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**Nonverbal Communication and Global Discourse Analysis:  
Report of the Application and its Results in the  
Context of Criminal Investigation**

**Comunicação Não Verbal e Análise do Discurso Geral:  
Relatório da Aplicação e seus Resultados no  
Contexto de Investigação Criminal**

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**Abstract.** This article consists of two analysis of an oral testimony conducted in police headquarters, of a case involving a child's murder. This case, of great repercussion in Brazil, has become a major challenge for the authorities, which led to the request of analysis involved aspects of verbal and nonverbal communication. They were performed separately by professionals from different areas. Such analysis, when confronted, brings convergent evidence, and corroborates the findings obtained by the two methods, the result indicates a reliable way of using communicative analysis in the context of statements. Finally, we intend to describe the used methodology and the theoretical resources on which professionals involved in the case are based on.

**Keywords:** Forensic linguistics; Forensic psychology; Utterance; Discourse analysis; nonverbal behavior.

**Resumo.** O presente artigo constitui-se de duas análises de uma oitiva realizada em sede policial de um caso envolvendo o homicídio de uma criança. Este caso, de grande repercussão no Brasil, tornou-se um grande desafio para as autoridades, o que culminou na solicitação das referidas análises. As análises envolveram aspectos da comunicação verbal e não verbal e foram realizadas separadamente, por profissionais de áreas

distintas. Tais análises quando confrontadas trouxeram elementos convergentes, corroborando os achados obtidos pelos dois métodos utilizados, cujo resultado indica um caminho confiável de emprego da análise comunicativa no contexto de depoimentos. Por fim, pretende-se descrever a metodologia utilizada, bem como os recursos teóricos em que se basearam os profissionais envolvidos no caso.

**Palavras-chave:** Linguística forense; Psicologia forense; Depoimento; Análise do discurso; Comportamento não verbal.

## 1. Introduction

The initiative, which has resulted in this article, came from the sharing of the results obtained from the analysis performed by two different areas of professions, a psychologist and a speech therapist. In 2013, it was asked to Instituto Paulista de Estudos Bioéticos e Jurídicos (IPEBJ)/Forensic Science Investigation Brasil (FSI – Brasil) to review the testimony of a murder suspect. Such an application deployed on the appointment of two institutes' teachers with specific training of different specializations, both involving human communication. Working one in São Paulo and another in Rio de Janeiro, they began their analysis using different methodologies.

The analysis of non-verbal behavior involves cognitive neuropsychology and the analysis of oral communication, linguistic aspects, namely: acoustic, syntactic, semantic and prosodic. It is not from today the relationship between linguistics and psychology. These two disciplines have always been linked, even though they are autonomous. Linguistic lingers over in the investigation of human language and psychology focusing on the subject. They interact in a way which language is the subject of thought and a vehicle of social communication. The language allows man to live in society, establish psychological and social ties<sup>1</sup>. The Social Psychology of Language discipline has an intimate relationship with sociolinguistics and exemplifies this statement. The article reports the screen analyzes highlighting, its theoretical basis and presents the results, which surprised the professionals involved in the analysis procedure and the police authority that requested the study. This work helps propelling and stimulating new studies and insights on testimonials analysis area.

## **1.1 Examined material, methodology analysis, theoretical assumptions**

The material submitted by the police, which led to the analysis described in this article, was composed by four (4) digital files in AVI extension, with audio and video recordings related to the oral testimony from a suspect of the murder of a child, adding up a total of 3 hours 12 minutes 19 seconds of testimony.

### **1.1.1 Verbal communication analysis**

The audio was used for analysis of verbal communication, the images was discarded. Video files, initially in .AVI, were converted to audio files in .WAV extension. All audio content was transcribed and all material related to the speech of the nonsuspect was discarded. Linguistic analysis was settled in compliance with the acoustic findings, which were analyzed the variations in pitch, loudness and voice stress through the Praat software, AdobeAudition (to edit the audio), Gram and WinPitch, and suprasegmental level, analyzing - the intonation, pauses and prolongations. For the lexical level, we used the WordSmith program for word count and to check the type of occurrence and its context. From the oral text transcript, it was possible to set demarcations about the level of tension in his voice, repeated words, contradictions and self-corrections.

When there was absence of a regular communication pattern of the suspect/ deponent, comparisons were made considering the situational context and content of statements. We decided to choose two distinct moments of testimony to compare them. The first part listed a moment referring to the time when the suspect reports about the night of fact (the suspect was with the child on the night of his disappearance) and a second moment when the suspect describes the procedures made, the next morning, after knowing of the child's disappearance. The two passages contained exactly 2 minutes and 30 seconds of speech of the suspect, they were analyzed and compared.

The vocal emission is a phenomenon that involves great interpersonal and intrapersonal variations, appearing in many aspects that can be measured by specialized programs. Suprasegmental aspects give the valuable information discourse on the meaning of the message and these subtleties in meaning are evoked through prosody, intonation and pauses, among other markers. In every enunciation you want to say something that is shaped by the intention and

speaker's goals. One of the main functions of prosody is the expression of attitudes, with the melodic curve, seen as the prosody parameter that carries more informations<sup>2</sup>. The audio files were analyzed following the transcript text and visualizing the spectrum of the sound wave produced by the speaker in order to check the times of formal sense evoked by lexical elements that act together with the prosodic features. The analysis of prosody is a resource that points to the attitude in the speech of individuals, as well as notes or decreases the value of something in the statement. Intonational aspects of cyclic groups, speech rate and pauses were checked by monitoring the melodic curve that followed the phonic segments in the statements. This analysis was based on phonological theory of intonation proposed by Sosa<sup>3</sup> with some of the following assumptions: i) the intonation is significant, can differentiate meanings (semantic or pragmatic) in identical statements formally; ii) the intonation is systematic: there is a limited number of intonation patterns in each language, which are used to produce defined semantic effects; iii) tone is characteristic and iv) text or speech is divided into units or melodic groups. Therefore, we monitored the values of the fundamental frequency, and duration and intensity of emissions. That said, the option of using the acoustic analysis was in order to add more elements to the analysis.

The enunciation is the linguistic materiality, and its meaning is inextricably tied to the production situation. The progression of the communication takes place through formulation activities in which the speaker chooses to introduce in his speech, recurrences of all kinds. Rath<sup>4</sup> says that the process of oral textual construction with all its deviations, restarts, repeats and corrections is directly observable. It is a fact that speech in interaction, presents systematic organization which is open to scientific research and description. Such descriptions are sidewalks on the observation of linguistic facts recorded by the transcription process, allowing a continuous and repeated contact with this data and the reflection detailed about their events in order to detect discursive strategies or the use of constant reformulation in the progression of oral text. From the text written, a syntactic analysis was performed. The syntax according to Michel Pêcheux<sup>5</sup>, is the site of an observation of discursive processes which more escapes of the speaker's strategic control are shown. This process aims to analyze: the arrangement of words in sentences; the arrangement of sentences in discourse;

the logical relationship of sentences together; the average word length; the average length of sentences; the presence of "collocates". The linguistic and acoustic findings were compared in order to detect patterns of behavior or inconsistencies.

Paveau<sup>6</sup> defined the discourse analysis as "the discipline that studies the verbal productions within their social conditions of production." The subjectivity of the speaker or his discursive intention, is expressed in their choices, is materialized in the enunciation, is determined by the circumstances and designed by discursive style. Foucault explains that the production of discourse is controlled, selected, organized and distributed. This act goes through a process of choices and words of exclusions in order to achieve the goal. Still quoting Foucault, this is not an interpretation of meanings that seeks only to discover what is hidden behind the speech, but what actually produces and shows, through there may be contradictions. From the concept of discursive formation of Foucault, who Pêcheux<sup>5</sup> appropriates and reframes the field of discourse analysis, and we take here as an example, this work proposes the appropriation and the reterritorialization or redefinition of the relationship between language, the subject, the ideology and the historical materiality. If the discourse is to address the linguistic materiality in a statement context, the analyses should be based on the speeches of two by the deponent in relation to the context in which it appears the charge, taking into account the language, while significant system materials and the symbolic materiality, which Orlandi<sup>7</sup> calls the order of history. This "story" is what we suggest to reconstitute the place of "historical" aspects that would be related to the period before the crime being investigated. Taking the speech, the effect of meaning between speakers, that statement makes think about what direction effects the deponent awaits to get on with his speech and through this discursive production, identify other elements that go through his speech and mark the inconsistencies of what was said.

### **1.1.2 Nonverbal communication Analysis**

The nonverbal communication behavior constitutes a research field that for decades has a collection of studies that has much to contribute to the professionals to aggregate knowledge as the ability to read the expressive manifestations of the people in a context<sup>8</sup>. According to Argyle<sup>9</sup>, the primary

functions of nonverbal communication behavior are: a) emotion expression (expressed through the face, body and voice); b) Communication of interpersonal attitudes (establishing and maintaining relationships through non-verbal cues such as tone of voice, look, touch etc.); c) Monitoring and language support (vocalization and nonverbal behaviors synchronized with speech during the conversation); d) Rituals (greetings, handshakes other rites. Traditionally, these studies are distributed in four dimensions: proxemics, kinesics, para-language and perception of physical appearance. Proxemic sets the field of study that seeks to understand the game of distances and positions that interweave people, objects and environment. Kinesics seeks to understand the logic of the body and its movements in each of its parts including gestures and facial expressions<sup>10</sup>. Paralanguage study concerns the relationship between vocal sounds and their function and feature. Finally, in studies of perception of physical appearance, one seeks to understand how it is perceived and interpreted by his interlocutors<sup>11, 12</sup>.

The non-verbal dimension of communication involves all manifestations not expressed in words, whose meaning is linked to the context in which they occur. Most of the voluntary intention is verbal communication between people we talk, and we focus our attention on what people say. However, gestures and seemingly secondary mode of facial expressions are active although most people have no awareness of their activity most of the time. Decode and understand the nonverbal message that an individual communicates (sometimes unaware that does) allows uncover emotional inconsistencies, or traces of dissimulation in subjects undergoing an investigative process. The analysis in question allowed the identification of incongruity, warning signs in an objective and reasoned manner. For this analysis, we used the Facial Action Coding System method (FACS) which is a system for classifying human facial expressions, originally developed by Paul Ekman and Wallace Friesen<sup>13</sup>. FACS categorizes facial muscles and their movements in share units (Action Unit - AU), which allows us to infer what emotion is being demonstrated by the suspect.

## **2. Confrontation and presentation of analysis**

In order to facilitate the understanding of the analysis to the requesting police, the oral text produced by the suspect, once transcribed, was encoded. Rating colors was elected to the analysis of oral communication, in particular, the acoustic

analysis of the sound level on the vocal stress. Acronyms and numbers constitute the use of the coding system of facial expressiveness, code that categorizes the physical expression of emotions based on specific movements of the facial muscles (FACS).

TEXT RED - peak stress

TEXT YELLOW - stress

TEXT GREEN - decrease stress

TEXT BLUE - controlled speech / without significant modulation

# - Repair and / or self-correction

xxx - decontextualized stretch or identified contradiction

() - Short break

M - handler (gesture related to discomfort, anxiety and fear)

IL - illustrator (gesture related to speech)

CB - head down

CE - head up

ST - Language slide

DG – swallowing/deglutition

R - breathing support

# - Cognitive difficulty

EM - emblem (gesture replacing speech)

AU - action unit (facial muscle) \*

\* The action units are expressed by contraction or relaxation of one or more facial muscles. Each muscle is represented by a number, or a specific action unit (AU).

The impossibility to perform in this article all the analyzed testimony, it was selected stretches of the analysis to illustrate what has been described.

AU/06 M (Handcuffs) 13/14/15

12:12 SUSPECT: Não, provavelmente foi de, não o celular ele chega em casa já brinca, entendeu?

12:15 INVESTIGATOR

12:17 SUSPECT: É... Agora não sei dizer exatamente.

12:19 INVESTIGATOR ST 12/21

12:20 SUSPECT: Mas... Eu num... De verdade qualquer coisa que eu te falar vai tá errado.

12:24 INVESTIGATOR

12:25 SUSPECT: Não é certeza.

12:26 INVESTIGATOR

12:26 SUSPECT: É. Porque ele pega, ele gosta muito, então às vezes...

12:27 INVESTIGATOR

12:36 SUSPECT: Com certeza foi antes da gente deitar pra dormir. Isso é certeza. Deglutition 12/49

12:46 INVESTIGATOR

LOE 12/57

12:56 SUSPECT: Dez horas, tem que, a aplicação era pra ser feita às dez horas.

13:01 INVESTIGATOR

AU6, 26, 9, 13/02/04

13:04 SUSPECT: Não, então, na verdade eu num... tô falando que teve a... Foi a medição.

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39:20 SUSPECT: Quando ela ligou pra polícia eu não fiquei do lado lá. Eu peguei a chave de casa e já corri pra 39/31/32 long breath

rua. A primeira coisa que eu fiz foi avisar o farmacêutico do lado, que abre as oito, tá, #

conhecido da família, ééé, logo em seguida a /THE NAME OF THE SUSPECT'S WIFE<sup>1</sup>/ veio atrás, depois de ser avisada\*, (NONUNDERSTOOD PASSAGE), ela já tinha conversado com a vizinha da frente. Alguém falou vê as câmeras, tá vê as câmeras,

#

e aí a gente foi na esquina, viu a câmera né, nn, subiu, tem uma empresa de monitoramento mas, (NONUNDERSTOOD PASSAGE) de cima, a gente perguntou quem tinha câmera ali né, pra... e eles não me falaram...

\* The suspect had previously stated that his wife, mother of the dead child, who has communicated the child's disappearance. In this excerpt, he says she was told, which contradicts the previously given information. What to stretch is

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<sup>1</sup> The name was omitted.

confusing because the suspect fumbles, trying to correct what he said. As the deposition was reduced to term<sup>2</sup> and the speech was confused, this information was not recorded.

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26:00 SUSPECT: Tem uma... eu vi uma declaração dela que ela disse, né. Então é... Quando, quando nós nos conhecemos, eu peguei uma carta dela. Uma carta, que tava, a gente tava, eu tava... ficando na casa dela, e tal, e eu encontrei uma carta e essa carta dizia... era uma carta de uma época que

26.05 M (right shoulder)

ela e o Artur estavam tentando se reconciliar né. Então tava escrito lá que oo, éé, que ela ti.., ela tava tentando fazer de tudo para dar certo, que ela nunca ia esquecer ele, e que o /Victim's name/ era um pedacinho dele, tá. Vou ter sempre um pedacinho seu, que é o /Victim's name/. E por várias e diversas vezes eu brinquei com ela. Não briguei. Eu brinquei com ela. Falei assim. Com eu brin..é, é, como eu falava de outros namorados dela, /The name of suspect's wife<sup>3</sup>/ sempre teve muitos namorados. Né. (XXX) Eu lembro de vários nomes. Então, bom, da mesma maneira que eu falava desses nomes eu brincava: é, você tem um pedacinho do (outro nome) aqui, você pode ficar tranquila, né.. provocando, sabe, mas não era briga ali, as vezes a gente entrava numa discussão, que eu acabava provocando ela, entendeu? Desse jeito. Mas 26.54

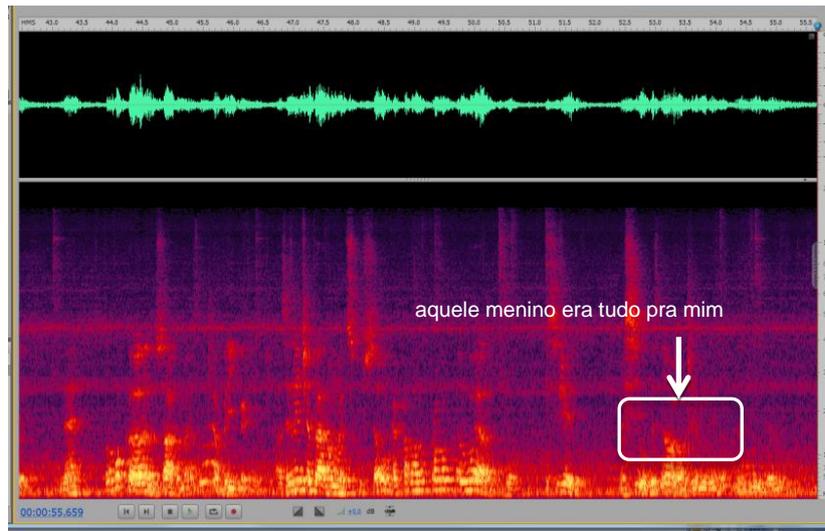
sudden movement of the torso+ ST

ciúmes não... Aquele menino era tudo pra mim.

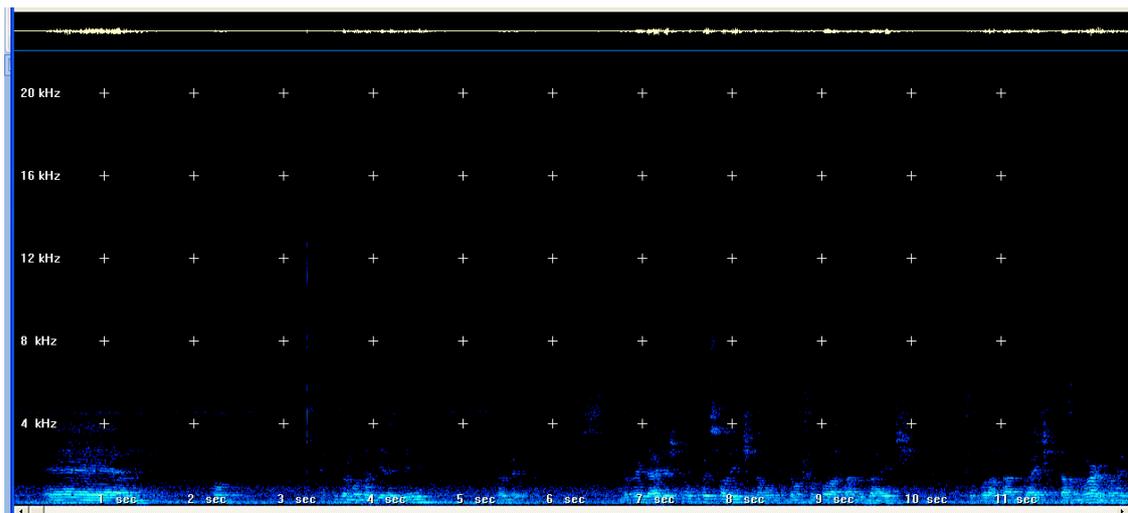
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<sup>2</sup> Reduce the term means that the testimony is dictated by someone who speaks summarizes the deponent.

<sup>3</sup> The name was omitted.

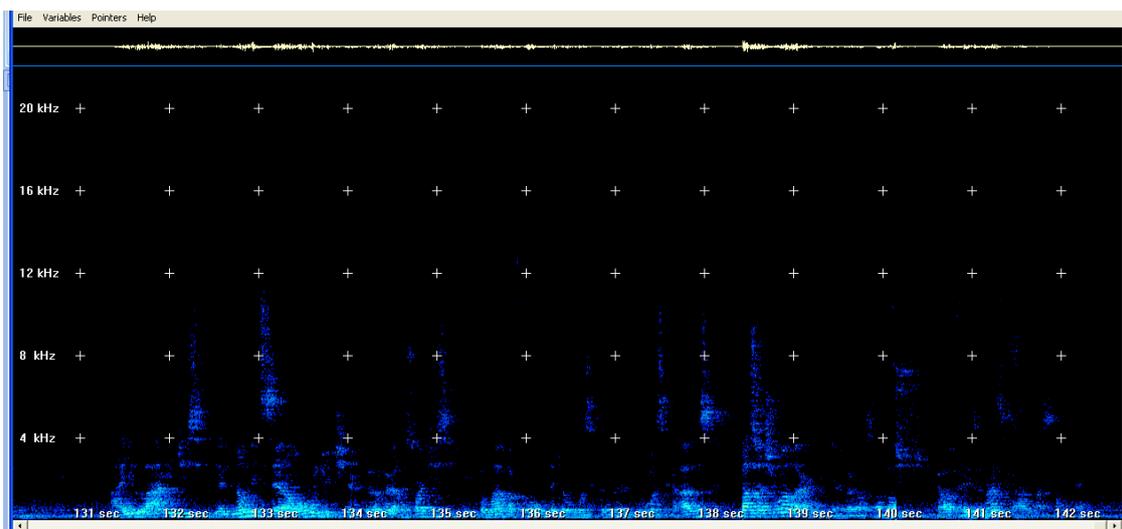


**Figure 1:** It is highlighted the passage in which the target says “aquele menino era tudo para mim” (“that boy was everything to me”). The sound spectrum analysis shows the different vocal behavior found in the speech of the previous minute. Differences were observed including the projection of harmonics.



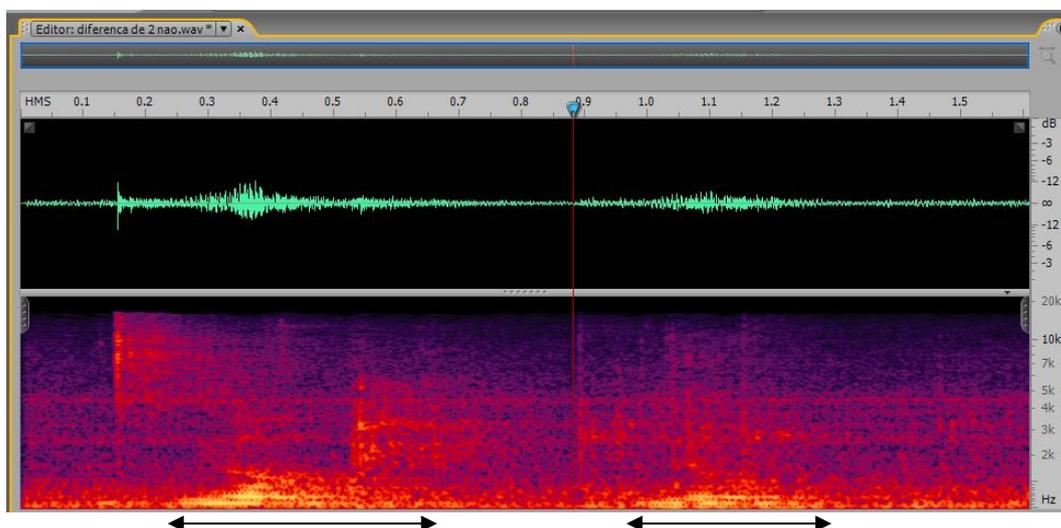
**Figure 2:** Report about the night of the crime. Acoustic image of energy vocal emissions (view - Gram).

Analyzed time: 2min 30sec  
Projection / intensity / energy = decreased  
Pausess = in greater number  
Number of words = 420  
Locution "GOOD" = 10 occurrences  
Prolongations = 30 occurrences

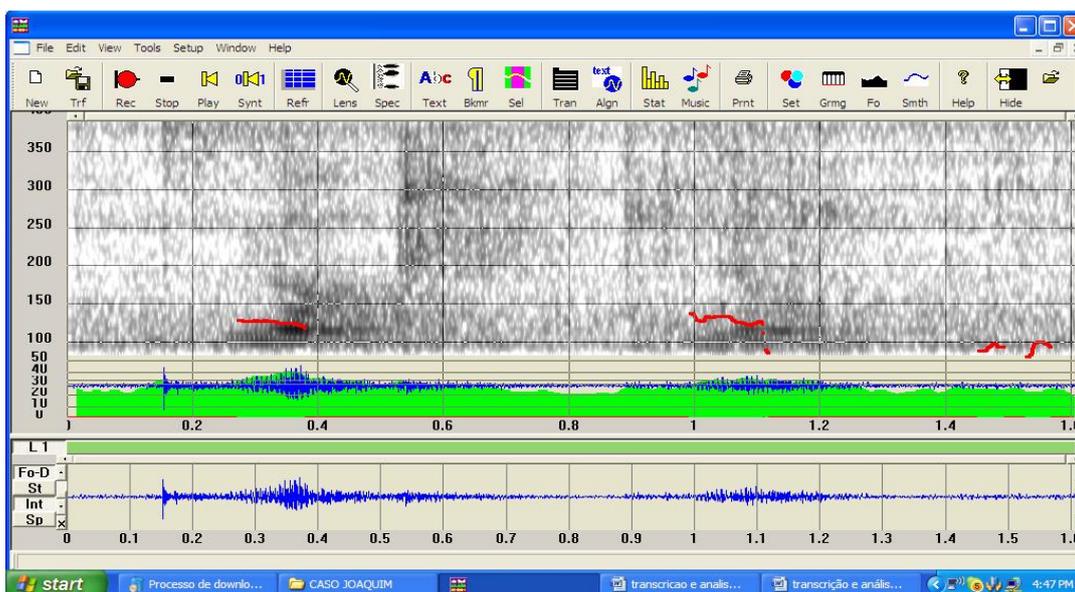


**Figure 3:** Report of the steps taken after the disappearance. Acoustic image of energy vocal emissions (view - Gram).

Analyzed time: 2min 30sec  
 Projection / intensity / energy = increased  
 Pauses= Shorter breaks and fewer  
 Number of words = 405  
 Locution "GOOD" = no occurrence  
 Prolongations = 9 events



**Figure 4:** Placed side by side, the first no responding to the questioning of the investigator, the suspect wanted more water (03:01:50) / second no in response to the investigator's questioning whether the suspect had more information to provide on the case (3:01:58) Only 8 seconds of difference between the two issues. Oscillogram and spectrogram show lower concentration of energy and vocal projection in the second no.



**Figure 5:** The intonation curve for the 1st and 2nd "no." Posted stretches only illustrate the analysis and some of the information obtained. Certain content and information that served the research have been preserved.

### 3. Conclusions and considerations

We can say that it is not easy to dissect human communication and present a "diagnosis" of interactions. Some of the most notable researchers of the communicative interaction behavior refuse to separate words of gestures, probably by the intense relationship that permeates the whole process. It is believed that the left brain processes verbal information, and the right brain processes mainly non-verbal information, but also seems to have the primary responsibility for vocal components that give excitement to our discourse. These elements are the pitch, height, and pace. Despite being widely studied, both non-verbal communication and verbal communication, it seems to be left out when it deals with the legal world regarding the collection of testimonials, especially in Brazil. We understand that the words, gestures and facial expressions can carry emotions and intentions, either explicitly, or in "between the lines" through verbal trickery or micro-expressions, and the analysis of communicational constituents, when performed in a combined order, brings important elements for the police and judicial investigations labors. In this case, the following behaviors were observed: the extensions of vowels and lexical interruptions. Procedures that marked the doubts and difficulties of the suspect considering the continuation of speech, gives the time necessary to reformulation. In terms of non-verbal analysis, such information corroborates the studies that indicates the cognitive difficult as a frequent feature

in underhanded behavior. The recast procedure of discourse demonstrates the attempt to correct the "errors" previously committed, even though not perceived by the listener. In this context, the "error" can be conceived as a choice of the suspect, who entered in the enunciation, for some reason, it was considered inappropriate, whether lexical, prosodic or organizational. Frequent occurrences of disruption and restructuring of the speech were punctual in the material analyzed.

The suspect's speech was characterized by a manifest of controlled manner, with directed and tranquility of expression. However, frequent emotional leaks, emerged through micro facial expressions and gestures under the aegis of the autonomic nervous system, unveiling emotional inconsistencies and decontextualized or contradictory content. We know that when a nerve impulse is excessive in the brain (principle due to the action of nerve activity), it is dispersed reaching areas of muscle over the control of the autonomic system, causing involuntary expressive movements. These gestures and seemingly secondary mode of facial expressions are active although most people have no awareness of their activity most of the time. The categorization of micro-expressions in action units (AU) allowed the identification of emotional patterns expressed by the suspect during the testimony.

The discontinuities and other features found were identified as communication strategies that facilitate the explanation, the interaction and discursive progression. Auto repair trajectories are presented as a fairly frequent phenomenon in the material analyzed and occurred before any interaction of the interlocutor. The repair of the phenomenon is a route directed to tackle recurring production problems, listening and understanding that does not equate correction. It occurs when the speaker stops the production of the statement to look for words (or ideas) before proceeding. This practice aims to remove "problems" of listening and understanding, as has been said, that the interaction can proceed and, if so, at times when the caller is able to understand the statement produced, hardly justifies the repair phenomenon used, leads to the belief that the corrections relate only to the intent and objectives of the speaker, in this case the suspect. Both in the analysis of non-verbal aspects of communication as well as in the verbal behavior of the suspect, the presence was observed in a reference sequence of coordinated actions featuring, between them, a speech rehearsed, controlled or trained over different parts of oral testimony. Finally, the use of two techniques

showed that the analysis were complementary and brought important information to the applicant, head of the investigative action.

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