criteria.

The table in the form of the input is given to the computer together with the data pertaining to a given Case and the final output would be the classification of the given case under the categories mentioned in Table 1.

Conditions	Modes of Stuttering	Types under each Mode	Occurrence of Types	Severity Scale
1—10	A and B	**A: 1—12**	0	Normal
		B: 13—20	1	Mild
			2	Moderate and Severe Stuttering

The types of stuttering patterns are classified under the primary Mode (verbal acts—prolongations and repetitions) and the secondary Mode (non-verbal manifestations), falling within specified ranges.

2.2 Check Lists

The numbers given in Table 1 mean the following

Conditions

1. With strangers
2. With superiors and officials
3. With acquaintances
4. With parents
5. With friends
6. While speaking to a big audience
7. With kith and kin
8. While alone
9. While singing
10. Others

Modes of Stuttering

A. Primary: 1
B. Secondary: 2

Types under each Mode of Stuttering

A. Primary

1. Repetition of stops
2. Repetition of fricatives
3. Repetition of syllables
4. Repetitions of hums and grunts
5. Repetition of vowels
6. Other repetitions
7. Prolongation of stops
8. Prolongation of fricatives
9. Prolongation of vowels
10. Prolongation of syllables
11. Prolongation of hums and gru ts
12. Others

B. Secondary

13. Tics
14. Facial grimaces
15. Jaw biting
16. Tongue thrusting
17. Trembling of lips
18. Shrugging of shoulders
19. Head shaking
20. Others

Occurrence of types

0. Never
1. Sometimes
2. Always

2.3 Method of Computation of the Types of Stuttering Patterns

The given values of the occurrence of types, for a particular Case, are summed up for all the ten conditions and divided by 400 (being the **total** number of the occurrences of all types in all the ten conditions).

The total sum under each condition and also the sura in each of the modes of stuttering pertaining to the respective condition are also obtained by just totalling the values falling under these categories.

The classification of stuttering patterns follows the classification criteria given in Table 2.

TABLE 2. Classification Criteria*

Types of Stuttering Pattern	Normal	Mild	Moderate	Severe
1. Primary (in a given condition)	Less than 4.0	L.E. 10 & G.T. 4.0	L.E. 18.0 & G.T. 10.0	L.E. 24 & G.T. 18.0
2. Secondary (in a given condition)	L.E. 2.0	L.E. 6.0 & G.T. 2.0	L.E. 12.0 & G.T. 6.0	L.E. 16.0 & G.T. 12.0
3. Primary and Secondary (in a given condition)	L.E. 10.0	L.E. 20.0 & G.T. 10.0	L.E. 30.0 & G.T. 20.0	L.E. 40.0 & G.T. 30.0
4. Overall stuttering pattern in all the conditions taken together	L.E. 15%	L.E. 45% & G.T. 15%	L.E. 75% & G.T. 45%	L.E. 100% & G.T. 75%

Index: L.E.—Less than or equal to.
G.T.—Greater than

* These criteria have been chosen arbitrarily.

3.0 Results and Discussion

3.1 Results

Illustrations of three typical hypothetical cases

The data cards illustrating the description of three hypothetical cases were punched according to the order indicated in Table 1, as:

Case No, Conditions, Modes, Types and *Occurrence of Type*

Each data card represented the description of the case for the given type with the given value pertaining to a given mode in one condition.

(See the Computer Output for the Three Cases)

The results printed out by the Computer after processing the data for all the cases are tabulated as follows, for further discussion see Table 3.

TABLE 3: Classification of Stuttering Pattern

Case No.	Condition	Primary	Secondary	Primary and Secondary	Stuttering Pattern (based on % of occurrence)
1	1	Mild	Mild	Mild	9.50 % Normal Stuttering
	2	Mild	Mild	Mild	
	4	Mild	Mild	Mild	
2	1	Moderate	Severe	Moderate	
	2	Moderate	Moderate	Moderate	
	4	Moderate	Moderate	Moderate	
	5	Moderate	Moderate	Moderate	50.50 % Moderate Stuttering
	6	Severe	Severe	Severe	
	7	Mild	Moderate	Mild	
	8	Moderate	Moderate	Moderate	
	9	Moderate	Mild	Mild	
3	1	Mild	Severe	Moderate	
	3	Moderate	Severe	Moderate	21.75 % Mild
	4	Mild	Severe	Moderate	
	5	Mild	Mild	Mild	

3.2 Discussion

From the results analysed by the computer, it is clear that for a given case, the degree of severity of the primaries and secondaries may vary in each condition. Their effect together in one condition is in turn different from the overall effect in all conditions. The general classification of the individual case, considering the values of occurrence of types in all the possible conditions, gives the total picture of the Case's performance, as indicated by the 'Percentage of Stuttering'.

In Case 1, though the classification of primary and secondary is 'Mild' in the given conditions, still the overall effect is 'Normal' and the case is classified under the 'Normal Stuttering' category. The term 'Normal Stuttering' here implies that the form of stuttering is within normal limits. That is, even normals do stutter when they are amidst superiors, officials or are facing any new situation causing nervousness. When their speech (verbal) acts are accounted for, together with the non-verbal manifestations, their speech characteristics have the form of stuttering. Yet, this type of defect is within normal limits and such individuals, when they undergo desensitization therapy for the pertaining condition, will be able to overcome the problem.

This category includes all those people who stutter under certain circumstances of stress and tension. Here therapy should take into account the condition under which the problem manifests itself. This could also be compared with the stage of normal non-fluency among children (Van Riper 1963).

In a similar way, in the other two cases, the variation in the overall effect is obvious, when we compare that with the individual effects of the primaries and secondaries under each condition.

InCase 2, despite the overall effect being Moderate, there are conditions where the effect of the primaries and secondaries is severe. This is an indication for the therapist to choose that pait for therapy first, which manifests lesser severity. When their effect is equal, both could be taken together for therapy. These results suggest the concept of 'condition orientated therapy' in the case of the stuttering problem.

The stuttering manifestations have to be tackled in relation to each condition, which will later lead to a better generalisation of the newly learned patterns.

4.0 Therapeutic Importance

The classification of stuttering patterns over a larger number of its manifestations is an important step in our approach to therapy. A prior classification of the case and his evaluation will enable the therapist to proceed with therapy in a systematic way. The therapist can arrange the conditions in the form of a hierarchy (Wolpe 1958) and proceed with the therapy on these lines, utilizing the desensitizing techniques. Further on, depending on the severity of the occurrence of primaries and secondaries, therapy can be given for the elimination of individual

mal-learned behaviour. The projective validity of the therapeutic approach could be established by comparing his percentage of stuttering before and after therapy. The results obtained by computational means themselves would provide face validity in view of the case's improvement.

5.0 Prospects

Based on these lines, the programme could be further extended to sort out cases having similar characteristics and to group them together for 'Group Therapy'. Data collected on a large sample covering stuttering problems could also be analysed for the most common type of stuttering patterns, including the commonest condition under which it occurs. The same program could be modified for comparing two similar cases in terms of their performance after therapy. This will prove to be an efficient technique for justifying the therapeutic approaches which in turn will speak for the practical utility of the above classification method.

The 'condition oriented therapy' based on the above criteria could be evaluated by the following method: Two groups of stutterers falling into a main group according to the same criteria under any given condition could be taken. For one group (taken from this main group) 'condition oriented therapy' is given and for the other group any other usual therapeutic methods are followed, keeping certain factors like therapist, place, etc., unchanged. A comparision of the performance of the two groups after some period of time could then be made to determine the therapeutic efficiency of the 'condition oriented therapy'.

Foot **Note:**

•f The numerical criteria chosen for classification (1), (2), (3) and (4) of Table 2 as Normal, Mild, Moderate and Severe correspond to the respective percentages given under (4).

REFERENCES

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Appendix: Computer Output

Case No	Conditions	Modes	Types	Occurrence
1	1	1	1	2
1	**1**	1	2	2
1	**1**	1	7	2
1	**1**	1	8	2
1	**1**	1	9	2
1	**1**	1		10
Primary Mild				
1	1	2	13	1
1	1	2	14	1
1	1	2	19	1
1	1	2		3
Secondary Mild				
1	1			13
Primary and Secondary Mild				
1	2	1	1	2
1	2	1	2	2
1	2	1	7	2
1	2	1	8	1
1	2	1	9	2
1	2	1	4	1
1	2	1		10
Primary				
1	2	2	13	1
1	2	2	18	2
1	2	2		3
Secondary Mild				
1	2			13
Priamary and Secondary Mild				
1	**3**	1		0
Primary Normal				
1	**3**	2		0
Secondary Normal				
1	**3**			0
Primary and *Secondary Normal*				
1	**4**	1	1	2
1	**4**	1	2	2
1	**4**	1	7	z
1	4	1		6
Primary MM				
	4	2	13	2
1	4	2	14	1
1	4	2	15	1
1	4	**2**	16	2
1	4	2		6
Secondary Mild				
1	4			12
Primary and Secondary Mild				
1				38
1				9.50%
Normal Stuttering				

Case No.	Conditions	Modes	Types	Occurrence
2	1	1	1	2
2	1	1	3	2
2	1	1	4	2
2	1	1	5	2
2	1	1	6	1
2	1	1	7	2
2	1	1	9	2
2	1	1	10	2
2	1	1	12	1
2	1	1		16
Primary Moderate				
2	1	2	13	2
2	1	2	14	2
2	1	2	15	2
2	1	2	17	2
2	1	2	18	2
2	1	2	19	2
2	1	2	20	2
2	1	2		14
Secondary Severe				
				30
2	1			
Primary and Secondary Moderate				
2	2	1	1	2
2	2	1	2	1
2	2	1	3	1
2	2	1	4	2
2	2	1	6	2
2	2	1	7	2
2	2	1	8	2
2	2	1	11	2
2	2	1	12	2
2	2	1		16
Primary Moderate				
2	2	2	15	2
2	2	2	16	2
2	2	2	17	2
2	2	2	18	1
2	2	2	19	2
2	2	2		9
Secondary Moderati				
2	2			25
Primary and Secondary Moderate				
				0
2	3	1		
Primary Normal				
2	3	2		0
Secondary Normal				
2	3			0
Primary and Secondary Normal				
2	4	1	1	2
2	4	1	2	2
2	4	1	5	2
2	4	1	6	2
2	4	1	7	2
2	4	1	8	1
2	4	1	9	1

Case No.	Conditions	Modes	Types	Occurrence
2	4	1	10	2
2	4	1	11	1
2		1	12	1
2	4	1		17
Primary Moderate				
2	4	2	13	1
2	4	2	14	2
2	4	2	15	1
2	4	2	16	1
2	4	2	17	1
2	4	2	18	2
2	4	2	19	2
2	4	2	20	2
2	4	2		12
Secondary Moderate				
2	4			29
Primary *and Secondary Moderate*				
2	5	1	1	2
2	5	1	2	2
2	5	1	3	1
2	5	1	4	2
2	5	1	5	2
2	5	1	6	2
2	5	1	7	2
2	5	1	8	2
2	5	1	9	2
2	5	1		17
Primary *Moderate*				
2	5	2	13	2
2	5	2	17	2
2	5	2	18	2
2	S	2	19	2
2	5	2	20	2
2	5	2		10
Secondary Moderate				
2	5			27
Primary and *Secondary Moderate*				
2	6	1	1	2
2	6	1	2	1
2	6	1	3	2
2	6	1	4	2
2	6	1	S	2
2	6	1	6	2
2	6	1	7	2
2	6	1	8	2
2	6	1	9	2
2	6	1	10	2
2	6	1		19
Primary Severe				
2	6	2	13	2
2	6	2	14	1
2	6	2	16	2
2	6	2	17	2
2	6	2	18	2
2	6	2	19	2
2	6	2	20	2
2	6	2		13

Case No	Conditions	Modes	Types	Occurrence
Secondary Severe				
2	6			32
Primary and Secondary Severe				
2	7	1	1	2
2	7	1	3	1
2	7	1	8	2
2	7	1	10	2
2	7	1		7
Primary Mild				
2	7	2	13	2
2	7	2	14	2
2	7	2	15	2
2	7	2	18	2
2	7	2	19	2
2	7	2		10
Secondary Moderate				
2	7			17
Primary and Secondary Mild				
2	3	1	1	2
2	8	1	2	2
2	8	1	3	2
2	8	1	4	2
2	8	1	5	2
2	8	1	6	2
2	8	1	7	2
2	8	1		14
Primary Moderate				
2	8	2	13	2
2	8	2	14	2
2	8	2	15	2
2	8	2	17	2
2	8	2	19	2
2	8	2		10
Secondary Moderate				
2	8			24
Primary and Secondary Moderate				
2	9	1	1	2
2	9	1	2	1
2	9	1	4	2
2	9	1	5	1
2	9	1	6	2
2	9	1	7	2
2	9	1	9	2
2	9	1		12
Primary Moderate				
2	9	2	15	2
2	9	2	17	2
2	9	2	19	2
2	9	2		6
Secondary Mild				
2	9			18
Primary and Secondary Mild				
2	10	1		0
Primary Normal				
2	10	2		0

Case No	Conditions	Modes	Types	Occurrence
Secondary Normal				
2	10			0
Primary and Secondary Normal				
2				202
2				50.50%
Moderate Stuttering				
3	1	1	4	2
3	1	1	5	2
3	1	1	7	2
3	1	1	8	2
3	1	1		8
Primary Mild				
3	1	2	13	2
3	1	2	14	2
3	1	2	15	2
3	1	2	16	2
3	1	2	17	2
3	1	2	18	2
3	1	2	19	2
3	1	2	20	2
3	1	2		16
Secondary Severe				
3	1			24
Primary and Secondary Moderate				
3	2	1		0
Primary Normal				
3	2	2		0
Secondary Normal				
3	2			0
Primary and Secondary Normal				
3	3	1	1	1
3	3	1	3	2
3	3	1	4	2
3	3	1	5	2
3	3	1	8	2
3	3	1	7	2
3	3	1	6	2
3	3	1		13
Primary Moderate				
3	3	2	13	2
3	3	2	14	2
3	3	2	15	2
3	3	2	16	1
3	3	2	17	2
3	3	2	18	2
3	3	2	20	2
3	3	2		13
Secondary Severe				
3	3			26
Primary and Secondary Moderate				
3	4	1	4	2

Case No.	Conditions	Modes	TypeS	Occurrence
3	4	1	5	2
3	4	1	7	2
3	4	1	9	2
3	4	1		g
Primary Mild				
3	4	2	13	2
3	4	2	14	2
3	4	2	15	2
3	4	2	17	2
3	4	2	18	2
3	4	2	19	2
3	4	2	20	2
3	4	2		14
Secondary Severe				
3	4			22
Primary and Secondary Moderate				
3	5	1	2	1
3	5	1	3	2
3	5	1	4	2
3	5	1	6	2
3	S	1	7	2
3	5	1		9
Primary Mild				
3	5	2	16	2
3	5	2	17	1
3	5	2	18	2
3	5	2	20	1
3	5	2		g
Secondary Mild				
3	5			15
Primary and Secondary Mild				
3				87
3				21.75%