

# STUTTERING AND TICS IN TWINS

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*A total of 63 twin pairs (22 MZ and 41 DZ), with one or both members affected by not organic stuttering and/or tics, have been drawn out of the Mendel Institute's twin file. Concordance of stuttering was observed in 10:12 MZ, but only in 2:19 DZ twin pairs; concordance of tics in 6:10 MZ and in 2:22 DZ twin pairs. Stuttering did not come out significantly associated either with other disturbances of language or with an IQ under the average; almost always it was possible to find out a precipitating factor. Significant relations between stuttering and tics could not be stated. Sex ratio, obtained regarding any affected subject separately, clearly turned in favour of males both in stuttering (32:12) and in tics (27:12). Stutterers and left-handers incidence in the families of stuttering subjects appeared significant in comparison with families of subjects with tics.*

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## INTRODUCTION

It is an uncertain and debated question how disorders like stuttering and tics can be clinically classified. Most of neuropsychiatric authors, especially if they have a psychodynamic tendency, consider them on the same level, i.e., like expression of neurotic pain or personality disorders. H. Ey et al. (1963) among others, particularly include tics, stuttering, enuresis, somnambulism, nail biting and thumbsucking among functional neurotic troubles (neurotic psychomotor syndrome) and consider them the expression of a disorder of nervous function integrations.

We mean by stuttering a momentary inability of starting the speech or hesitation, interruption of talk-rhythm blocking, so that letters, syllables and words are repeated or prolonged. It is tonic if there is block, clonic if there is repetition. Often, stuttering is associated with spasms which can interest both speech apparatus and parts of the body not directly interested at the language production. This associated motor activity is sometimes represented by tics and is explained as rituals or regression to gestural language.

Stuttering is considered a frequent symptom of neurosis during the latency period (Coriat 1928). It is said to be strictly connected to obsessive behaviour, because it also has two psychodynamic aspects: the motivational system and the scheme of the discharge interference (Rado 1959). Other etiopathogenetic hypotheses are based on a primary epileptic disorder (Landolt and Luchsinger 1954, West 1958), on a disorder of the lateral dominance (Morley 1967, de Ajuriaguerra 1970), on anomalies of the ontogenetic development of interactions between thought and language (Vygotsky 1966), on a lack of feedback dynamics\* (Sheehan 1958). According to Pichon and Borel-Mausonny (1971) it is only found in subjects who are affected by *insuffisance linguo-spéculative\*\**.

\* There are at least three important patterns of feedback which are able to produce and to change stuttering behaviour: proprioceptive, visual, and auditory feedback.

\*\* There are two models of thought: the *sensu-actoriel* and the *linguo-spéculative*; only the latter, exclusive of the human species, would allow abstraction, logical strictness and perfect communication. Those who don't have the inborn quality of an immediate communication (*res ipsae verba rapiunt*) are obliged in a following moment to cover their thought with the language dress; stuttering should be present only in these subjects.

American authors clinically distinguish a "primary" stuttering, in which the subjects apparently have no consciousness of their own pain and no anxiety, and a "secondary" stuttering characterized by consciousness of the unfluency of their language and by the attempt to change or to avoid it. Similarly Luchsinger et al. (1954, 1959) clearly distinguish cluttering (*Poltern*) and stuttering and assert that in the former case it is possible to control the disorder if necessary; frequently there are electroencephalographic anomalies, the prognosis is better, and the ground is clearly constitutional. Bassi and Canella (1968) too speak about stuttering "without anxiety" and "with anxiety". Anyway, especially in mixed cases, differential diagnosis appears difficult and is mainly based on *ex juvantibus* criterion.

The age of onset of stuttering is placed by the majority of authors between 6 and 11 years. It is said to be more frequent in twins (Berry 1938, West 1958). The familiarity has been always acknowledged (the Roman Sempronius' family had as second name Balbus and Blaesus because many of its members were affected by stuttering and stigmatism). A high concordance in MZ twins and an almost complete discordance in DZ has been reported by many authors (Schiller 1937, Seemann 1937 and 1950, Berry 1938, Schmidt 1940, Nelson et al. 1945, Gedda 1951, Schepank 1974). The sex ratio clearly turns in males favour (about 3:1). Frequently, stuttering is associated with left-handedness, and this event is said to be frequent in stuttering subjects families (de Ajuria-guerra 1970), and is associated too with an IQ under the average (Luchsinger 1960).

We mean by tics or muscular spasms, involuntary, unexpected, sudden, often repeated movements of limited muscular groups. They have no clear purpose; face and neck are the most frequently affected districts, but there is no part of the body that could not be interested. There are tonic tics and clonic tics.

Besides the hypothesis of a basic neurophysiologic disorder, particularly assumed in case of simple tics (Moldofsky 1971), a psychic genesis has always been recognized. Like stuttering, tics are believed to be frequent symptoms of latency period neurosis (Gerard 1947). Some authors consider them like a conversion symptom of hysteric type, but others think they are the expression of compulsive disorders (Ascher 1959). According to Fenichel (1951), in the former case a well marked body zone is interested and the patient's Ego essentially becomes not touched; anyway also more complex tics should belong to conversion symptoms, but in this case the personality regression should be noticed and therefore complex tics should be bound with catatonic phenomena and described like compulsive symptoms. Other psychoanalysts (Deutsch 1925, Reich 1925) consider them equivalents of masturbation. But one should notice the extreme polymorphism of the psychogenic tics syndrome and the remarkable difference both of pathogenetic interpretations and clinic position (Pescetto and Maffei 1969).

The age of onset is placed between 6 and 8 years and sometimes at puberty. According to Charcot, inheritance should be very important; in probands' families other affected and neurotic or psychopathic members were often found. Twin studies on psychogenic tics are almost absent, or not utilizable above all because of too small sample. In this connection the last report (Schepank 1974) indicates a concordance of tics in 2:4 MZ and in 1:5 DZ twin pairs. No significant differences about tics frequency in the two sexes have been found.

## MATERIAL AND METHODS

The aim of our research was to study stuttering and tics in MZ and DZ twin pairs in the developmental age, limiting the investigation field mainly to emotional disorders and clearly excluding organic disorders. This twin study also had the purpose to give a further contribution to the estimate of genetic factors in both disorders, to the possible correlation between them, to the control of literature data. We then inquired about the age of onset, about the familiarity of stuttering and tics as well as of that of left-handedness, about possible neuropsychiatric associations and electroencephalographic reports.

The twin sample, represented by 63 pairs (22 MZ and 41 DZ), originated from the Twin Register of the Rome Mendel Institute.

## RESULTS

The results are very synthetically and incompletely summarized in Tables 1 (MZ pairs) and 2 (DZ pairs). The data connected with concordance and discordance between twin pairs are summarized in Table 3.

As regards MZ twins, in stuttering pairs (9 MM and 3 FF) we found a concordance of 83.33% (10 pairs out of 12) and in those with tics (6 MM and 4 FF) a concordance of 60.00% (6 pairs out of 10). In DZ twins a concordance of 10.53% for stuttering and of 9.09% for tics came out. The age of onset of stuttering appears to be concordant in 7 out of 10 MZ pairs, and that of tics in 3 out of 6 MZ pairs. In our twin sample stuttering does not appear to be significantly associated with other disorders of language (only 5 subjects out of 43 presented stigmatism and/or rhotacism), nor with mild mental deficiency (IQ 83-90 only in 8 cases), nor with enuresis (2 cases). The speech retardation (in all 15

Table 1. *Stuttering and tics in MZ twins*

File no.	Sex	Trouble	Age of onset	Associations	Family history	
					Specific	Left-hand.
4192	M	Stutt	7	Mild ment. def.		
	M	Stutt	7	Mild ment. def.		
8621	M	Stutt	5	Mild ment. def. Arachnodact.	+	+
	M	Stutt	5	Mild ment. def. Arachnodact.		
3530	M	Stutt	9	Left-handed		+
	M	Stutt	7	—		
6629	M	Stutt	6		+	
	M	Stutt	7			
2779	F	—	—			+
	F	Stutt	6			
1174	M	Stutt	5		+	
	M	Stutt	6			
10454	M	—	—	Left-handed		
	M	Stutt	7	Onychophagia		
12462	M	Stutt	6	Left-handed	+	+
	M	Stutt, tics	6			
6342	M	Stutt	5	Left-handed	+	
	M	Stutt	6	—		
5666	M	Stutt	6	Sigmatism, rhotacism		+
	M	Stutt	6	Sigmatism, rhotacism		
Pers. case	F	Stutt	4			+
	F	Stutt	4			
5627	F	Stutt	6	Left-handed		
	F	Stutt, tics	6			
11828	M	Tics	2	Noct. enuresis		
	M	Tics	2	Noct. enuresis		
12879	M	Tics	8½			
	M	Tics	9			
5904	F	Tics	8	—		
	F	Tics	8	Left-handed		
420	M	Tics	9			
	M	—	—			
690	F	Tics	13		+	
	F	Tics	14			
6099	M	Tics	10			
	M	Tics	10			
8643	M	Tics	8			
	M	Tics	6			
10.182	F	—	—	Mild ment. def.		
	F	Tics	8	Mild ment. def.		
10187	F	Tics	6	Noct. enuresis		
	F	—	—	Noct. enuresis		
6272	M	Tics	14			
	M	—	—			

Table 2. *Stuttering and tics in DZ twins*

File no.	Sex	Trouble	Age of onset	Associations	Family history	
					Specific	Left-hand.
5630	F F	Stutt —	8 —			
4494	M M	— Stutt	— 7	Mild ment. def. IQ 110	+	
6319	M M	Stutt —	4 —			+
6161	M M	— Stutt	— 5	— Left-handed		+
6171	M M	— Stutt	— 10			
5289	F F	Stutt Stutt	12 10		+	
190	M M	— Stutt, tics	— 6	— Sigmatism, Rhotacism	+	+
12164	M M	Stutt —	10 —	— Left-handed, Enuresis		+
6617	M M	Stutt —	4 —	Enuresis Left-handed		+
9087	M M	Stutt, tics —	5 —	Sigmatism, Left-handed —	+	+
11590	M M	Stutt —	6	Mild ment. def. Mild ment. def. Left-hand., Enur.		+
13841	F M	Stutt —	5 —			
6829	M F	— Stutt	— 6	— Mild ment. def.		
274	F M	— Stutt	— 8	Mild ment. def. Mild ment. def.		
9100	F M	— Stutt	— 4	— Sigmatism Enuresis	+	
11264	M F	Stutt —	8 —		+	+
6.980	F M	Stutt Stutt	4 5			+
9863	F M	Stutt —	4 —		+	
9026	F M	— Stutt	— 7	— Left-handed	+	+
912	F F	Tics —	8 —			
1028	F F	Tics —	8 —	Ambidextrism Left-handed		

*(Continued)*

Table 2. *Continued*

File no.	Sex	Trouble	Age of onset	Association	Family history	
					Specific	Left-hand.
384	M M	— Tics	— 8			
5142	M M	Tics —	9 —			
5626	F F	— Tics	— 5	Petit mal		
5570	M M	Tics Tics	9 7	— Noct. enuresis		+
12360	F F	Tics —	3 —	— Left-handed		+
6.726	M M	Tics —	7 —			
5612	M M	Tics —	10 —		+	
8637	M M	— Tics	— 7			
7315	M M	— Tics	— 7	Noct. enuresis —		
8580	M F	Tics —	8 —	— Noct. enuresis		
11829	F M	— Tics	— 8	— Mild ment. def.		
5610	M F	Tics —	7 —	Mild ment. def. Mild ment. def.	+	
5415	F M	— Tics	— 8	— Migraine		
563	F M	— Tics	— 5			
5854	M F	Tics —	5 —	Sigmatism —		
10404	M F	Tics —	7 —	Mild ment. def. —		
10218	F M	— Tics	— 8	Mild ment. def. Ambidextrism		+
5451	M F	Tics —	3 —			
13868	F M	Tics —	9 —	Rhotacism —		
6697	M F	Stutt Tics		Left-handed, Noct. enuresis —		+

Table 3. *Analysis of concordance*

		N	Concordance		Discordance	
			n	%	n	%
Stuttering <sup>a</sup>	MZ	12	10	83.33	2	16.67
	DZ	19	2	10.53	17	89.47
Tics <sup>b</sup>	MZ	10	6	60.00	4	40.00
	DZ	22	2	9.09	20	90.91

<sup>a</sup> In two concordant MZ pairs one of cotwins is affected by a winking-tic associated with stuttering; in two discordant DZ pairs the stuttering cotwin is also affected by tics.

<sup>b</sup> In one discordant DZ pair the cotwin without tics is stutterer.

Table 4. *Analysis of familiarity<sup>a</sup>*

	N	Specific fam. hist.		Left-handedness	
		n	%	n	%
Stuttering	31	14	43.75	16	50.00
Tics	32	3	9.37	4	12.50

<sup>a</sup> At least two cases in maternal or paternal side.

cases) is more frequent, and the “peculiar language” or idioglossia (2 cases of MZ pairs) is limited to the “twin situation” and for that cannot be discussed. Stutterers and left-handers incidence in the families of stuttering subjects is significant in comparison with families of subjects with tics (Table 4). No stutterer presented electroencephalographic anomalies. In most cases of stuttering it is possible to find out a precipitating event-factor, both psychic (fear reaction) or somatic (surgical operations). No meaningful association has still been found for tics and it has been difficult to find out conscious precipitating factors.

Sex ratio, obtained regarding any affected subject separately, clearly turns in favour of males, 32:12 for stuttering and 27:12 for tics (this last report was unexpected). In this connection, educational differences can be important in the two sexes. Incidentally, in 9 out of 10 DZ twin pairs of opposite sex, the male has a tic.

While duly considering the limits of our sample, the following tentative conclusions can be drawn:

- (1) there is some evidence of genetic factors — likely predispositional — in the etiology of stuttering and tics;
- (2) these factors would be particularly important in stuttering;
- (3) environmental factors — mostly, we think, psychogenetic ones — seem to be clearly more important in tics;
- (4) we believe there are no significant interactions between tics and stuttering nor between stuttering and other disorders of speech;
- (5) in the stuttering pathogenesis a disorder of hemispheric dominance can be important.

A further family study, especially at the psychological level (individual and interactional) and in longitudinal view, seems necessary so that we can individuate environmental factors. For the time being we may notice that in the 4 MZ pairs discordant for tics, the affected twin either had the leadership in his “twin society” or presented a better school performance.

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