# FREQUENCY AND TYPOLOGY OF DISFLUENCIES: COMPARATIVE ANALYSIS BETWEEN CLUTTERERS AND STUTTERERS

## *Frequência e tipologia das disfluências: análise comparativa entre taquifêmicos e gagos*

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**ABSTRACT**

**Purpose:** to quantify and to compare the typology of disfluencies in the speech of adults who clutter and adults with developmental persistent stuttering. **Method:** participants of this investigation were 15 adults, divided in two groups: Group of Adults Who Clutter, composed by 5 individuals and Group of Adults Who Stutter, composed by 10 subjects. The procedures used were: Assessment of Fluency, Predictive Cluttering Inventory and Stuttering Severity Instrument. **Results:** the data indicated that the groups differed regarding the occurrence of other disfluencies (p=0,021) and stuttering-like disfluencies (p<0,001). The analysis for the types of other disfluencies revealed that there was statistically significant difference for the interjections, revision and unfinished word. The Group of Adults Who Stutter showed statistically significant increase of all the types of stuttering-like disfluencies. **Conclusion:** the group of adults who clutter showed increase of the occurrence of the other disfluencies, whereas the group of adults who stutter showed increase in the occurrence of the stuttering-like disfluencies. The other disfluencies were variable in both groups and those who clutter show less types of stuttering-like disfluencies when compared to those who stutter.

**KEYMORDS:** Speech, Language and Hearing Sciences; Speech; Diagnosis; Stuttering; Speech Disorders

## INTRODUCTION

Stuttering and cluttering are the main fluency disorders. Stuttering is a developmental speech disorder in which the primary symptoms are motor; the flow of fluent speech is disrupted as the nervous system fails to generate the appropriate command signals to drive the muscles involved in speech production[1]. Therefore, stuttering is a chronic condition involving involuntary disruption to speech fluency[2], that is the central feature of the disorder[3]. These disfluencies in the adult who stutter (AWS) are characterized specially by syllable repetitions, prolongations, sounds' blocks and word substituions[4]. The disorder typically stars in early childhood (developmental)[5] and tends to persist into adulthood. The stuttering-like disfluencies generally

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begin in the period of language acquisition, especially between the ages of 2;0 and 5;0 years[6].

Cluttering is a fluency disorder wherein segments of conversation in the speaker´s native language are typically perceived as too fast overall, too irregular, or both. The segments of rapid and/or irregular speech rate must further be accompanied by one or more of the following: excessive normal disfluencies, omission of syllables and/or pauses, abnormal syllable stress or speech rhythm[7]. More recently, cluttering was described as a fluency disorder characterized by three factors: high frequency of between-word and within-word disfluencies, fast and/or irregular articulatory rate, reduced intelligibility and indistinct articulation[8]. The language is an important aspect that must be considered in the cluttering[9,10]. The Clinical Committee of the *International Cluttering Association (ICA)* includes the language components in the cluttering and highlights that those must be evaluated[11].

Nevertheless, while stuttering is widely investigated, research involving cluttering is rare. A possible explication for this is the difficulty in making the diagnosis of this disorder, as well as the fact of lower prevalence of cluttering in comparison to stuttering[12].

Fluency is an aspect of speech production related to continuity, smoothness, speed and/or effort in which phonological, lexical, morphological and/or syntactic language units are expressed[13]. Therefore, stuttering and cluttering are classified as fluency disorders with a high frequency of discontinuity or disfluencies. However, the typology of the disfluencies is different. While the stuttering-like disfluencies (SLD) are the main characteristics of the stuttering[2-4], the high frequency of other disfluencies (OD) is the most essential symptom for the diagnosis of cluttering[7,9,13,14]. These other disfluencies (OD) seem to indicate doubts related to the linguistic formulation of phrases or pronunciation of words.

Understanding of the typology of the disfluencies is important to characterize the disruption in the speech, classifying as other disfluencies or stuttering-like disfluencies, which will add to the determine the differential diagnosis of the fluency disorders. For the speakers of Brazilian Portuguese, there is a normative study that showing the fluency parameters for all the ages that helps the diagnosis of the fluency disorders[15].

Therefore, the literature show information concerning the manifestations of the cluttering and stuttering, however the studies that investigate simultaneously both disorders are rare. Thus, the present work has the purpose to quantify and to compare the typology of disfluencies in the speech of adults who clutter and adults with developmental persistent stuttering.

## METHOD

This research is design as an experimental and cross-sectional study with comparison between groups, developed with adults who clutter (AWC) and adults who stutter (AWS), of the Laboratório de Estudos da Fluência – LAEF do Centro de Estudos da Educação e da Saúde (CEES) da Universidade Estadual Paulista – FFC – Marilia.

Research ethics approval was received from the local institutional human research ethics committee of Universidade Estadual Paulista – CEP/FFC/UNESP (protocol number 009/2011). Those who met the criteria were invited to participate by the principal investigator of the study, who presented information about the study (objectives, risks, benefits and procedures they would be submitted), verbally and in written form. After reading and clarification of doubts of the Consent Term, the adults signed consenting to his/her participation and dissemination of the results of this research in compliance with Resolution 196/96 of the National Health Council/Brazilian Ministry of Health (BRASIL. Resolução MS/CNS/CNEP nº 196/96 de 10 de outubro de 1996).

Participants of this study were 15 adults, between 18.0 and 40.11 years old (mean age of 27:6 years, SD=7.41), of both gender (6 male and 9 female). The adults were patients of the Laboratório de Estudos da Fluência (LAEF) do Centro de Estudos da Educação e da Saúde (CEES – Marília – Unesp), and were divided in two groups: Group of Adults Who Clutter (AWC), composed by five clutterers (mean age of 27 years, SD=4.83, whereas 2 were male and 3 female); and Group of Adults Who Stutter (AWS), composed by 10 adults with developmental persistent stuttering (mean age of 27.9 years, SD=5.10, 4 male and 6 female), paired with the clutterers by gender and age (± 3 months).

Cluttering is rarer than stuttering[12], and for this reason, the number of adults who stutter (AWS) was twice the number of adults who clutter (AWC).

The inclusion criteria of the adults were: to be speaker of Brazilian Portuguese and age between 18.0 and 40.11 years. The group of cluttering (AWC) should present fluency disorder, however not characterized as stuttering. For the group of AWC, were used the following inclusion criteria: to show disfluent speech, fast speech rate and score above 120 on the Predictive Cluttering Inventory (PCI)[16], because, according to the author, preliminary data above this score suggest a diagnosis of cluttering.

To compose the group of AWS, the following inclusion criteria were adopted: stuttering complaint by the adults themselves; beginning of the stuttering should occur during the childhood (developmental), with the persistence of the disfluencies (persistent), and show at least mild stuttering on the Stuttering Severity Instrument 3 (SSI-3)[17].

For both groups the exclusion criteria were to present any: neurological disorder or condition genetic or not, as like dystonia, extrapyramidal diseases, mental retardion, disorder and attention deficit hyperactivity; psyquiatric symptoms or conditions; conductive or sensorineural hearing loss; and others conditions that could misinterpret the diagnosis.

A speech sample of each adult contained at least 200 fluent syllables was collected and videotaped for analysis and comparison of the data. The speech samples were transcribed literally considering both fluent and non-fluent syllables. The typologies of the disfluencies were analyzed to separate the other disfluencies (OD) and the stuttering-like disfluencies (SLD).

To characterize the frequency of speech disruptions, the following measurements were used: percentage of total disfluencies (TD), percentage of other disfluencies (OD) and percentage of stuttering-like disfluencies (SLD). The speech rate was measured according to the used protocol, characterizing the flow of syllables and words per minute (SPM, WPM)[15].

The Predictive Cluttering Inventory[16] was applied in the adults who clutter (AWC) to analyze the main characteristics of the disorder and confirmation of the diagnosis. Total score between 80 and 120 is indicative of the presence of stuttering and cluttering, and score above 120 suggest diagnosis of cluttering[16].

The Stuttering Severity Instrument (SSI-3)[17] was used in the adults who stutter (AWS) to classify the stuttering as mild, moderate, severe and very severe. This test assesses the speech disruptions frequency and duration, and also the presence of physical concomitants associated with these disruptions, following the recommendation of the author.

The data were stored and tabulated. The statically analysis data were analyzed by Statistical Package for the Social Sciences (SPSS) 19.0 software. Mann-Whitney Test was applied to compare the quantitative results among the groups. The values were considered significant at less than 0.05 ($p<0.05$) with a confidence interval of 95%. The adopted level of significance was of $p=0.05$ (5%). The significant p values were marked with asterisks (*).

## RESULTS

The mean age of the population studied was 27.6±7.41 years, the age range of 18.0 to 40.11 years. The group of AWC showed a score in the Predictive Cluttering Inventory[17] that varied between 125 and 138. The group of AWS shows different stuttering severity in the Stuttering Severity Instrument[17], ranging from mild to very severe. The stuttering severity of the majority of the group AWS was mild (n=5), severe (n=2), very severe (n=2) and just one show moderate stuttering.

The Tables 1, 2 and 3 show the results of the statically analysis obtained in the comparison between the groups for each one of the variable. There was statistically significant difference between AWC and AWS for the total of the disfluencies, total of other disfluencies (OD) and total of stuttering-like disfluencies (SLD), which the OD occur in higher frequency in the group of AWC, and the SLD in the group of AWS (Table 1).

**Table 1 – Intergroups comparison concerning the occurrence of other disfluencies and stuttering-like disfluencies**

| Variables | AWC (N=5) | | | | AWS (N=10) | | | | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Minimun | Maximo | Mean | SD | Minimum | Maximo | |
| Total of disfluencies | 13,50 | 1,51 | 11,00 | 15,00 | 20,50 | 15,80 | 9,00 | 62,50 | < 0,001* |
| Other disfluencies | 13,14 | 1,49 | 11,00 | 15,00 | 10,46 | 6,06 | 4,00 | 28,00 | 0,021* |
| Stuttering-like disfluencies | 0,36 | 0,38 | 0,00 | 1,00 | 10,04 | 11,72 | 3,00 | 45,00 | < 0,001* |

Legend: AWC = group of adults who clutter; AWS = group of adults who stutter; SD = standard deviation
*Statistical significance ($p \leq 0.05$) – Mann-Whitney Test

In the intergroup comparison of the OD the results indicate that the quantity of hesitation, phrase, segment and word repetitions is similar (Table 2). However, there was difference in the occurrence of the interjection, revision and unfinished word between the groups, and the group of AWC showed higher occurrence of these typologies. The most common OD was the interjection for the group of AWC, whereas for the group of AWS was the hesitation.

The results of the occurrence of SLD of the participants distributed according to their typologies show that the group of AWS exhibited higher occurrence in the different disruptions when compared to the group of AWC (Table 3).

There was statistically significant difference for all SLD in the intergroup comparison of each typology separately. The most common typology was prolongation for AWC, whereas blocks for AWS. The group of AWC didn´t presents the followings typologies: sound repetition, block, pause and intrusion (Table 3).

**Table 2 – Intergroup comparison concerning the other disfluencies**

| Groups | Hesitation | | Interjection | | Revision | | Unfinish word | | Phrase repetition | | Segment repetition | | Word repetition | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | M | SD | M | SD | M | SD | M | SD |
| AWC (N=7) | 5,00 | 2,77 | 11,71 | 3,45 | 4,57 | 2,76 | 0,86 | 1,07 | 0,57 | 0,98 | 0,00 | 0,00 | 2,71 | 2,06 |
| AWS (N=14) | 8,07 | 7,62 | 6,29 | 5,01 | 0,93 | 0,83 | 0,07 | 0,27 | 1,93 | 2,09 | 0,14 | 0,36 | 3,50 | 2,57 |
| p-value | 0,430 | | 0,016* | | < 0,001* | | 0,038* | | 0,062 | | 0,305 | | 0,543 | |

Legend: AWC = group of adults who clutter; AWS = group of adults who stutter; M= mean; SD = standard deviation
**Statistical significance ($p \leq 0.05$) – Mann-Whitney Test

**Table 3 – Intergroup comparison concerning the stuttering-like disfluencies**

| Groups | Part-word repetition | | Sound repetition | | Prolongation | | Block | | Pause | | Intrusion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | M | SD | M | SD | M | SD |
| AWC (N=7) | 0,29 | 0,76 | 0,00 | 0,00 | 0,43 | 0,54 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| AWS (N=14) | 2,36 | 2,85 | 1,93 | 3,15 | 5,57 | 10,07 | 6,71 | 7,63 | 1,00 | 1,88 | 1,21 | 1,42 |
| p-value | 0,012* | | 0,009* | | 0,011* | | < 0,001* | | 0,049* | | 0,016* | |

Legend: AWC = group of adults who clutter; AWS = group of adults who stutter; M = mean; SD = standard deviation
**Statistical significance ($p \leq 0.05$) – Mann-Whitney Test

## DISCUSSION

The characterization of the frequency and typology of the disfluencies in adults who clutter (AWC) has an extreme importance for both area, scientific and clinic, since that improve the diagnosis of the different fluency disorders, providing greater credibility and better control of the therapeutic efficacy. Some researches analyzed the fluency of persons who clutter[14,18]. However, just one study including cluttering and stuttering[19] was found in the literature compiled, however, nevertheless, it didn´t compare the disfluencies between persons who clutter and persons who stutter.

In the characterization of the group of AWS it was noted that there was variability in the stuttering severity, with half classified as mild (50%). The results confirm previous findings[9-11] about the diagnostic proposal that the group of AWC showed a wide spectrum of manifestation in the communication, which at least one of each area described in the Predictive Cluttering Inventory (PCI)[16].

Differences were found between the groups for the quantitative analysis of the disruptions. These findings are in accordance with the literature that indicates that the presence of excessive other disfluencies is one of the main manifestation of cluttering[7,9,13,14], while the increase in the occurrence of stuttering-like disfluencies is typical of persons

who stutter[2-4]. However, the data of this study didn´t show the increase of within-word disfluencies in the group of AWC as reported by a study in the literature[19]. It is important to highlight, however, that the persons who don´t stutter can also show SLD in their speech, but in lower frequency[14,20,21].

When the values of the percentage of total disfluencies were compared with the normative data for adults who do not stutter described in the literature, for the Brazilian Portuguese speakers (ages 18.0 to 40.11 years)[15] and also for English speakers[20] it was verified that both groups showed similar values. Regarding to the percentage of stuttering-like disfluencies the values of the AWS were higher than the data of the literature[15,20], as expected. The group of AWC showed a total of stuttering-like disfluencies within the confidence interval described by the authors[15,20].

Analyzing the distribution of the different stuttering-like typologies, it was observed that the group of AWS showed every types of SLD, whereas that the group of AWC showed only part word repetition and prolongation. The results of this study corroborate the literature which states that the disfluencies characterizing stuttering suggest breakdowns in the motor programming that underlies speech production[22], which seems not to occur in the speech of AWC.

This way, in relation to SLD, the results indicated that the groups differed regarding the types expressed. It must be considered that adults who clutter, as any speaker, can present a few occurrences of SLD, not only in percentage but also in different types of ruptures. The findings of this research regarding to the group of AWC were similar to those found with adults who not stutter English speakers[20], which part of word repetition and prolongations were the SLD showed. However, in the study with speakers of Brazilian Portuguese[15], besides the prolongations and part of word repetitions, the adults who do not stutter also showed pauses and sound repetitions. Therefore, the group of AWC is similar to the adults who not stutter in relation to SLD, and different from adults with stuttering.

When comparing the typology of OD among the groups of AWS and AWC, the results indicated the occurrence of several types of OD in both groups. Adults who stutter showed all types of OD, and adults with cluttering did not show just the segment repetition.

Statistical analysis indicated no differences for hesitation, phrase, segment and word repetition. However, the group of AWC showed greater amount of interjection, revision and unfinished word, confirming the findings of a study that examined the disfluencies of two individuals with cluttering[23]. Others researches have also reported the presence of an excess of interjections and revisions[24]. These linguistics disfluencies can be supported by the difficulties of words finding or grammatical formation of the utteranes[25].

It´s worth discussing these findings in linguistic terms. The disfluencies are considered as constituting the flow of speech, and can be used as resources for the development of oral message. The other disfluencies are often used in moments of linguistic doubts, or also to fix mistake in the conversation, or rebuild the message to facilitate understanding by the listener. As indicated in the literature, cluttering present the typical characteristics of difficulties in language[9].

The ruptures provide time for the speaker to solve temporary difficult related to “what to speak” or “how to speak” something[26]. Therefore, the results indicate that adults with cluttering use high frequency of disfluencies in speech, suggesting greater difficulty in language development and/or formulation of oral discourse. The interjections, for example, may be used to provide time to continue an unfinished formulation during the communication.

Specifically, the revisions show excerpts considered inadequate by the speaker that are fixed[26]. This way, it is concluded that adults with cluttering show more inadequate excerpts in the flow of speech, and therefore use a larger amount of revisions. Difficulties in the organization of thought and temporal coordination between thought and speech usually manifested by people with cluttering may justify an increase in the quantity of revisions, as well as unfinished words. It is believed that the function of both revisions and unfinished words are similar, making a correction of speech. However, the self-monitoring was faster in the unfinished word, when the speaker has detected that the word was not appropriate, abandoning it to transmit the desired message.

In the group of AWC, the interjection was the most common typology of occurrence. Similar results were described in a recent study that analyzed the disfluencies of 18 persons with cluttering and 20 persons without cluttering[18]. The high frequency of interjection can be linked mainly to two factors: fast speech rate[9], since the fast articulatory rate provides insufficient time for the speaker to formulate and organize the utterances, and difficulty of finding words in lexical selection process.

## CONCLUSION

From the results of this study, it is possible to conclude that the analysis of the typology and the

frequency of the disfluencies provides relevant information for the differential diagnosis of the cluttering and stuttering, especially regarding to linguistic disfluencies. Regarding the frequency of disfluencies, it was observed that the high frequency of other disfluencies was typical of the group with cluttering, whereas the high frequency of stuttering-like disfluencies was common in the group with stuttering.

Both groups showed a great variety of different types of other disfluencies. However, the results concerning the stuttering-like disfluencies have shown that adults who clutter present only part of word repetition and prolongation. The group of adults who stutter showed all the different types of stuttering-like disfluencies.

It can be concluded that the fluency profile of adults with cluttering is very distinct from fluency profile of adults who stutter, suggesting the presence of language difficulties in clutterers. It is believed that this study is relevant to assist in making the differential diagnosis of cluttering based on clinical evidence, also collaborating on improving the assessment and treatment of the disorder.

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**RESUMO**

**Objetivo:** quantificar e comparar as tipologias das disfluências da fala de adultos com taquifemia e adultos com gagueira desenvolvimental persistente. **Método:** participaram 15 adultos, divididos em dois grupos: Grupo de Pessoas com Taquifemia, composto por 5 adultos com taquifemia e Grupo de Pessoas com Gagueira, composto por 10 adultos com gagueira. Os procedimentos utilizados foram: avaliação da fluência, Inventário Preditivo de Taquifemia e Instrumento de Gravidade da Gagueira. **Resultados:** os grupos apresentaram diferenças estatisticamente significantes para o total de disfluências comuns (p=0,021) e de disfluências gagas (p<0,001). Quanto à tipologia de disfluências comuns, interjeição, revisão e palavra não terminada apresentaram diferenças significantes. Todos os tipos de disfluencias gagas foram manifestados com maior ocorrência no grupo de gagueira, com diferença estatisticamente significante. **Conclusão:** o grupo de pessoas com taquifemia apresentou aumento da frequência de disfluencias comuns, enquanto que o grupo de pessoas com gagueira apresentou aumento na frequencia de disfluências gagas. As disfluências comuns foram variadas em ambos os grupos e taquifêmicos mostraram menos tipos de disfluências gagas em relação aos taquifêmicos.

**DESCRITORES:** Fonoaudiologia; Fala; Diagnóstico; Gagueira; Distúrbios da Fala

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