MINISTERY OF NATIONAL EDUCATION

BABEȘ-BOLYAI UNIVERSITY

FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES

DOCTORAL SCHOOL "EDUCATION, REFLECTION, DEVELOPMENT"

DOCTORAL THESIS SUMMARY

THE INVESTIGATION OF NONVERBAL BEHAVIOUR INDICATORS IN THE PRISON ENVIRONMENT

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Keywords: emotions, facial micro-expressions, simulated behavior, seductive behavior, suicide, behavioral pattern, psychopathy, penitentiary, polygraph.

CHAPTER I. THEORETICAL BASIS

I.1 Introduction and justification of the chosen topic

The prison environment is a special one both through its closed environmental features, but above else through the rich casuistry that can be found in such a place. In general, the study of the psycho-social phenomena specific to the penitentiary covered only the dimensions related to the environment. Over the past decade, however, approaches have begun to focus on the individual in the prison context (Florian, 1996). From this perspective, we deem it necessary to thoroughly analyze the behavior in the moment in which detainees are placed in prison. The first contact with the prison environment may also target suicidal ideation, as well as possible deceptive behaviors that seek to generate short-term benefits.

I.2 Theories, paradigms and models of emotion

I.2.1 The theory of facial expression anatomy (Sir Charles Bell)

In the studies conducted, Bell (1806) identified elements of facial muscles that are representative when a certain expression of emotion is rendered at the facial level. Therefore, the whole work of Sir Charles Bell was based on the belief in the Divinity and the role the Creator has on each individual. His studies, unique up to that date, have been a landmark for what was to be further developed.

I.2.2 The theory of human physiognomy mechanisms (Duchenne de Bologna)

Duchenne (1862) defines the expressive fundamental gestures of the human face and associates each expression with a group of muscles or a specific facial muscle. His research is based on a new non-invasive electrical shock technique, which he calls "électrisation localisée" (localized electrification).

I.2.3 The theory of the universality of emotion expression: comparative approach between species (Charles Darwin)

According to Darwin's principles (1872), most of the behaviors of the individual have come to act involuntarily, as a signaling mechanism that aims to transmit messages to the interlocutor. In 1872 Darwin wrote "The Expression of the Emotions in Man and Animals", a reference book in the literature in the field of emotion study. Based on an entire scientific foundation, Charles Darwin refers to the works of Sir Charles Bell (1844), "*Anatomy and Philosophy of Expression*," Duchenne (1862) "*Mechanisme de la Physionomie Humaine*, " Pierre Gratiolet (1865) "*De la physionomie et des Mouvements d'Expression*", which is a small part of the scientific works he studied.

I.2.4 The theory of fixed action patterns (Konrad Lorenz)

Lorenz develops the idea of "*innate releasing mechanism"* to explain instinctive behaviors (fixed action models) (Lorenz, 1981). He introduces the concept of fixed action patterns or models (in the case of people, an example is given by the eyebrow lifting, which is perceived by the receptor and represents a facial behavioral pattern with the purpose of conveying a message, or to signal the presence of the other). Whether they are called *conventional signs* (Darwin, 1872), *conversational signs* (Ekman, 2011), or *fixed action models* (Lorenz, 1981), all these behavioral actions seem to be aligned to a common goal - transmitting messages in an adaptive sense (survival and reproduction).

1.2.5 The theory of positive and negative affects (Silvan Tomkins)

In his book "*Affect Imagery Consciousness*", Silvan Tomkins (2008) supports the idea that the affect is an "evolutionary system with a goal in the survival of the individual". His subsequent studies were based on this main idea, after which he developed the "Theory of Positive Affects and Negative Affects". Thus, Tomkins (2008) starts from the basic idea of Mowrer's theory (1938), which asserts that each response is triggered by a stimulus (Stimulus-Response Pair), after which he demonstrated that " life is lived by organisms capable of affection, and that no stimulus can trigger an answer if initially it does not trigger an affect ... " (Tomkins, Affect Imagery Conscious, p. xiii, 2008), adding to the old S-R relationship, the affect, resulting the Stimulus-Affect-Response relationship (S-A-R).

1.2.6. The theory of universal emotions (Paul Ekman)

Depending on the life events that individuals face in ontogenesis, they learn to react by wanting to discharge behaviorally the emotion felt or to protect themselves (Ekman & Fridlund, 1987). *The Emotional memory* refers to the process of rapid, even automatically, assessment of the situations, followed by the action (Ekman, 2003). *The emotional trigger* can be a word, an idea, an attitude, a behavior, a situation that is automatically assessed by each individual, taking into account the personal emotional experience of each person (Ekman, 2003). The assessment is done automatically, then, for each situation encountered, using the response pattern functions, the individual responds at behavioral level.

Ekman & Davidson (1994) bring up for discussion **the seven characteristics of emotions**: (1) automatic evaluation, (2) communality in past events, (3) the presence of emotions in other species, such as primates (anthropoid monkeys), (4) their rapid triggering (5) short duration, (6) involuntary action, and (7) distinct physiology. Ekman & Friesen (2003) define the face as "a multisignal and multimessage system", which offers three types of signals: (1) **static** (skin color), (2) **slow** (permanent wrinkles) and (3) **rapid** (eyebrow lift). Paul Ekman's research is based on over 40 years of field and lab work. In all this scientific approach, the fundamental question that further fueled interest in emotions, micro-

expressions, body language and beyond was: "Are expressions universal or are they, as any language spoken, specific to each culture?" (Ekman, 2003, pg. 20). This question has been the source of over 25 years of research, when in 1978, Paul Ekman and his colleague Wally Friesen concluded that facial expressions are universal and that emotions (at least a part of them: surprise, fear, anger, sadness, happiness, disgust and contempt) are universally expressed at the facial level (Ekman, 2003).

I.3 Nonverbal communication – theoretical and practical aspects

Matsumoto (2013) defines nonverbal communication (NvbC) as an "exchange of information where words are not involved". Nonverbal communication occurs at the level of *dynamic actions* on the face, voice and body. Nonverbal messages can be transmitted through multiple *nonverbal channels* including **facial expressions, voice signals, gestures, body postures, interpersonal distance, touch and** eyesight (Matsumoto, 2013).

Matsumoto (2013) argues that the human face does not react only involuntarily when an emotion is triggered, but that facial expressions can be deliberately displayed in order to convey short messages to the interlocutor, such as:

- *illustrators of speech*: for example, people often lift their eyebrows when they are curious or lower their eyebrows when they lower their voice;
- *conversation regulation*: the clues offered to the interlocutor for him to understand that what we are conveying is nearing the end (hand gestures or voice tone);
- *emblematic gestures*: movements that symbolize messages that are not/ cannot be expressed in words (eg skepticism is transposed at the facial level by lifting a single eyebrow);
- *thinking/concentration*: using the face to transmit signals when we are pensive or confused (eyebrows when we are concentrated);
- *expressive regulations*: the use of facial muscles to regulate emotional signals (eg, keeping the upper lip stiff).

One of the major areas of nonverbal communication is *the voice channel* (Matsumoto, 2013) which, in turn, has several subchannels:

- *verbal*: involving the words used;
- *the style of speech*: which provides information about the model and pauses used to accompany spoken words;
- *the tone of speech*: which represents the acoustic properties of discourse, such as strength, sonority.

I.4 Nonverbal behavior and relationships with others

Establishing a connection with others is very important in face to face interaction from the perspective of individual benefits - survival and reproduction (Chartrand & Bargh, 1999, apud Matsumoto, 2013). The interpersonal connection takes place when the relationships are in harmony or in concordance, as they are supposed to be "the same wavelength" in terms of communication (Matsumoto, 2013). *Mirror posture* is known as the "*chameleon effect*," which can be defined as the tendency to adopt posture, gestures, manners through interaction with partners (Chartrand & Bargh, 1999).

I.4.1 Facial anatomy – description of facial muscles

The facial muscles, under the direct control of the nervous system, can become a plastic motor tool for exteriorizing mental states (Papilian, 2003). The entire locomotor system has an expressive function, even where the main purpose is entirely of a different function (walking, writing, posture).

I.5 Universal emotions

Of all the channels of nonverbal behaviour, *the face* seems to be the most complicated channel of communication, for this reason being extensively studied by researchers (Matsumoto, 2013). One of the most important signals that the face shows is *emotion*. Matsumoto (2013) defines emotions as "bio-psycho-social transient reactions to events that have consequences for our well-being and may require immediate action." These are: (1) biological, because it involves physiological responses from the central and autonomic nervous system, (2) psychological, because it involves specific mental processes and (3) social, because they are often triggered by social factors and have a social meaning when they are produced, initiated, triggered.

I.6 Emotional triggers

An important aspect of emotions is the event that triggers them. The emotional antecedents are events or situations that trigger emotion (Table 1, Matsumoto, 2013). One of the most representative studies was conducted by Scherer and his colleagues, a study in which they proposed to assess the quality and nature of emotional experiences in several different cultures (Scherer, 1997a, 1997b, Scherer and Wallbott, 1994).

Table 1. Triggers and biological functions of emotions (adapted after Lazarus, 1991 and Matsumoto, 2013).

Emotion	Triggers	Function
Happiness	Achieving and meeting goals	Future motivations
Anger	Obstruction of goals, injustice	Removing obstacles
Sadness	The loss of relatives or objects	Recovery of resources, request for help
Disgust	Contamination	Repelling or removing the contaminated object
Fear	Physical or psychological threat to well-being	Avoiding threats, reducing damage
Surprise	The emergence of new situations	Guidance and getting more information
Contempt	Immoral actions	Affirmation, support for your own superiority

I.7 The lie

I.7.1 The Deceptive/ Non-deceptive behaviour

Ekman (1985-2001) makes the distinction between two important terms, *deception* and *lie*, terms that underlined his studies that concerned the behaviour of the liar. Thus, *deception* is defined as an action or phenomenon that misleads someone, while lying is an act by which someone deliberately misleads another person and does so without letting those people know that he or she will mislead (Ekman, 2009). The significant difference between deception and lie seems to be the word **deliberately**. The deception may or may not be a deliberate act, while the lie is always a deliberate act (Ekman, 2009). Some scholars have made a distinction between emotion and cognition, with an "emotional" approach and a "cognitive" approach to the lie (Figure 1) (Vrij, 2004, 2008). Other authors dispute these one-dimensional approaches and consider that there are no just cognitive or just emotional behavioral indicators (Matsumoto, 2013).

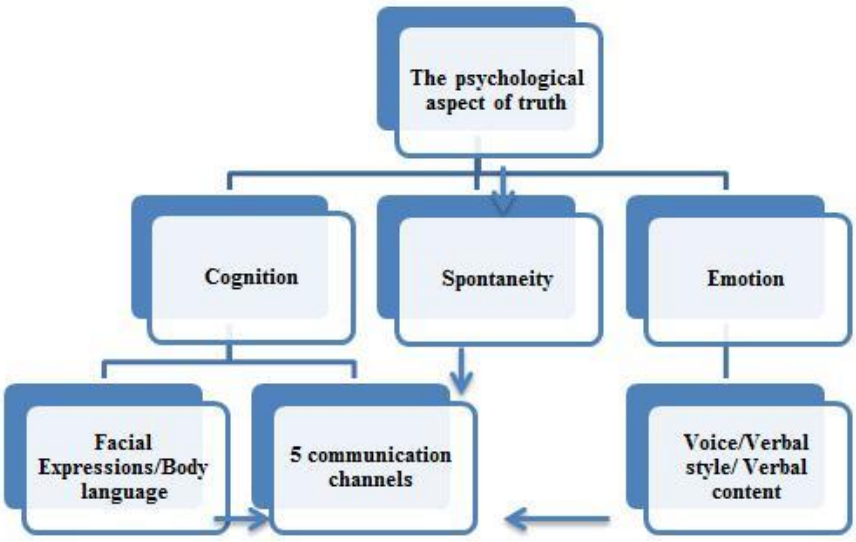

Figure 1. Representing the psychological process of truth after Ekman, 2003; Pearse & Lansley, 2010 (http://www.ekmaninternational.com/media/4581/reading_others[2]%20cliff%20n%20john.pdf)

I.7.2 Indicators of lying at facial level (micro-expressions, macro-expressions)

Ekman (2003) identifies four aspects of facial expressions that can tell if a person controls their own facial expressions:

1. *The morphology*: the particular configuration of the face appearance;
2. *The exposure time of an expression*: how long it takes an expression to appear, how long it remains and how long it takes it to disappear from the face;
3. *Locatio*n of expression in conversation;
4. *Micro-facial expression* that occurs from interruptions.

All four elements - *morphology, exposure time of an expression, location and micro-facial expression* - are analyzed in light of the social context in which the expressions are occurring. The social context may include other behaviors (head movements, postural changes, body movements, voice, words).

I.8 Techniques and methods used to identify emotions and deceptive behavior

I.8.1. The polygraph

The polygraph examination is an analysis of several physiological indicators influenced by the specific emotion of fear caused by a lie and its consequences (Saxe, 1991, apud Vrij, 2012). Beyond the affective impression of the situational context of examination, the behavior of any person bears the mark of his personal, private identity. In emotionally high situations, changes in physiological parameters (in the electrodermal activity of the skin, blood pressure, breathing, and pulse) may occur (Vrij, 2012).

I.8.2 Facial Action Coding System (FACS)

A Facial Action Coding System (FACS - Ekman, Friesen & Hager, 2002) is a method frequently described in the literature to measure facial non-verbal indicators. Ekman and Friesen developed the FACS for the first time in 1970, tracking the contraction of each facial muscle (alone, but also in combination with other muscles).

The Facial Action Coding System indicates 28 Facial Actions or additional codes as named by the authors, plus 58 Facial Actions (Facial Actions in the superior part of the face: AU 1, 2, 4, 5, 6, 7, 43, 45, 46, 70, 71; head positions: : AU 51, 52, 53, 54, 55, 56, 57, 58; eyes positions: AU 61, 62, 63, 64, 65, 66; lips partition and jaw opening: AU 25, 26, 27; Facial Actions in the inferior part of the face: AU 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 23, 24, 28, 72; combined Facial Actions: AU 8, 19, 21, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39; apud. Ekman, Friesen & Hager, 2002; Facial Action Coding System: Score Sheet, pg.513-514).

For each universal emotion, several groups of AUs have been identified, such as: Happiness = 6 + 12, Sadness = 1 + 4 + 15, Surprise = 1 + 2 + 5B + 26, Fear = 1 + 2 + 4 + 5 + 7 + 20 + 26, Anger = 4 + 5 + 7 + 23, Disgust 9 + 15 + 16.

Facial actions can be coded by identifying the degree of intensity and variations in the intensity of Facial Action, and the following degrees of intensity according to the FACS (Ekman, Friesen & Hager, 2002) are proposed in this respect (Figure 2).

Trace of an action	**Small evidence**	**Pronounced evidence**	**Severe or extreme evidence**	**Maximum evidence**
A	**B**	**C**	**D**	**E**

Figure 2. The relationship between Evidence and Intensity Scale, adaptation after Ekman & Friesen, 2002.

I.8.3 FACET (iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient)

FACET (iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient), originally known as CERT, is a software for the analysis and recognition of facial expressions developed by iMotions (Denmark and the US), which is based on over 20 years of scientific research. FACET is based on the FACS system (Ekman, Friesen & Hager, 2002).

I.9 Emotional intelligence (Mayer, Salovey, Caruso)

Emotional intelligence can be defined as the ability to monitor one's own emotions and other people's, to discriminate between different emotions, and to label them appropriately, and to use emotional information to guide thought and behavior (Gardner, 1983). **Mayer-Salovey-Caruso Emotional Intelligence Test** (validated and adapted to the Romanian population by testcentral.ro) evaluates emotional intelligence from the perspective of **the four-branch model** (*Perceiving emotions, Facilitating thought, Understanding emotions, Managing emotions;* Mayer, Salovey, Caruso, 2002, apud Iliescu & Livinți 2011)

- the Perceiving Emotions Scale (Branch 1) is the ability of a person to perceive their own emotions and other people's emotions as well as the emotions expressed by other stimuli; includes the Faces and Pictures subscales;
- The Facilitating of Thought scale (Branch 2) is the ability to generate, use and feel emotion; includes the Facilitation and Sensation subscales;
- The Understanding Emotions Scale (Branch 3) is the ability to understand emotional information; includes the subscales Blends and Changes;
- the Emotion Managing Scale (Branch 4) is the ability to be open to the feelings and modulate them to one's own person and others; includes the Emotions Management and Relationship Management subscales (Mayer, Salovey, Caruso, 2002, apud Iliescu & Livinți 2011).

MSCEIT (Mayer, Salovey, Caruso, 2002) contains 141 items, and about 30-45 minutes are required to complete the test. It can be applied from the age of 17 years.

I.10 The prison environment and the suicidal behaviour

At the level of the penitentiary system, the National Penitentiary Administration has an interest in suicide issues, and therefore there are specific psychological intervention programs aimed at preventing suicide among detainees and not only (eg the specific adaptation program to the prison environment for newly deprived of freedom prisoners, the specific

psychosocial assistance and suicide prevention program, the clinical group protocol for depression, the clinical protocol for personality disorders, the clinical protocol for anxiety disorders).

The shock of placement in the penitentiary

Deprivation of liberty involves several forms, and from a qualitative point of view, by restricting individual freedoms, it can give rise to a phenomenon called the imprisonment shock (Florian, 1996), associated with a complex range of psychological and psychosocial disorders, starting with the detention crisis manifested from closure in the silence of the carcass to aggressive and self-aggressive behaviors (suicides, autoflagings).

I.11 Criminal motivation from an evolutionary perspective

The individual's evolutionary adaptive abilities allow him/her to compete with other human individuals (Geary, 2005), using emotional recognition skills (Ekman, 2003), and aggressiveness indicators that can be used as a a basic function to protect the individual against exploitation even if the chances of success are reduced (Ness, 1990) in an attempt to gain access to resources directly related to the survival of the individual in different contexts (Geary, 1998). In this respect, the studies presented in this doctoral thesis investigate, measure and identify the elements of nonverbal communication that can lead to a better understanding and assessment of the intentions, emotions, attitudes, behaviors of the persons deprived of their liberty in relation with prison staff for the prevention and management of various incidents.

CHAPTER II
RESEARCH METHODOLOGY
AIMS, OBJECTIVES AND RESEARCH PROCEDURE

In this doctoral thesis, the main objectives were to propose the identification of nonverbal behaviors in different contexts specific to the prison environment. It is accepted that the information extracted from the nonverbal behavioral analyzes is representative from the communicative quality point of view and the significance of the signals transmitted in the communication remains, often, insufficiently clarified. This research proposes measuring nonverbal behavior through specific techniques already used (eg study 1), but also through new techniques (eg study 4), where a multidimensional approach to identifying nonverbal behaviors is being pursued in order to obtain information about the emotions of the person evaluated psychologically.

The first objective is to investigate facial micro-expressions displayed by a detained person in emotionally charged situations by conducting a case study. In the past there have been such studies (Kruh, Frick, & Clements, 2005) that sought to identify behavioral reactions to detainees. Decryption of nonverbal behavior in aggressively imprisoned persons can be a rich source of information for staff carrying out direct activities with this category, to prevent and manage conflict situations properly.

The second objective proposes, in the first part of the study, to identify nonverbal indicators of seductive behavior in the context of initial psychological assessment in prison, in the intersexual interaction. The content of 33 initial psychological videotaped interviews (based on informed consent) of recently condemned females (N = 33, aged between 22 and 65), held in custody by the Arad Maximum Security Penitentiary, Romania, was analyzed. In the second part of the study, it was investigated whether in the context of non-sexual situations (initial psychological interview), the detained females would display a protean strategy (display of behavioral signals with seductive valence) towards the male psychologist when they meet for the first time and if the seductive signals relate to the individual values of their reproductive potential (individual evolutionary fitness).

The third objective of the study is to identify a potential facial pattern in terms of facial emotional expressions that accompany the answer to the question of thoughts and / or suicide plans for detained persons and visually impaired persons. There were conducted 27 initial psychological assessment interviews with detainees and 13 psychological assessment interviews with visually impaired persons. The first category of participants consists of persons detained (N = 27, M = 42.04, AS = 11.53), who are newly placed in the Arad Maximum Security Penitentiary. The second category is represented by visually impaired persons (N = 13, M = 34.27, AS = 9.23) who were members of the Arad Visually Impaired Association. The aim was to identify the similarities and differences in the head movements (yaw, pitch, roll), the duration of the response to the questions regarding the suicidal ideation / autolytic behavior, at the level of emotions and identified facial actions, between detained persons and visually impaired persons, and between people with ideation / history of suicide and people without thought / history of suicide. For the data analysis, the sequences of the videotaped interviews which are accompanying the response of the two categories of participants to the question about thoughts and / or suicide plans were identified and the elements of nonverbal behavior (facial actions, direction of head movement) were collected. The analysis of the data was based on semi-structured interviews and on the observation of the participants' nonverbal behavior.

The fourth objective concerns the behavioral and biometric analysis of a suicidal person's facial expressions in the context of initial psychological assessment in the penitentiary. Starting from the results of study three, study four aims to highlight the elements of a potential facial pattern associated with denial of suicidal ideation. A positive aspect lays in the way to integrate the information resulting from the various tools used here, for example, the multidimensional analysis of the video recordings of the initial psychological assessment (psychological screening; iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7; behavioral analysis through the frame by frame method - facial macro-expressions, gestures, postural changes).

The fifth objective proposes, in the first part, to identify possible associations/ differences between penitentiary agents (with different levels of professional training in the penitentiary environment), at the levels of Emotional Intelligence (EI), experience at work (penitentiary) and age, but also to analyze the need for education of emotional recognition skills, etc. It is intended to establish the level of accuracy of authentic/ deceptive behavior detection based on the analysis of recorded situations (three situations of truth and three lies); but also to identify the level of self-perception (low/ increased ability) regarding the success of the choices made in case of filmed situations among novices (M= 21, 55; AS= 3,43) and experts (M= 40,02; AS= 8,51). The subjects of this study are divided into two categories: (1) active, **experienced** penitentiary agents and officers from the Arad Maximum Security Penitentiary (N = 34) aged between 25-57; and (2) **novices**, pupils (future penitentiary agents) at the Târgul Ocna School, Arad (N = 34), aged 18 to 31.

In the second part of the study regarding the fifth objective, it is intended to identify deceptive behaviors in different highly emotionally loaded situations in the context of initial psychological assessment and also in the context of polygraph testing by presenting a case study of a person in detention.

CHAPTER III
III.1. STUDY 1
Investigation of Emotional Facial Micro-expressions in Psychopathy – A Case Study of an Individual in Detention

III.1.1.Introduction

Similar to verbal communication, nonverbal communication can be manipulated, especially by people with mental health problems. In particular, people with mental health problems in the psychopathic sphere are believed to have good acting skills and can easily manipulate others in different contexts of interpersonal relationships (Porter, ten Brinke, Baker & Wallace, 2011).

III.1.2 Theoretical basis and related literature

Glass and Newman (2006) argue that a better understanding of the emotional deficiency of people diagnosed with dissocial personality disorder can be achieved, given that universal emotions that can be expressed by facial muscles can easily be identified by standardized methods in the field of emotion recognition. Thus, in the prison environment, it would be necessary to know these "abilities" of individuals with traits of dissociated personality in order to prevent unpleasant situations.

III.1.3 Research objectives and hypotheses

The objective of this study is to investigate the facial micro-expressions displayed by an individual in custody with the diagnosis of dissocial personality disorder in various highly emotionally charged situations in the context of the psychotherapeutic interview, i.e. a structured environment in terms of interpersonal communication (detainee-psychologist interaction). The *hypothesis* of the study is: questions that act as emotional triggers will be associated with intense emotions expressed at the facial level through facial micro-expressions.

III.1.4 Research methodology

Participant

A case study of a person in detention in Romania, a male adult, aged 23 years, is presented. All data from video analysis is confidential and used for scientific purposes only. The participant (C.A.) is an imprisoned young adult man convicted of first degree murder at the age of 17. C.A. has completed 8 grades and has no professional qualifications. Information on clinical diagnosis and history of self-aggressive and hetero-aggressive behaviors has been provided by the Prison Medical Department (Arad Maximum Security Penitentiary, Romania) at the request and on the basis of consent to the confidential use of clinical data for this study.

Procedure

The recorded interview was not the first meeting between the participant and the psychologist, but approximately the forty-fifth meeting. The professional and psychotherapeutic relationship was built over a period of one and a half year during the sessions, with one meeting/week (on average). Recording was done with a Sony HDR-CX 190 camcorder. The interview took place in a room at the Arad Maximum Security Penitentiary, Romania, and the recording was made in February, 2015. The participant was informed in advance of the activity (semi-structured interview and video recording of the interview) and he was asked for the written consent to record the interview (see Annex 4). A frame-by-frame analysis of the interview was performed to extract behavioral data (Facial Actions, emblems, and conversational / conventional signs).

Instruments

The facial reactions of the person in custody were measured with the Facial Action Coding System (FACS), a standardized method of identifying and describing the emotional expressions of facial behavior.

III.1.5 Results

During the interview, the representative emotional triggers were topics related to physical detention / aggression (n = 21) and antisocial actions (n = 8, Table 2) (eg physical and verbal aggression towards other detainees or prison staff; antisocial behavior in history - thefts, robbery, murder, manipulative behavior in order to obtain short-term benefits, difficulties in complying with the penitentiary internal regulation, manifesting interest in "refining" for criminal purposes).

These subjects triggered a series of negative emotions at the facial level, such as anger (AU = 4 + 5 + 7 + 23) and contempt (AU = R12), but also positive emotions such as happiness (AU = 6 + 12) . Examples of Action Units / AUs are provided in Figure 3 and Figure 4. The numbers are the conventional ones in the Facial Action list associated with the Facial Action Coding System.

Table 2. FACS results after frame-by-frame analysis
*=AU and **= conversational signs and emblems

Emotional triggers general/specific topics	Frequency of the disscused topic	AU*/ conversational signs; emblems**	Universal emotions
Environment/ childhood	3	2/9/32/46**	Various
Antisocial actions	8	4+5+7+23*/+10+25*	Anger
		6+12*	Happiness
Detention/aggression	21	4+5+7+23*/+10+25*	Anger
		6+12*	Happiness
Lie/Manipulation	5	6+12*	Happiness
Educational activities	1	4+5+7+23*/+10+25*	Anger
Inappropiate behavior in detention	4	R12*	Contempt
Total	**42**		

Figure 3. Examples of Facial Actions expressed by C.A. during the interview with the psychologist (in the prison environment)

Figure 4. Examples of Facial Actions, emblems and conversational signs expressed by C.A. during the interview with the psychologist.

The identified conversational signs - "raised eyebrows" (AU = 2) occurred when a particular word was emphasized or it was given a lot of importance by the speaker (Figure 4). Emblems such as "blinking" (AU = 46) can generally be interpreted as an amicable agreement between the transmitter and receiver (Ekman & Fridlund, 1987). The "bottom lip bite" emblem (AU = 32) appeared when the subject remembered his criminal deeds, their severity and the joy he felt at those moments (joy was expressed through verbal descriptors). The nose wrinkles (AU = 9) occurred when the subject made statements about his aggressive behavior, lies and other antisocial actions.

III.1.6 Discussions and conclusions

Behavioral data analyzed show an image that prefigures the pattern specific to the psychopathic personality, dominated by facial expressions of negative emotions. However, facial expressions of positive emotions have also been numerous and expressed in a clear way, being directly associated with negative triggers (physical aggression and lie expressed through verbal descriptions). In addition to the facial expressions identified in this study, the topics of the participant's

speech seemed to be specific to the psychopathic personality, ie no reference to remorse or guilt, cruelty, lack of empathy, low self-control, antisocial behavior in childhood, impulsivity, etc. (DSM-V, 2013; Cleckley, 1988).
From an evolutionary perspective, these behaviors can represent some survival strategies, in the sense that in such an environment (prison environment), if alternatives to forming social coalitions are limited, emotional expressiveness can be a quick way to signal some intentions to potential competitors in the battle for resources. In conclusion, the present study provides important information at the level of nonverbal communication regarding the good knowledge of persons deprived of their liberty during psychological assessments, counseling sessions and not only.

Limitations
A first limit of this study is the lack of a participant's overall behavioral analysis (voice analysis, postural analysis). Another aspect that addresses the limits of this study is that only one participant is described, so it can only be concluded at an individual level and the present results cannot be generalized. In this case there may be a degree of subjectivity in terms of the interaction between the psychologist and the detainee.

Strengths of the present study and recommendations
This case study has provided both the possibility of "testing" psychological assessment techniques and some hypotheses from the literature on emotional triggers (Ekman & Fridlund, 1987), but can also be perceived as a useful method of analysis of an isolated case of a person diagnosed with a dissocial personality disorder in detention. By identifying the connection between emotions and emotional triggers in the biography of each detainee, psychologists can obtain meaningful information with the value of **preventing antisocial behaviors in the prison environment.** For example, the emotion of happiness in this case has been associated with negative emotional triggers such as lying, physical aggression against another person, or antisocial actions (theft, robbery). In other words, a clear behavioral diagnosis of the associations between emotional categories and emotional triggers is recommended for specific categories of persons with a tendency to aggression, such as psychopathy.
The FACS (based on behavioral observations) method, along with a semi-structured interview containing specific emotional triggering elements, could function as a behavioral assessment tool for psychologists working in penitentiaries. Thus, in view of conceiving a range of activities to prevent antisocial behaviors in prison, this type of instrument could help psychologists to identify the link between facial expressed emotions indicators and emotional triggers in imprisoned persons who have psychopathology associated with aggression and not only. In this respect, these techniques could also be used by psychologists in the school environment, in police investigations, in the activity of the traffic system and customs control system, etc.

Mention: *Please note that the results presented in this chapter have been published in the article: Investigation of Facial Micro-expressions of Emotions in Psychopathy – A Case Study of an Individual in Detention. Procedia-Social and Behavioral Sciences, 209, 46-52; year 2015, authors: Andelin, E. I. & Rusu, A. S.*

III.2. STUDY 2
The Evolutionary Analysis of the Seductive Nonverbal Behavior in the Context of the Initial Psychological Assessment in the Penitentiary in Recently Condemned Females

III.2.1 Introduction
Studies in the field of evolutionary psychology support the possibility that women have developed adaptive cognitive mechanisms to visually assess the physical capabilities of potential partners (Hugill, Fink, Neave, 2010). In the prison environment, in addition to the need to cope with environmental changes, new prisoners (eg psychologically rated women by male psychologists) may unconsciously show evaluation behaviors towards other male detainees with whom they make contact inside the penitentiary, as well as with the male personnel of the penitentiary.

III.2.2 Theoretical basis and related literature
The general question from which begins the investigation of seductive behavior in a nonsexual social context (psychologist – detainee interaction) is: "Why do specific expressions of seductive behavior occur in women, even in non-sexual contexts?" Finding an optimal solution to the environmental problems / pressures of the Environment of Evolutionary Adaptation / EEA, which our ancestors faced, is directly connected with the well-being, survival and individual reproduction that takes place in the context of communicating with the other members of the group (Buss, 2000; Grammer, 2002 Andelin & Rusu, 2015).
In this study we consider that from the perspective of emotional behavioral indicators in the first phase of psychological assessment the emotionally encountered universe may seem to be vast because the subject is walked through all areas with high psychological impact by using assessment questions and the semi-structured interview. Therefore, during the interaction with the psychologist, the interviewed subject resonates emotionally with all memories evoked from childhood to the present.

Asymmetries in gender communication: Opinions on seductive behavior
The analysis of literature on intersex interactions shows an asymmetric distribution of control behavior, regarding the person who initiates or determines the outcome of communication with the opposite sex (Grammer et al., 2000, apud Andelin & Rusu, 2016). Various empirically validated studies of gender interactions indicate a repertoire of the wooing signals that have been observed and described in various situations, either in sexual contexts (eg single bars, laboratory conditions) or non-sexual contexts, such as experiments from waiting rooms and client-therapist interactions; most studies show similarities in behavioral manifestations of women in the presence of foreign males, including come-on signals (Grammer et al., 2000, Moore, 1985). Moore (1985) produced an index of 52 behavioral elements (wooing behavior) that was positively correlated with male approaches bars for single people, but did not identify direct predictors of women's interest in men.

Protean strategy and communication ambiguity: Seductive signals in non-sexual contexts
The literature in the field of evolutionary psychology indicates that men try to trick women with symbols related to their socio-economic status (ability to provide resources), while women tend to deceive their physical attributes (fertility indicators and reproductive capacities, Buss, 1992, apud Andelin & Rusu, 2016). Miller (1997) identifies three possible counter-strategies against deception: (a) hiding intentions (poker face strategy); (b) tactical deception and misinformation (KGB strategy); (c) adaptive unpredictability (protean strategy).
Behavioral information in non-sexual contexts, such as the waiting room scenario (Grammer et al., 2000), indicates that women use request signals (seductive signals) irrespective of their sexual interest, which supports the hypothesis that nonverbal seductive signals displayed by women in front of strangers, unfamiliar, males can be part of the proteanist strategy of female psychology developed by them. The question that arises is whether nonverbal seductive signals displayed by women in nonsexual contexts are connected/or not to the individual evolutionary fitness ability (ie, survival and reproduction ability). In this study, we ask the question whether the seductive signals displayed by women in a non-seductive context (in this case we refer to the initial psychological interview of newly condemned women who were confronted with a male psychologist), if these take place according to the model predicted by the protean strategy of the first woman-man interaction, are related to the individual value of the reproductive potential (evolutionary fitness).

III.2.3 Research objectives and hypotheses
The first objective of this study is to identify nonverbal indicators of seductive behavior in the context of initial psychological assessment in prison, in intersexual interaction.
The second objective is to investigate whether, in the context of non-sexual situations (initial psychological interview), women in detention will display a protean-type strategy towards the male psychologist they encounter for the first time (display of seductive behaviors) and whether the seductive signals relate to the individual values of the reproductive potential (evolutionary fitness). The assumptions made are as follows:

- It is possible to identify nonverbal indicators of seductive behavior in the context of initial psychological assessment in the penitentiary, in intersexual interaction.
- There will be an association between the type of seductive category (expressive and non-expressive detained persons) and the individual values of the reproductive potential (evolutionary fitness) adjusted to the information in the semi-structured interview.

III.2.4 Research methodology

Design

This is an exploratory, field-based, ecological study that seeks to highlight elements of nonverbal communication in different contexts.

In the case of the first hypothesis an exploratory strategy is used. For the second hypothesis, the identified independent variable is represented by the category of participants (expressive and non-expressive detained persons) and the dependent variable is represented by the individual values of the reproductive potential (evolutionary fitness), more precisely by the scores that were calculated by adjusting the evolutionary fitness measurement scale (High-K Strategy Scale, Giosan, 2006) to the information in the semi-structured interview.

Participants

The content of 33 videotaped initial psychological interviews (based on informed consent) with recently condemned female (N = 33, aged between 22 and 65) was analyzed in the Arad Penitentiary, Arad, Romania.

Instruments

(1) Facial Action Coding System (Ekman, Friesen, Hager, 2002)

Content analysis of nonverbal-centered interviews focused around the facial identification system FACS (Ekman, Friesen, Hager, 2002), on the indicators of positive facial expressions - happiness (Duchenne smile), surprise (forehead wrinkles, eyelid lifting) and indicators of negative facial expressions of emotions - anger (frowning eyebrows, tight lips), disgust (wrinkles on the nose, lifting of the upper lip) and contempt (raising a corner of the mouth).

(2) Psychological Screening

It covers the following dimensions: (1) identification data; (2) general psychological support (family of origin, quality of family environment, social support network, educational level); (3) specific psychological support (suicide risk, aggressiveness management, substance abuse, psychic disorders, sexual impulses, victimization / marginalization, additional information). This is the standard tool used in the penitentiary environment in Romania for initial psychological assessments.

(3) High-K Strategy Scale (Giosan, 2006) - Evaluating the individual score of evolutionary fitness

Four dimensions for calculating the individual value of the reproductive potential based on the High-K Strategy Scale (Giosan, 2006) were considered: (1) health and attractiveness, (2) ascending mobility, (3) social capital and extended family and (4) risk assessment. The four dimensions of the HKSS (Giosan, 2006) have been designated dimensions extracted from the semi-structured interview used by the psychologist during the initial psychological assessment in the penitentiary, such as: age, history of psychological and medical conditions in the family, suicidal ideation, suicide attempts, civil status, number of children, psychiatric diagnosis, financial mobility, occupational history, support in social networks, family connection during detention, social situation of children, type of offense, criminal history, existence of aggression against their own, drug use.

Each dimension in the psychological screening equated to the value of the evolutionary fitness was coded with 0 (presence) or 1 (absence), depending on the situation of each participant. The sum of values for all dimensions is the individual score of the evolutionary fitness (Table 3).

The four dimensions in HKSS (Giosan, 2006) were equated with psychological screening items in the following way:

- the health dimension was equated with the following items in the psychological screening: the participant's age (18-50 years), dichotomically coded (reproductive = 1, if the participant falls within the age limit and non-reproductive = 0 if the participant does not falls within the age limit); psychiatric pathology in the family (Yes = 0 and No = 1); suicidal ideation (Yes = 0 and No = 1); suicide attempts (Yes = 0 and No = 1); and the attractiveness dimension was equated with the cohabitation / marriage relationship (Yes = 1 and No = 0); has children Yes = 1 and No = 0);
- the ascending mobility dimension was equated with the following items in the psychological screening: professional qualification (Yes = 1 and No = 0); occupational history (Yes = 1 and No = 0);
- the size of the capital and the extended family was equated with the following items of psychological screening: social support network (Yes = 1 and No = 0); is visited in the penitentiary (family = 2, friends = 1, nobody = 0); children (live / are in the care of the family = 1, state institutions / placement centers = 0);

- the size of the risk assessment was equated with the following items in psychological screening: violence offense (Yes = 0 and No = 1); criminal offense (Yes = 0 and No = 1); self-aggressive behaviors in the past (Yes = 0 and No = 1); past history of substances (Yes = 0 and No = 1).

Analysis of nonverbal seductive behavioral data

A frame-by-frame analysis of the video recordings was performed to extract seductive nonverbal behavioral data.
Behavioral analysis focused on nonverbal behavioral elements:

1. micro-facial expressions;
2. posture changes;
3. changes in the tone of voice;
4. elements of seductive behavior (Grammer et al., 2000).

Among the many repertoires of nonverbal seductive behavioral elements found in the literature, we have selected only those identified by Grammer et al. (2000) as being related to the sexual interest declared by women in the waiting room situation:

5. Primp (trimming) - arranging the garment without a visible need;
6. Coy smile - a smile immediately followed by the return and lowering of the head;
7. Look through - look at the other person without fixing it and pointing the look elsewhere; there is no break between looking at partner and looking elsewhere;
8. Short glance - look in the direction of the partner for less than 3 seconds.

A binary coding system (0 = non-occurrence, 1 = appearance) was used to quantify the seductive behavioral indicators for each initial interview of newly condemned women. These elements allowed us to generate two categories of people in detention: (1) expressive and (2) non-expressive (inexpressive) (Andelin & Rusu, 2015).

Procedure
The participants were seated and the video camera was positioned 40-50 cm in front of them. The interviews lasted between 25-50 minutes / session. The first 20 minutes of the interview were considered for behavioral content analysis. The recording was done with a Sony HDR-CX 190 camcorder.

III.2.5 Results
The detained persons were included in two categories regarding seductive behavior indicators: expressive women (N = 14) and non-expressive (N = 19). Summary of the two categories identified by the detainees (expressive and non-expressive at the level of manifest behavior):

1. Expressive persons - tend to show that they have developed social skills (both in verbal and nonverbal communication) and are characterized by abundance of nonverbal behavior: active women at the behavioral level (change of posture in concordance with the situation), in terms of facial expression display micro-expressions (happiness, surprise), high interpersonal skills, empathy, directionality (clear and direct expression of intentions), a proper physical presence in the proximity of the other, etc. Demographics indicate that these people have a socio-economic status and a level of education above the average of the population and are accused of crimes of fraud, incitement to fraud, robbery, theft, consumption and drug trafficking, etc.
2. Non-expressive persons - have low social skills (low ability to adapt to the environment and interpersonal relation), low level of expressivity (closed posture, crossed arms, facial micro-expressions from the sphere of negative emotions - anger, sadness, fear) , low levels of self-esteem, anxiety, inner tension, restlessness, fear and mistrust in their own forces). Demographics show that these people come from precarious social environments and are illiterate or semi-illiterate.

Within the category of "expressive persons", based on the literature in the field of expression and recognition of emotions, several indicators of seductive behavior were identified as follows:

- the "fugitive" look associated with facial expressions and micro-expressions from the sphere of positive emotions;
- lower lip bite (lower lip covers lower teeth and upper teeth bite part of lower lip, right or left);
- insinuating questions and suggestions;
- position the head to the right or to the left to expose the neck;
- self-touch (movements that are a gesture of pleasure and accompany the discourse, a situation that reinforces an affirmation, those types of unconscious touching towards the other);
- arranging hair;
- arranging of clothing and jewelry;
- touching legs and constantly changing their position;
- changing body posture and approaching the opposite sex;

- gestures to explore the inner area of the arms;
- symbolic use of the arms - the "broken wing", emphasizing the trunk line.

Results of the evolutionary fitness values

SPSS (version 19) was used to process the data obtained. In the first phase, descriptive statistics were made on the basis of participant responses that were coded and entered into the statistical program, then *t test* was used for independent samples to calculate the differences between means for the two categories (expressive and non-expressive); in the final phase simple regression was calculated to graphically highlight the possible relationship between variables (Fig. 5, Fig. 6) (Howitt & Cramer, 2010).

Slight differences, but statistically insignificant, were found between the two categories of women in the sense of the values of the evolutionary fitness (t test for independent samples, NS, expressive women: m = 13.8, SD = 2.6, women non-expressive: m = 12.8, SD = 3.02), with expressive women having an average higher individual fitness value (see Annexes 1A and 1B).

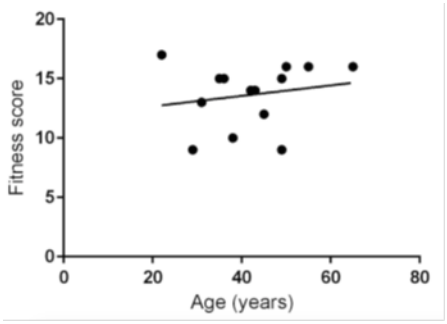

Figure 5. Regression analysis of expressive women's age and evolutionary fitness values indicates an increase in age-related evolutionary fitness score for this category of women (N = 14), but the difference is not significant.

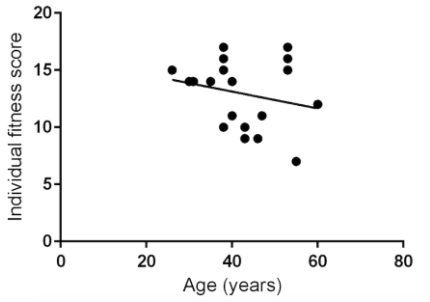

Figure 6. Regression analysis of the non-expressive women's age (N = 19) and evolutionary fitness values indicate a downward direction of the score, but the difference is not statistically significant. In this category, 5 women had attempted suicide before the time of the conviction.

Table 3. Age (years) and individual evolutionary fitness score calculated for each person in detention (14 women in the category of expressive persons and 19 non-expressive women)

Seductive category															
Expressive women (N=14)	Age (years)	43	31	22	35	50	38	42	65	45	55	24	49	49	36
	Evolutionary fitness score	14	13	17	15	16	10	14	16	12	16	9	9	15	15
Non-expressive women without suicide attempts (N=14)	Age (years)	43	53	38	40	35	43	38	47	40	53	30	53	31	38
	Evolutionary fitness score	9	15	16	14	14	10	15	11	11	16	14	17	14	17
Non-expressive women with suicide attempts (N=5)	Age (years)	53	38	26	60	46									
	Evolutionary fitness score	7	10	15	12	9									

III.2.6 Discussions and conclusions

The aim of this research on seductive nonverbal behavior is to raise awareness that the prison environment does not prevent human individuals from using their "selected natural behavioral arsenal" developed in years of evolution, closely related to survival and reproduction, even if the situations in which they interact have no sexual intent but are part of the social and professional context. Even with no statistical significance, the data obtained regarding female detained persons indicates small differences in the individual evolutionary fitness score between expressive and non-expressive seductive persons in the non-sexual context of the initial psychological interview in the penitentiary (persons in detention - female and psychologist - male).

A larger sample and other investigations are definitely needed to uncover the link between evolutionary fitness and the protean strategy of transmitting seductive signals to this specific type of non-sexual situation, namely, the prison environment. It is important to note that all women with suicide attempts prior to detention fell into the non-expressive category, which means that there were no seductive behavioral indicators during their initial interviews.

Being aware of the small sample size (N = 5 people in detention with attempted suicide), we suggest that the results concerning the lack of seductive non-verbal behavior in suicide attempts, regardless of average scores of evolutionary fitness, should stimulate a reconsideration of the evolutionary fitness assessment in the case of individuals who have already attempted suicide in order to designate a low value on the evolutionary fitness scale, or at least zero values on the dimensions of risk and health considerations. If null values for the dimensions of risk and health considerations were designated for the five people in detention who attempted suicide in our sample, differences between expressive and non-expressive women would become significant (Andelin & Rusu, 2016).

Another interesting aspect is that regression analyzes of age and score of individual evolutionary fitness point to the evolutionary prediction between evolutionary fitness and age for non-expressive women (Figure 6, the higher the age, the more lower is the evolutionary fitness score), but not for expressive women (Figure 5), where the relationship seems to be inverse, ie, the higher the age, the higher the value of the evolutionary fitness. It is possible that this specific relationship between age and the value of evolutionary fitness applies to this particular category of individuals (people in detention) who take risks. More data is needed to confirm this hypothesis.

In order to perform an objective psychological assessment and to avoid the seductive manipulation behavior of women interviewed in the prison environment, we suggest the following three methods by which psychologists can try to control this behavior (to prevent or stop it when it appears):

1. *Visual inspection* - the psychologist controls the interaction (in the context of communication) by keeping a fixed look until the other caves and turns his gaze. This action will stop when the psychologist will notice signs of stress, anxiety or aggression on the person interviewed. This technique is meant to restore the position of the psychologist in the interview and to reveal the true character of the interviewee.
2. *Questions confirming dominant behavior vs. defensive behavior* - this technique consists in simply observing the detained person and his behavior in an emotionally stressed situation in order to create a position of superiority in that relationship, followed by asking a question. Both behavioral (dominant / defensive) behaviors are most likely lacking in authenticity, it is a response dictated by emotions, the desire to lead or to make a good impression (social desirability), fear of the unknown, surprise, anxiety or even helplessness (Example 1 and Example 2).

Example 1: Behavior of superiority and domination by the interviewed woman

-> the psychologist's question: "Do you feel vulnerable right now?" The woman's answer: "Oh ... no, no ... that's how I am right now ... a little restless."

Example 2: Defensive behavior of the interviewee

-> the psychologist's question: "Are you okay? I notice that you are emotional, is it true? "The interviewee's reply comes immediately, in a low and fearful tone:" Yeah ... I do not know what's going to happen to me, I'm a little afraid. "

3. *Controlling the distance between persons* - In the initial phase of the evaluation, the distance between the psychologist and the interviewee can be manipulated with the purpose of obtaining a reaction. Depending on the behavior shown, it may intentionally produce tense situations (respecting the deontological norms of the psychologist-client interaction), which can trigger shame or support for interviewees. The dynamics of social distance to the interviewee depends on some variables initially identified in the standard assessment, such as depression, self-esteem, lack of social support, etc.

Strengths of the present study

A strong point of the present study is the context of the field in which the data collection took place, ie all interviews were conducted in the prison environment, at the first meeting with the male psychologist. Also, the dimensions included in the form of psychological screening allowed for an assessment of the form of evolutionary fitness according to the HKSS dimensions (Giosan, 2006), which is a tool often encountered in Evolutionary Psychology.

Limitations

The present study focused on the relationship between woman (detained) - male (psychologist) and nonverbal elements could be identified only in this situation. In the future, it would also be useful to analyze the relationship between a woman (psychologist) and a male (detained), hoping to identify other possible nonverbal behaviors and not only. Another element limiting the present study is the reduced sample size and the socio-demographic differences between the participants, the experimental group being not homogeneous in this case. Another limit of the study can be represented by the type of personality of the participants, the personal representation of the impact with the prison environment and the way in which this situation is subjectively felt, variables that have not been measured and which could influence the results of this study. Further studies should also take into account these variables in order to produce a general and broad picture of the relationship between these subjective elements and seductive nonverbal behavior displayed in a non-sexual context.

Recommendations and future research directions

It is advisable to become aware of and acknowledge information about these seductive nonverbal signals, in which case the assessment / intervention by the psychologist (male in this case) is done in a professional manner. The results of this study support the idea of proteanism in social situations, especially in non-sexual situations (such as the initial psychological interviews in the present study), and may be useful for future research, clinical practice and daily interactions for adopting the best strategies for interpersonal relationships. Also, it would be useful to address the protean approach of the emotional expressiveness in detained women from the perspective of the T-model algorithm proposed by Magnusson (2000) in order to identify seductive behavioral patterns in a non-sexual context (such as the prison environment). One aspect that may be taken into account in future studies would be that in which null values for the dimensions of risk and health considerations would be designated (HKSS, Giosan, 2006), then the differences between expressive and non-expressive women could be significant.

Mentions: *Please note that some of the results of this chapter have been published in the article: An Evolutionary Analysis of Seductive Behavior of Newly Convicted Females. The European Proceedings of Social & Behavioural Sciences EpSBS, XVIIIr, 27-34, year 2016, authors: Emanuel I. Andelin & Alina S. Rusu;*

Some of the results of this chapter have been published in the article: Identifying Non -verbal Seductive Behavior Indicators in the Context of Initial Psychological Evaluation in Prison–Analysis of Situational Type Interviews. Procedia-Social and Behavioral Sciences, 209, 61-66, year 2015, authors: Emanuel I. Andelin & Alina S. Rusu.

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III.3. STUDY 3

Detecting a Potential Pattern of Nonverbal Behavior in Visually Impaired and Non-Impaired Individuals in the Context of the Discussion on Suicide

III.3.1 Introduction

Studies that use facial actions as a measurement method have had results predicting the onset of depression and other psychopathologies (Ekman, & Rosenberg, 1997; Andelin, & Rusu, 2015), but also prompted research that identifies differences in the type of facial micro-expression between suicide and non-suicide subjects (Heller, & Haynal, 1994). To reduce the amount of time required for facial coding, this study presents a new method of recognizing and analyzing facial expressions - an automated software analysis (iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient) which identifies emotions and facial actions specific to them in real time, significantly reducing the time required for video analysis.

In 1970, the Eibl-Eibesfeldt states that behavior is formed by patterns in time and that they are not always visible (Eibl-Eibesfeldt, 1970, p. 1, in Magnusson, 2000). In this sense, it can be said that the pattern is made up of three parts - the relationship between context, problem and solution (Alexander, 1979).

In this study, we can discuss the three situations (context, problem and solution) from a perspective adapted to the prison environment, in the case of identifying a potential pattern of facial expressions of emotions in the context of the discussion on suicide, especially denial of suicidal idea / behavior (Figure 7).

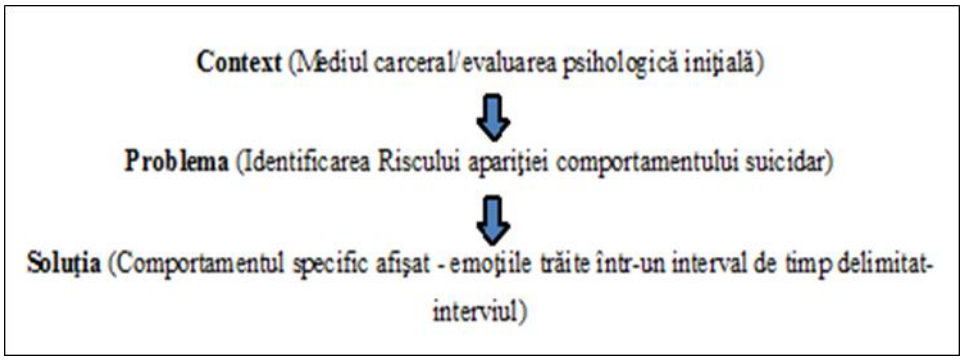


Figure 7. Potential Pattern Formation Representation (takeover after Alexander, 1979) - adapted to the prison context.

In the case of the detection of repetitive elements of behavior, Magnusson (2000) uses the dynamic relationship of communication, of subject interaction to define them as a temporal behavioral type, based in ethologic research (Dawkins, 1976), of human interaction (Duncan, & Fiske, 1977), in short the **T-pattern**. Thus, the T-pattern is perceived as a behavioral element (Figure 7), which depends strictly on the *context* in which the pattern was displayed; depends on the *problem* faced by the subject and finally on the solution offered to deal with both the context and the problem (Casarrubea et al., 2015).

III.3.2 Theoretical basis

From a qualitative point of view, the imprisonment shock can be associated with a series of intense emotional and psychosocial experiences, finding them in social withdrawal behavior, aggressive and self-aggressive behaviors (Florian, 1996). Work has been done with detainees in prison for several reasons: (1) because the literature reminisces of the existing factors in the prison environment that can influence the suicidal behavior (Towl, 2003), (2) because it was known their clinical history and (3) because it is desirable to maintain adequate psychosocial status during detention (the role of the penitentiary being a custodial one).

The importance of identifying a potential T-pattern of denial of suicidal ideation / behavior

In the case of denial of suicidal behavior (in the context of the discussion on suicide) and the identification of a potential T-pattern of facial expressions in the context of the discussion on suicide (denial of suicidal ideation / behavior) one can discuss the absence or inversion of the concepts that are in relation with a theme, in this case, with the presence or absence of an autolytic idea or a potential behavior (Chu et al., 2006). Along with verbal communication, denial is also expressed at nonverbal level (gestures and facial expressions of emotions) (Ekman & Friesen, 1978). Later on, Matsumoto (2009) has conducted studies that highlight the fact that facial expressions of emotions are universal even when it comes to athletes, even if they are visually impaired or blind.

The importance of studying the facial expression of emotions in visually impaired *people*

Matsumoto (2013) asserts that the facial expressions of emotions are universal, they prepare us for behavioral reactions; they are not socially learned reactions, but are phylogenetically transmitted. Recognition and reading of other people's emotions can provide insight into the personality, motivation, and intentions of others, even in the case of visually impaired people (Matsumoto, 2013). This study proposes to identify a potential facial pattern in the expression of the following idea's (*Have you thought about/ do you plan to commit suicide*?) and / or suicidal behavior's (*Do you want to commit suicide*?) denial *in the case of persons deprived of liberty and of visually impaired people*. This study does not specifically address the topic of suicide in visually impaired people, but this category is used as a control group to align and identify common facial elements in a provoked situation (questions ***to identify facial expressions when discussing suicide - denial of suicidal ideation / behavior***).
A possible identification of the facial pattern in the case of the suicide discussion (specifically verbal denial on suicidal ideation and behavior) starts from the hypothesis that for the two groups of participants (prisoners and visually impaired persons) the universality of emotions is a strong premise that can outline a potential pattern for facial expressions in this respect, and it is possible to identify common nonverbal elements, regardless of cultural influence, context, gender or visual analyzer functioning.

III.3.3 Research objectives and hypotheses

Objectives

The first objective of the study is to identify behavioral facial expressions in the context of the discussion on suicide (answers to specific questions, *"Have you thought about/ do you plan to commit suicide?"* and / or "*Do you want to commit suicide?"* regarding detained and visually impaired people, with the word "suicide" being a triggering element.
The second objective is to identify the differences in the head movements (yaw, pitch, roll), the duration of the response to questions about the suicidal ideation / autolytic behavior, the emotions and the facial actions identified, between people in detention and visually impaired people, ie people with ideation / history of suicide and people without thought / without a history of suicide.

Hypotheses

- There is a possibility of identifying similar facial expressions at the level of the two categories of participants (people in detention and visually impaired persons) in the case of providing a verbal answer "NO" to specific questions in the context of the discussion of suicide.
- There will be significant differences in head movements, response time to questions about suicidal ideation / autolytic behavior, emotions and facial actions identified between detained persons and visually impaired persons.
- There will be significant differences in head movements, response time to questions about suicidal ideation / autolytic behavior, emotions and facial actions identified, between people with an ideation / with a history of suicide, and people without an ideation / no history of suicide.

III.3.4 Research methodology

Design

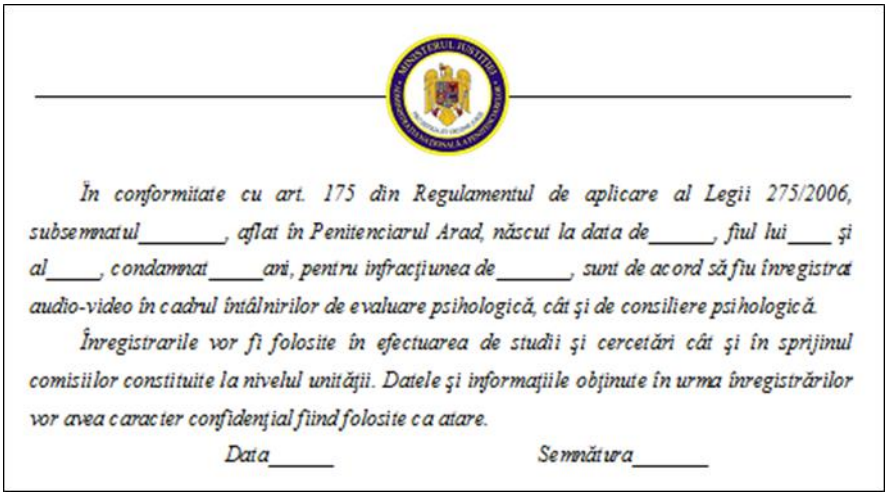
This study seeks to identify a possible facial pattern, is a field-based, ecological study.
In case of hypothesis 1, 2 and 3 a quasi-experimental design was used.
For hypothesis 1, the quasi-independent variable is the emotional trigger (suicide word), the participants being divided into two categories: inmates and visually impaired people. The dependent variable is represented by emotional facial expressions in the context of the discussion on suicide, more specific in the context of providing a verbal answer "NO" to the questions "*Do you plan to commit suicide*?" and / or "*Do you want to commit suicide*?".
For hypothesis 2, the independent variable identified in this case is represented by the status of the participants (inmates vs. visually impaired persons), and the dependent variable is represented by nonverbal facial behavior.
For hypothesis 3, the independent variable identified in this case is the status of the participants / the history of the suicidal antecedents (with suicidal ideation vs. no suicidal ideation), and the dependent variable is represented by the nonverbal facial behavior.

Participants

Between July 2012 and August 2016 psychological interviews with 27 detainees and 13 psychological assessment interviews with visually impaired people (N = 40) were recorded.
Following the analysis of video recordings with the FACET biometric platform, the total number of participants is lower (N = 32), of which inmates (N = 21) and visually impaired people (N = 11). The first category of participants consists of detained persons (N = 21, M = 42.04, AS = 11.53), who are recently placed in the Arad Maximum Security Penitentiary,

being arrested for various offenses (murder, robbery, rape, and drug abuse, incitement to robbery, deception), of which men (N = 5) and women (N = 16).
The second category of participants is represented by visually impaired people (N = 11, M = 34.27, AS = 9.23) who are part of the Arad Visually Impaired Association, of which men (N = 4) and women (N = 7), respectively congenital blinds (N = 8) and visually impaired persons that became over the course of their life (N = 3). Participation was based on voluntary and informed consent.
The medical records of the detainees were checked for the purpose of identifying possible suicide attempts prior to the conviction. In this regard, nine people with a history of suicide were identified, of which men (N = 3) and women (N = 6). Detainees were monitored throughout the entire detention period (July 2012 - February 2017). All interviewees are of Romanian nationality.

Consent of the participants
All interviewees were informed about the purpose of the research and the analysis and subsequent use of the video recordings. In this respect, written consent was requested from detained persons (Figure 8), while visually impaired persons expressed their verbal consent.



În conformitate cu art. 175 din Regulamentul de aplicare al Legii 275/2006, subsemnatul_____, aflat în Penitenciarul Arad, născut la data de_____, fiul lui____ şi al_____, condamnat_____ani, pentru infracţiunea de_____, sunt de acord să fiu înregistrat audio-video în cadrul întâlnirilor de evaluare psihologică, cât şi de consiliere psihologică.

Înregistrarile vor fi folosite în efectuarea de studii şi cercetări cât şi în sprijinul comisiilor constituite la nivelul unităţii. Datele şi informaţiile obţinute în urma înregistrărilor vor avea caracter confidenţial fiind folosite ca atare.

Data_____ Semnătura_____

Figure 8. Informed consent model used for audio-video recordings.

The equipment used
A camcorder (Sony HDR-CX190) was used to record the interviews in which the participants' face was recorded during the initial psychological assessments. It was intended that the size of the frames should be from the shoulders to the upper part of the head (Fig. 9, Fig. 10).

Location of the interviews
Filming took place in (1) the psychological cabinet of the Arad Penitentiary and (2) in a room of the Arad Visually Impaired Association, Romania.

The central theme of the interview was the subject of suicide, namely:

1. If a detained person / a visually impaired person proposes / is thinking of committing a new attempt to suicide (in the case of those who have suffered suicidal ideation / committed at least once a previous suicide attempt). The question was: "*Do you have suicidal thoughts? / Do you want to commit suicide*?".
2. If the detainee/visually impaired person intends / is thinking about committing an attempted suicide (in the case of those who did not have suicidal ideation / did not have suicide attempts). The question was: *"Do you have suicidal thoughts? / Do you want to commit suicide?"*.
3. For the magnitude of suicidal behavior and suicidal ideation, coding of video recordings started from the moment the subject begins to give the answer and stops immediately after the last word of the subject. The sequence duration varies between 1 - 6 seconds. The interviews took a minimum of 20 minutes and a maximum of 45 minutes, and the distance between the video camera and the subjects was about one meter.

Coding the collected nonverbal information:
The results of the nonverbal behavior expressed as:

- Facial Muscle Activity - Action Units. Based on the analyses conducted with the FACET biometric platform, 23 indicators of nonverbal behavior were identified and encoded.
- Direction of head movement (yaw, pitch, and roll). The FACET biometric platform identifies these values in degrees, at the head, using 3 dimensions (Figure 9, Figure 10): (1) turning the head in the left-right direction, (2) moving the head in the up and down direction, (3) tilting the head in the left-right direction (yaw, pitch, and roll).

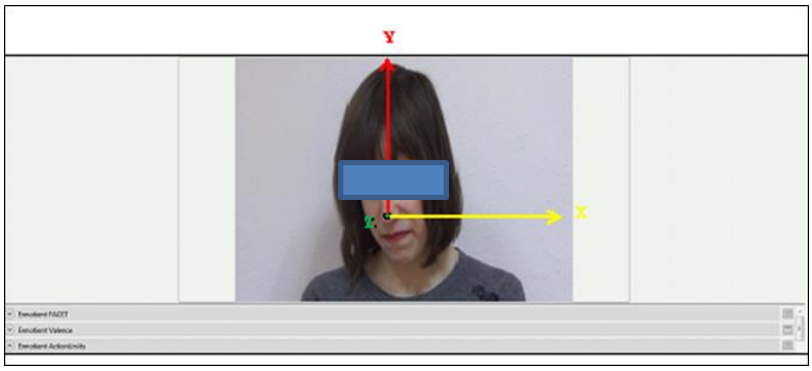


Figure 9. Values of the three dimensions measured with the FACET biometric platform at head level for a visually impaired subject. Head rotation in left-right direction **Yaw (negative)** = **-11.09;** head movement in the up and down direction **Pitch (positive)** = **9.79**; tilted head in left-right direction **Roll (positive)** = **7.04.**

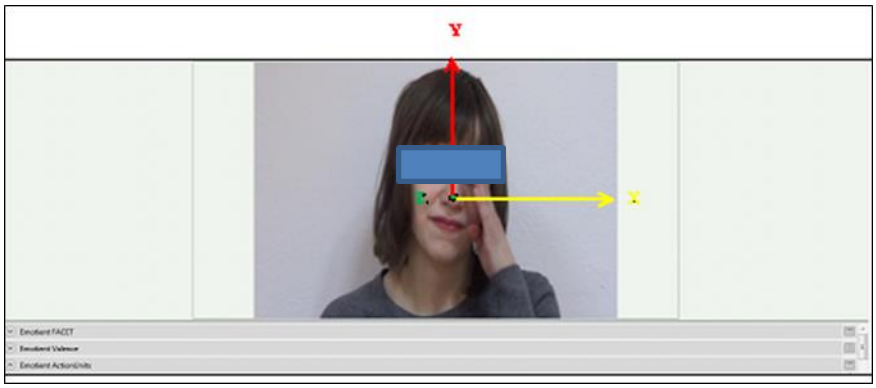


Figure 10. Values of the three dimensions measured with the FACET biometric platform, at the head, in the case of a visually impaired subject. Head rotation in left-right direction **Yaw (positive)** = **13.72**; head movement in the up and down direction **Pitch (positive)** = **0.13**; tilted head in left-right direction **Roll (negative)** = **-5.61.**

- Body behaviors such as postural movements, head movements, direction of sight hand gestures, face touch, etc. were examined. Information obtained from behavioral analyses provides an overview of the subject's emotional perspective and helps identify and define existential problems in the context of clinical interventions (eg stress management, prevention of self-aggression and hetero-aggressiveness, prevention of autolytic behavior, etc.).

Biometric data analysis

In order to identify the potential pattern for facial expressions in the context of the discussion on suicide, in particular the verbal expression NO, in response to the questions "Do you have suicidal thoughts? / Do you want to commit suicide?", in the case of analyzes performed with the FACET biometric platform, the following steps were taken:

- the baseline (automatic adjustment of emotional values according to facial morphology) was established for the emotion record using the FACET biometric platform (Figure 11);

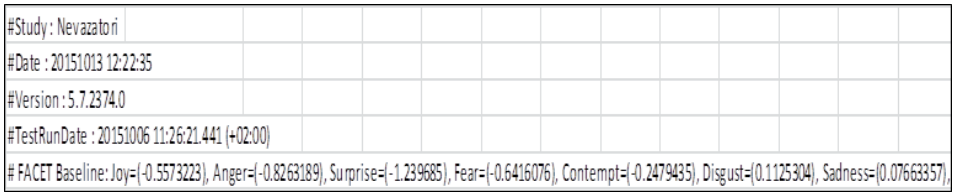

#Study : Nevazatori
#Date : 20151013 12:22:35
#Version : 5.7.2374.0
#TestRunDate : 20151006 11:26:21.441 (+02:00)
FACET Baseline: Joy=(-0.5573223), Anger=(-0.8263189), Surprise=(-1.239685), Fear=(-0.6416076), Contempt=(-0.2479435), Disgust=(0.1125304), Sadness=(0.07663357),

Figure 11. Example of a baseline of universal emotions set for the case of a visually impaired subject.

- the marker times (M) - start of the subject's response (M1) and the end of the subject's response (M2), were established, the time interval being used for subsequent analyzes;
- the biometric analysis was performed for each record on the segment set by the markers;
- biometric analyses were performed at 0.040 seconds for each record;
- the highest value of the Surprise emotion was identified on the selected interval for analysis. This particular emotion was chosen on the assumption that this universal emotion is the most spontaneous reaction to an emotional trigger (Ekman, 2003; Ekman, & Friedlund, 1987), and Landis and Hunt (1939) speak of the thrilling reaction ("*Startle preemotional behavioral measurements*");

In order to identify a potential pattern associated with the denial of suicidal ideation / behavior, the results of 32 participants (persons deprived of liberty and visually impairedpersons) were analyzed irrespective of the response (positive or negative) offered.

III.3.5 Results

The identification of facial expressions (potential behavioral pattern) associated with verbal answer to questions about suicide

The collected data were entered into the SPSS program (version 19), then the descriptive statistics for the experimental group and the control group were carried out, showing the means and the standard deviations for each category (Table 4), but also for the category of persons with ideation / with a history of suicide (inmates and visually impaired persons) and persons without ideation / no history of suicide (inmates and visually impaired persons) (Table 5).

Table 4: Average and standard deviation for people in prison (N = 21) and visually impaired people (N = 11) by age.

Category	N	Minimum	Maximum	Mean	Standard Deviation
Detained persons	21	23.00	65.00	42.0476	11.53896
Visually impaired Persons	11	21.00	58.00	34.2727	9.23137
Total	32	21.00	65.00	39.3750	11.29016

Table 5: Mean and standard deviation (N = 9) for persons (detained and visually impaired persons) with ideation / history of suicide, and persons (inmates and visually impaired persons) without ideation / no history of suicide (N=23) depending on age.

	Age				
Category	N	Minimum	Maximum	Mean	Standard Deviation
Persons with ideation / history of suicide	9	23.00	58.00	36.5556	10.48941
Persons without ideation / no history of suicide	23	21.00	65.00	40.4783	11.62235
Total	32	21.00	65.00	39.3750	11.29016

Firstly, for the two groups of participants (inmates and visually impaired persons), factorial analysis was performed to identify common significant factors (Facial Actions) that were activated at the time the participants responded to questions about the suicidal ideation (*Have you had thoughts about suicide*?) /suicidal behavior (*Do you want to commit suicide?*).

For the category of persons detained, the exploratory factorial analysis was performed to identify significant factors, which have values greater than 1.00 (Figure 12). Initially, seven main components were derived from the variance analysis. Elements with values greater than 1.00 were extracted, the results being presented in Table 6 (for more statistical information, see Annex 3 A, B, C, D).

Table 6.The main Facial Action components and elements of nonverbal behavior with values greater than 1.00, following variance analysis in the case of detained persons in the context of the discussion on suicide.

Component	Initial Eigen Values			Extraction of loadings' sums of squares			Rotation of loadings' sums of squares		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	6.114	26.582	26.582	6.114	26.582	26.582	5.297	23.032	23.032
2	4.830	20.998	47.580	4.830	20.998	47.580	4.587	19.945	42.976
3	2.705	11.761	59.341	2.705	11.761	59.341	2.399	10.429	53.405
4	2.151	9.354	68.696	2.151	9.354	68.696	2.068	8.992	62.397
5	1.811	7.874	76.569	1.811	7.874	76.569	1.970	8.566	70.963
6	1.367	5.945	82.515	1.367	5.945	82.515	1.893	8.232	79.195
7	1.004	4.364	86.879	1.004	4.364	86.879	1.767	7.684	86.879

Principal component analysis was performed based on Facial Action correlations (twenty Facial Actions) and nonverbal behavioral elements (three elements of head movement). The orthogonal rotation of the factors determined the factorial structure represented in Table 6. The first three cumulative factors account for about 59% of the factors activated in the case of the detained persons in the context of the discussion about suicide. The first component is found in the lower part of the head (Facial Actions 14, 25, 24, 26, 28, 17, 12), the second component contains Facial Actions 9, 2, 7, 1, 6, 4, and the third component contains the Actions Faces 20 and 18 (Table 7).

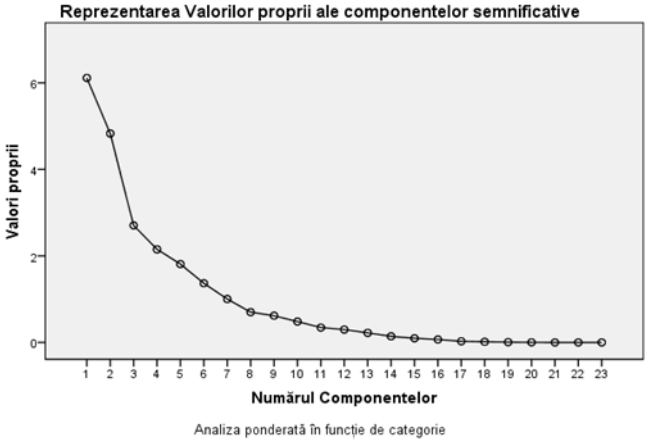


Figure 12.Graphic of the main Facial Actions components and head movements as a result of the variance analysis for the detained persons.

The decreased graphic indicates that after the seventh dimensional component (the last significant factor with a value greater than 1.00), the values decrease, reaching the critical threshold of 1.00. Components represent units of action.

The values greater than 1.00 found in Table 6 were rotated in the orthogonal plane, and the saturations of the twenty-three variables (Facial Actions and head movement elements) for the seven factors are found in Table 7.

Table 7. Significant factorial saturations (correlation coefficients) of variables (Facial Actions and elements of head movement) in the case of detained persons in the context of the discussion on suicide.

Rotated Component Matrix[a]

AU	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
AU14	**.895**	.062	.133	-.052	-.094	.212	-.046
AU25	**-.892**	.018	.367	-.064	-.027	.105	-.106
AU24	**.891**	.124	-.150	.091	-.139	-.025	.027

AU26	**-.833**	.045	.357	.094	-.240	.088	-.201
AU28	**.765**	.275	.429	.165	-.011	-.028	-.106
AU17	**.724**	-.163	-.148	.449	-.230	.166	-.016
AU12	**.584**	.277	.477	-.246	.314	.241	-.220
AU9	-.046	**.903**	.118	.055	.129	-.098	.122
AU2	-.159	**-.893**	.189	.187	.078	-.054	-.129
AU7	-.003	**.805**	.005	.280	.193	-.010	.127
AU1	-.088	**-.796**	.193	.075	.148	-.374	.147
AU6	.453	**.688**	-.020	-.055	.396	.157	-.053
AU4	-.072	**.655**	.075	-.039	.228	-.529	.256
AU20	-.174	-.049	**.813**	-.153	.043	-.121	.054
AU18	.092	.353	**-.703**	-.172	.208	.134	.310
AU43	-.180	.456	.472	-.462	.146	-.180	.189
AU5	-.065	.083	-.009	**.887**	-.146	-.074	.099
AU15	.523	-.010	-.079	**.683**	-.015	.157	.104
AU23	.338	-.119	.131	.184	**-.780**	.321	.050
AU10	.120	.376	.156	-.160	**.739**	.428	-.092
Pitch	.017	.084	-.174	.050	.033	**.951**	.070
Yaw	-.173	-.080	.260	-.212	-.105	.003	**-.855**
Roll	-.101	.281	.212	-.054	-.432	.017	**.783**

Extraction method: Principal components analysis. Rotation method: Varimax with Kaiser normalization.[a]
[a]The rotation converged in 11 iterations
The variables are sorted and ordered according to the saturation they have for each factor (Fig. 13).

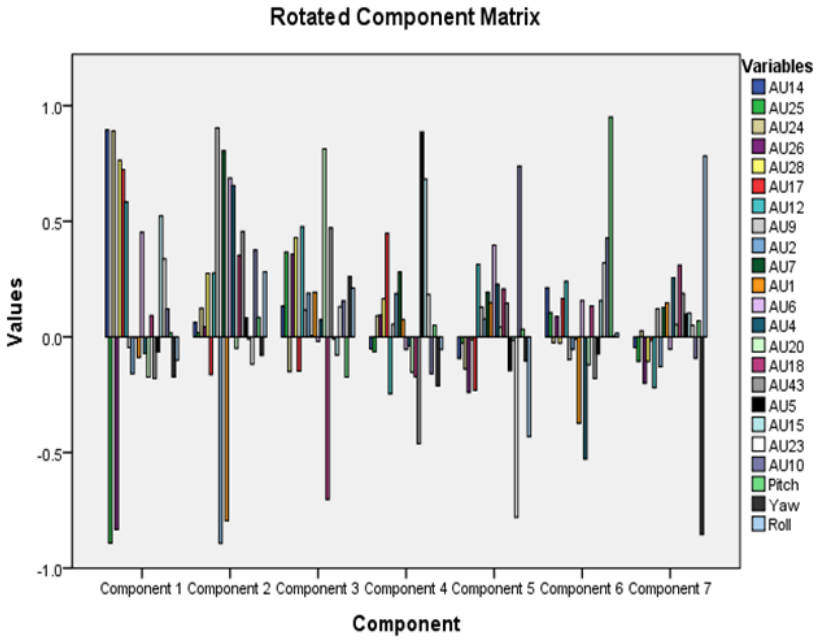


Figure 13. Graphic representation of the main components, the saturation of the variables (Facial Actions and head movements) and their sequence in the case of the persons detained, depending on the positive or negative values.

Negative values of factorial saturation indicate that some of the values of nonverbal indicators (Facial Actions, head movements) correlate negatively with each other (Table 7). Negative correlations represent the fact that when an indicator of nonverbal behavior measured in this study is activated and exceeds the baseline for biometric measurements (value of -1), another indicator of nonverbal behavior cannot reach the same values positive aspects, which may be due to the way the facial muscles work (for example, the levator muscles contract upwards and the depressor muscles contract downwards) (Ekman, 2003). For example, in Table 7 (for component 1), the negative correlation coefficients for Facial Action 25 (lip split) (r = -.892) and Facial Action 26 (jaw dropping) (r = - .823)are in reversed correlation with Facial Actions 14 (dips), 24 (tightening of lips), 28 (teeth covering with lips), 17 (lifting the chin), 12 (pulling the corners of the mouth).This may be due to the way the facial muscles work. Another example (component 7) where the negative values

of the correlation coefficients for the nonverbal index "spin the head in the left-right direction"- yawn (r = -855) are in reverse correlation with the nonverbal indicator " tilting the head in the right-hand direction "-roll. For the biometric analyzes performed, the value -1 is used as a benchmark value for the highest sensitivity in identifying nonverbal indicators.

In the case of visually impaired persons, exploratory factorial analysis was performed to identify significant factors with values greater than 1.00 (Figure 14). Five main components were originally extracted with values greater than 1.00, the results are shown in Table 8.

Table 8. The main components of Facial Actions and head movements with values greater than 1.00, following the variance analysis of visually impaired people in the context of the discussion on suicide.

Component	Initial Eigen Values			Extraction of loads' sums of squares			Rotation of loads' sums of squares		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	7.879	34.256	34.256	7.879	34.256	34.256	5.649	24.563	24.563
2	4.886	21.242	55.498	4.886	21.242	55.498	5.479	23.823	48.385
3	3.349	14.563	70.060	3.349	14.563	70.060	4.111	17.876	66.261
4	2.397	10.422	80.483	2.397	10.422	80.483	2.433	10.579	76.840
5	1.576	6.851	87.333	1.576	6.851	87.333	2.414	10.494	87.333

Extraction method: Principal components analysis; a. category – visually impaired persons

Principal component analysis was performed based on Facial Action correlations (twenty Facial Actions) and nonverbal behavioral elements (three elements of head movement). The orthogonal rotation of the factors determined the factorial structure represented in Table 8. The first three cumulative factors represent about 70% of the factors activated in the case of visually impaired people in the context of the discussion on suicide. The first component is represented by Facial Actions 14, 24, 43, 28, 12, 17, 15 and the head movement - Pitch, the second component is represented by Facial Actions 6, 7, 10, 9, 1, 2), and the third component by Facial Actions 26, 25, 20 (Table 9).

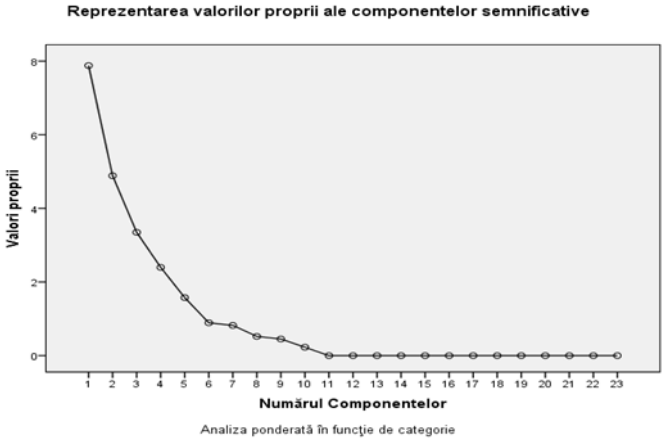


Figure 14.The graphic of Facial Actions and head movements' principal components as a result of variance analysis for visually impaired people.

The decreased graphic shows that after the fifth component (the last significant factor with a value greater than 1.00), the values decrease, reaching the critical threshold of 1.00. The components are units of action. Values greater than 1.00, found in Table 8, were rotated in orthogonal plane, and the saturations of the twenty-three variables for the five factors are found in Table 9.

Table 9. Significant factorial saturations (correlation coefficients) of the variables (Facial Actions and head movements) in the case of the visually impaired persons in the context of the discussion on suicide.

Rotated Component Matrix[a]					
AU	Componentă				
	1	**2**	**3**	**4**	**5**
AU14	**.867**	-.152	-.235	.198	.308
AU24	**.836**	.043	-.344	.001	.372

AU43	**.764**	-.231	.168	-.395	.182
AU28	**.732**	-.087	.370	.072	.527
AU12	**.727**	.468	.170	.449	-.104
AU17	**.723**	-.360	-.343	-.011	.448
AU15	**.716**	-.402	-.058	-.097	-.339
Pitch	**-.679**	.322	.469	.100	-.002
AU6	.369	**.874**	-.219	.099	-.089
AU7	-.079	**.867**	-.086	.004	.020
AU10	-.350	**.836**	.204	-.061	-.011
AU9	-.159	**.832**	.173	-.025	-.071
AU1	.496	**-.773**	-.133	-.135	-.282
AU2	.452	**-.760**	-.081	.238	-.165
AU26	-.075	-.169	**.960**	-.041	-.106
AU25	-.162	.114	**.925**	-.071	-.284
AU20	-.103	.381	**.870**	-.167	-.005
AU4	.099	-.096	.103	**-.904**	.017
Yaw	.054	-.224	-.321	**.597**	.514
AU23	.374	-.400	.565	**.573**	.018
Roll	-.184	-.047	.143	.029	**-.784**
AU18	.236	.368	-.450	-.506	**.521**
AU5	.162	.395	-.247	.360	.424

Extraction method: Principal components analysis. Rotation method: Varimax with Kaiser normalization. [a.]The rotation converged in 9 iterations.
The variables are sorted and ordered according to the saturation they have for each factor (Fig. 15).

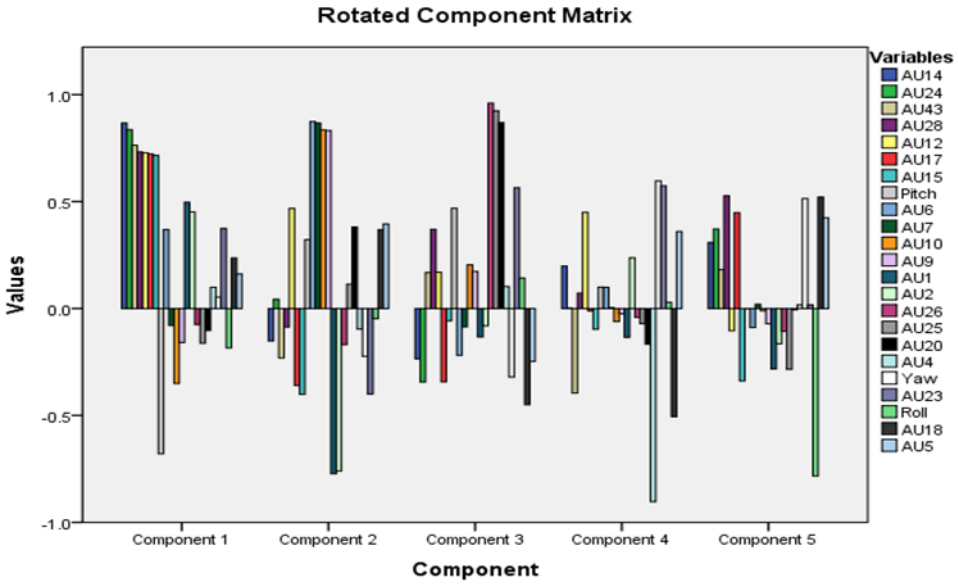


Figure 15. Graphical representation of the principal components, the saturations of the variables (Facial Actions and head movements) and their sequence in the case of the visually impaired persons, depending on the positive or negative values. Negative values of factorial saturation indicate that some of the values of nonverbal indicators (Facial Actions, head movements) correlate negatively with each other (Table 9). For the biometric analyzes performed, the value -1 is used as a benchmark value for the highest sensitivity in identifying nonverbal indicators.

The automatic analysis of Facial Action is here only for the sequences that contain the suicide theme (1 - 6 sec. / recording). The results of factorial analysis (Table 6 and Table 8) indicate that identical facial indicators were identified in the components in nonverbal expression of suicide denial in the two groups with similar variance values. These values are shown in Table 10.

Table 10. Common variables (Action Units-AU) for the category of inmates and visually impaired persons - **The pattern of facial expressions in the verbal expression of the denial of suicide.**

Category	Component	Initial Eigen values	% Variance	AU	Common AU Suicide denial pattern	AU	% Variance	Initial Eigen values	Component	Category
visually impaired persons (n=11)	**1**	7.87	34.25 %	**AU14,AU24**, AU43,**AU28**, **AU12,AU17**, AU15,Pitch	**AU14, AU24, AU28, AU17, AU12**	**AU14,**AU25 **AU24**,AU26 **AU28,AU17 AU12**	26.58%	6.11	**1**	Detained persons (n=21)
	2	4.88	21.24%	**AU6,AU7**, AU10,**AU9, AU1,AU2**	**AU6, AU7, AU9, AU1, AU2**	**AU9, AU2 AU7,AU1 AU6,**AU4	20.99%	4.83	**2**	
	3	3.34	14.5%	AU26, AU25 **AU20**	**AU20**	**AU20,**AU18	11.76%	2.70	**3**	
	4	2.39	10.4%	AU4, Yaw AU23	_	AU5, AU15	9.35%	2.15	**4**	
	5	1.57	6.85%	Roll, AU18	_ _ _	AU23,AU10 Pitch Yaw, Roll	7.87% 5.94% 4.36%	1.81 1.36 1.00	**5** **6** **7**	

The facial indicators identified by factorial analysis are partial elements of the following universal emotions: Surprise (1 + 2 + 5B + 26), Sadness (1 + 4 + 15), Happiness (6 + 12) 5 + 7 + 20 + 26), Fury (4 + 5 + 7 + 23), Disgust (9 + 15 + 16), Contempt (R12A + R14A).

For a better representation of the common components (Table 10), nonverbal indicators are represented in Figure 16.

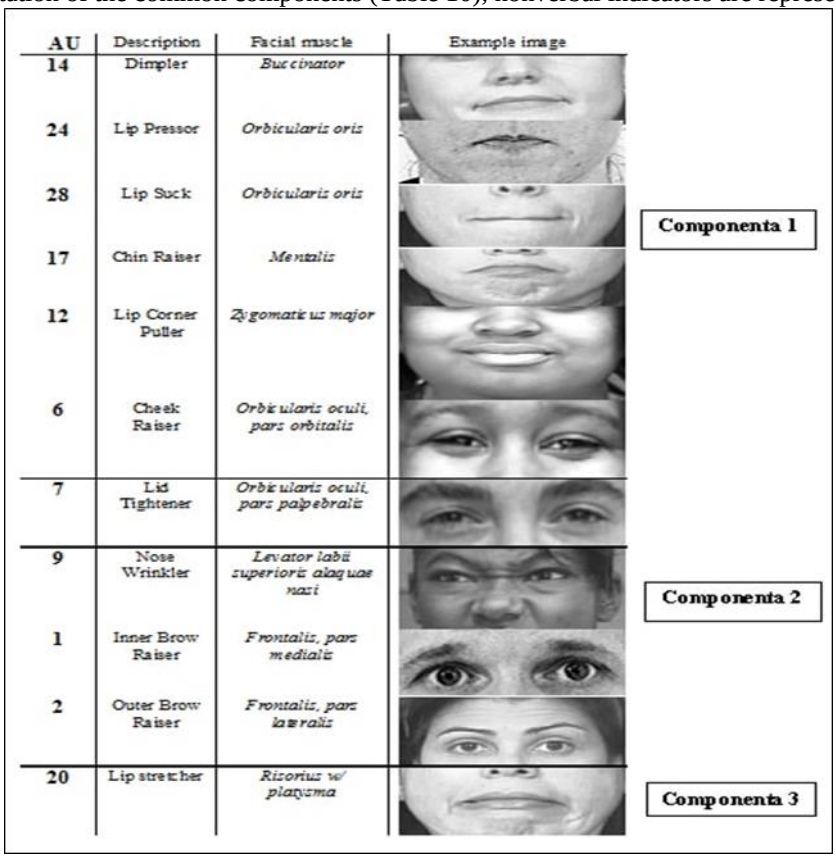


Figure 16. Taken after FACS - Facial Action Coding System (Ekman, & Friesen, 1978). Significant common facial actions for detainees and visually impaired people at verbal denial of suicidal ideation / behavior regarding plans for the future.

Behavioral expressions manifested at the facial level during verbal denial of suicidal ideation / behavior in the two categories of investigated individuals may be a behavioral pattern (Figure 17).

Figure 17. Sequence of facial indicators/ facial behavior (visually impairedperson vs. detained person) performed with the FACET Biometric Platform at a time interval T = 0.040 sec. - eyebrow lift and mouth opening, according to Fixed Action Models (MAF), Eibl-Eibesfeldt, 1972

The identification of differences in head movements, response time to questions about suicidal ideation / autolytic behavior, emotions and facial actions in the case of detained persons and visually impaired*people, namely people with ideation / history of suicide and people without ideation / without a history of suicide.*

The statistical analysis was made using SPSS, version 19, based on the data obtained from the processing of audio-video recordings with the FACET biometric platform. The level of significance was set at p = .05. In the first stage, analyzes of head movements, duration of response to questions about suicidal ideation / autolytic behavior, emotions and facial actions identified for the category of detained persons and visually impaired persons were performed. Means and standard deviations for representative variables are shown in Table 11 (for more statistical information see Annex 1E).

Table 11. Means and standard deviations for head movements, response time to questions about autolytic ideology / behavior, evidence of emotion and Facial Action for detainees and visually impaired persons.

Emotions/ Facial actions*	Category	N	Mean	Standard deviation
Evidence for Surprise	Inmates	21	**1.1692**	1.11172
	Visually impaired persons	11	**-.0186**	1.47790
AU6	Inmates	21	**-1.4753**	.61146
	Visually impaired persons	11	**-.9670**	.75984
AU7	Inmates	21	**-1.4504**	.47820
	Visually impaired persons	11	**-1.0570**	.52307
AU15	Inmates	21	**-.4169**	.46380
	Visually impaired persons	11	**-.7751**	.45043

* Action Unit - AU

In order to verify whether there are differences between the group of detainees and that of the visually impaired persons in the head movements, the duration of the response to the questions concerning the autolytic idea/ behavior, the evidence of emotion and the Facial Actions, the t test for independent samples was performed. The results are shown in Table 12 (see Annex 1F).

Table 12. Test t for differences in head movements, response time to questions about autolytic idea / behavior, evidence of emotion, and Facial Action for inmates and visually impaired persons.

	T test for Equal Means			
	t	Degrees of freedom	Level of significance (2-tailed)	Means difference
Evidence of Surpise	2.562	30	**.016**	1.18785
AU6	-2.055	30	**.049**	-.50829
AU7	-2.141	30	**.040**	-.39339
AU15	2.095	30	**.045**	.35823

The t test for independent samples was applied to determine the difference between the mean scores of the detained persons and the visually impaired persons in the head movements, the response time to the questions regarding the autolytic idea / behavior, the emotion evidence and the Facial Actions. The mean scores of the universal emotion Surprise (Table 11) in the case of the detained persons (N = 21, M = 1.169, AS = 1.11) are significantly higher t (30) = 2.56, p bidirectional = .016, than those of the visually impaired persons (N = 11, M = - .0186, AS = 1.47).
The mean scores of AU6 (Orbicularis oculi, pars orbitalis- raised cheek) and AU7 (Orbicularis oculi, pars palpebralis- tightened eyelid) in the case of the persons detained are significantly lower t (30) = 2.05, p bidirectional = .049, respectively t(30) = 2.14, p bidirectional = .040, than the scores of visually impaired people.
The average scores of AU15 (Depressor anguli oris – triangularis, lowered mouth corners) are significantly lower for visually impaired persons t (30) = 2.09, p bidirectional = .045. This may be due to the fact that the psychological state of recently detained prisoners is less good compared to the psychological state of the visually impaired persons who are free. It should be stressed that AU15 (Depressor anguli oris, aka Triangularis - the lowered corners of the mouth) is one of the basic facial actions, specific to the pattern of the universal emotion Sadness (AU1 + AU4 + AU15).
In this case it can be said that AU6 and AU7 are less obvious in the case of the detained persons compared to visually impairedpersons, which may be due to the facial morphology of the visually impaired, and AU15 is less obvious in the case of visually impaired persons compared to the detained persons. There were no statistically significant differences in the other scores for the two categories of participants.

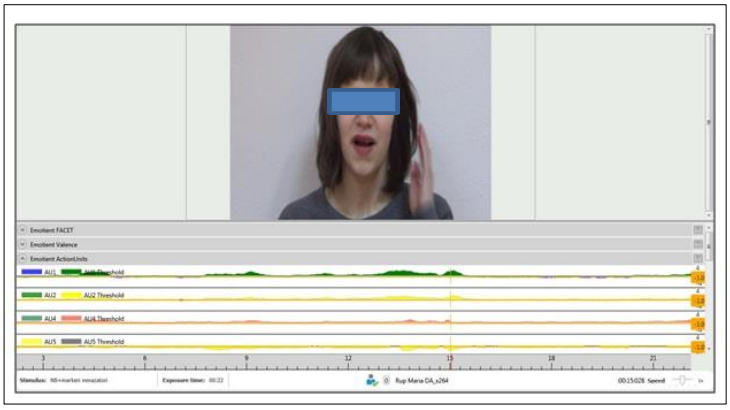


Figure 18. Identification of Facial Actions at the evidence level at the value of -1. Sequence from biometric analysis for a visually impaired subject.
In the second stage, analyses of head movements, response time to questions about suicidal ideation / autolytic behavior, emotions and identified facial actions were performed, for people with ideation / history of suicide * and people without ideas / no history of suicide **. Means and standard deviations for representative variables are shown in Table 13 (see Appendix 1G).
Table 13. Means and standard deviations for head movements, response duration to questions concerning autolytic ideation / behavior, evidence of emotion, and Facial Actions for persons with suicidal ideation / history * and persons without ideation / no history of suicide **

	Category	N	Mean	Standard Deviation
Evidence of Contempt	With suicidal ideation / history	9	-1.3356	1.30529
	Without suicidal ideation / history	23	-1.0561	.97930
Evidence of Disgust	With suicidal ideation / history	9	-.9818	1.07449
	Without suicidal ideation / history	23	-1.1929	1.10756
Evidence of Sadness	With suicidal ideation / history	9	-1.2375	1.46360
	Without suicidal ideation / history	23	-.6191	1.17151
AU25	With suicidal ideation / history	9	-.4463	1.38129
	Without suicidal ideation / history	23	-1.1372	1.06244
AU26	With suicidal ideation / history	9	-.3459	1.49019

	Without suicidal ideation / history	23	-.7942	1.10075
Yaw	With suicidal ideation / history	9	-1.9184	13.11685
	Without suicidal ideation / history	23	-5.2794	10.14700
Response duration	With suicidal ideation / history	9	**1018.7778**	841.52819
	Without suicidal ideation / history	23	**2301.3913**	1042.15348

Note: * Persons with a suicidal ideation /history - It refers to the participants of this study who at the time of the interview answered affirmatively the questions: "*Do you plan to commit suicide*?" (people **with suicidal ideation**); and "*Did you ever try to commit suicide*?" respectively (people **with a history of suicide**).

** Persons without suicidal thoughts /history - It refers to the participants of this study who at the time of the interview answered negatively to the questions: "*Are you planning to commit suicide*?" (people **without suicidal ideation**); and "*Did you ever try to commit suicide*?" (people **without a history of suicide**)

In order to verify whether there are differences between people with a suicidal ideation / history of suicide and those without a suicidal ideation / without a history of suicide, head movements, response time to questions about autolytic behavior, evidence of emotion, and Facial Actions, the t test for independent samples was performed. The results are outlined in Table 14 (see Annex 1H).

Table 14. T Test for independent samples in the case of differences in head movements, response time to questions about autolytic idea / behavior, evidence of emotion, and Facial Action for people with a suicidal ideation / history of suicide and for people without a suicidal ideation / without a history of suicide.

T test for Equal Means				
	t	Degrees of freedom	Level of significance (2-tailed)	Means difference
Response Duration	-3.286	30	**.003**	-1282.613

The t test for independent samples was applied to determine the difference between the mean scores of people with suicidal ideation / history of suicide and those without suicidal ideation / no history of suicide, at the head movements, the duration of the response to the questions concerning the autolytic idea / behavior, the evidence of emotion and Facial Action. There was a statistically significant difference in the response time mean scores for participants without a suicidal ideation / no history of suicide (N = 23, M = 2301.39, AS = 1042.15). They are significantly higher t (30) = 3.28, p bidirectional = .003 than those with suicidal ideation / history of suicide (N = 9, M = 1018.77, AS = 841.52).

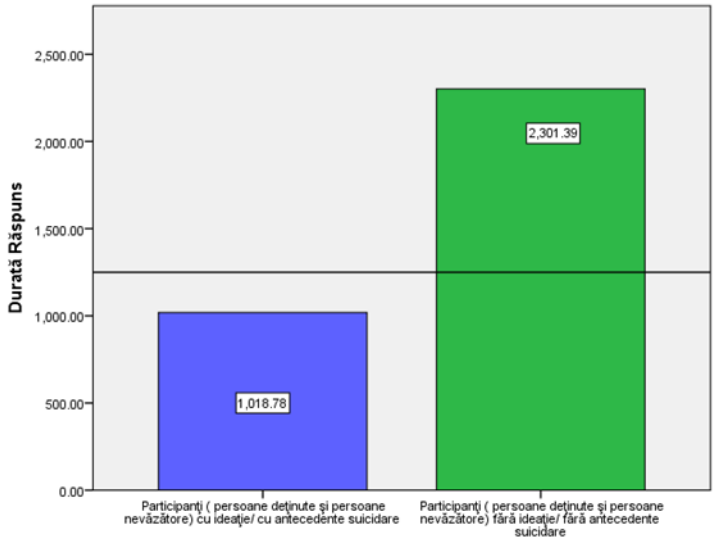


Figure 19. Graphical representation of the response time for the two categories of participants: detained persons and visually impaired people with suicidal ideation / history of suicide and detained persons and visually impaired people without suicidal ideation / no history of suicide).

III.3.6 Discussions

The hypotheses of this study were partially confirmed. In this respect, the first hypothesis of this study highlights nonverbal elements common to the two categories of participants (both prisoners and the visually impaired). The

statistical analysis of the data supports the proposed hypothesis in identifying a facial expression pattern associated with verbal negation about suicidal ideation / behavior, allowing the identification of three major components, namely eleven Action Units (AU) for the two groups of participants. The study by Heller, Haynal-Reymond, Haynal, & Archinard (2001) identified in persons who have attempted suicide, oral activity at the facial level that cannot be explained by the activity of the speech and which cannot always be associated with the risk of a new suicide attempt.

The principal components identified by the factorial analysis in the case of the presented study highlight facial indicators grouped at mouth level, which is supported by similar studies in the literature (Heller, Haynal-Reymond, Haynal, & Archinard, 2001). Data suggests that participants tend to show more facial activity in the lower part of the face, especially at the mouth level in the context of the discussion on suicide. Studies in nonverbal communication support the hypothesis that expressivity is perceived as an element of normality that characterizes healthy people (Ekman & Fridlund, 1987).

In the category of the detained persons, the results obtained are relevant for the cumulative percentage of the variance, indicating that 59.34% of the factors activated in the context of the suicide discussion are found in the first three components (in the first component Facial Actions 14, 25, 24, 26, 28, 17, 12, were activated; Facial Actions 9, 2, 7, 1, 6, 4 were activated in the second component and Facial Actions 20 and 18 were included in the third component.) In the case of visually impairedpeople, the results obtained are relevant for the cumulative percentage of the variance, indicating that 70.06% of the factors activated in the context of the suicide discussion are found in the first three components (Facial Actions 14, 24, 43, 28, 12, 17, 15 and the head movement element –Pitch were activated in the first component, Facial Actions 6, 7, 10, 9, 1, 2 have been activated in the second component, and the third component includes Facial Actions 26, 2, 20.

In the context of the discussion on suicide, the common Facial Actions found in the two categories of participants in the first three components may represent the fact that regardless of the category of persons (inmates or visually impaired persons), context (prison or state of freedom), when there is an emotional trigger (eg, the discussion about suicide), both categories of participants can activate common facial actions.

In this study, the static behavioral pattern is highlighted, which refers to behavioral analysis within a well-defined timeframe, that is, behavioral pattern refers to a single sequence of time. Simple (static), unlike ritualistic (dynamic) patterns (Haynal-Reymond, Jonsson, & Magnusson, 2005), refers only to simple behavioral actions that do not involve arm movements or postural changes.

In present study we can discuss a simple, static behavioral pattern where Facial Actions common to the two categories of participants are activated. In the case of the first component (34, 25% of the variance for the detained persons and 26.58% of the variance for visually impaired people), a Facial action regularity is displayed at the lower level of the face (AU14, AU24, AU28, AU17, AU12). Concerning the second component (21%, 24% of the variance in the detained persons and 20,99% of the variance for visually impaired people), a regularity of the Facial Actions in the nose, eye and eyebrows is shown (AU6, AU7, AU9, AU1, AU2), and in the case of the third component (14, 56% of the variance for the detained persons and 11.76% of the variance for visually impaired people), a regularity of the Facial Actions at the lip level (AU20) occurs. In the context of the discussion on suicide, a possible explanation for the large number of facial indexes identified at the mouth level (such as the first component) could be given by the verbal expression of the response (the mechanical function of the facial muscles involved in the speech process) but also by the nonverbal expression of disapproval, the denial of the possibility of another suicide attempt in the future. Significant facial indicators may play a role in transmitting the specific emotions faced by participants only in the context of the discussion on suicide: (1) the participants present a mixed multi-emotional index, as is the case with the second and third components (eg anger, contempt) ; (2) anxiety identified by lip tension from a possible desire to control the situation. In the case of verbal denial of suicidal ideation / behavior regarding future situations, in this study, data suggest that participants exhibit more facial activity at the mouth compared to upper face indicators.

The Facial Actions identified in the two groups of participants can represent a potential behavioral pattern that can be determined by a possible degree of rhythmicity in the occurrence of these actions in the context of the discussion on suicide for future situations. The literature demonstrates that the pattern in nonverbal behavior is characterized by the rhythm of the structure and not by its content (Grammer, Kruck & Magnusson, 1998; Magnusson, 2000).

Facial expressions highlighted by statistical analysis may represent an indicator of a potential pattern of emotional expressions accompanying verbal denial of suicide (though a much larger number of subjects is needed to identify a pattern) that can be used in the future as a diagnostic tool, allowing identification of pattern deviations and assessing the needs for specific analyses and interventions to assess and prevent the risk of suicide.

Magnusson (2000) asserts that identifying the type of pattern is important for the flow of different types of behavior within a time frame. In this sense, the pattern is important in organizing behavior (Magnuson, 2000).

In relation to the data obtained in this study (common Facial Actions activated by detainees and visually impaired persons were identified in the case of verbal denial of suicidal ideation / behavior), reference can be made to the theory of universality of emotions from a philogenetic perspective, but also to the idea according to which affective states are reflexes (Darwin, 1872). In the visually impaired people category, people with congenital, but also acquired, blindness are found. In the case of people with congenital blindness, it is not possible to discuss ways of learning and expressing emotions at the facial level in the context of social interaction, these people not being able to visualize the facial

expressions of other individuals. The literature highlights the fact that the phylogenetic dimension is responsible for expressing emotions at the facial level, even for the visually impaired (Darwin, 1872; Matsumoto, 2013).
The results obtained in this study can highlight the dynamic nature of the communication process that relates to the exchange of information at the verbal and / or nonverbal level between the psychologist and the participants in the context of the psychological assessment. The results of the studies by Grammer, Fink, & Renninger (2002) highlight the fact that the communication process is dynamic, regardless of context.
In the second part of the statistical analysis, regarding the differences between the groups of participants (prisoners / visually impaired persons, *people with suicidal ideation / history of suicide and people without suicidal ideas / no history of suicide*), it can be concluded that there have been identified in total five statistically significant differences. In the first analyzed situation (inmates vs. visually impaired persons), differences were found: (1) at the level of evidence for the emotion Surprise, in the case of the inmates the results are significantly higher than those of the visually impaired persons; (2) at *Facial Action level 6* and (3) at *Facial Action 7*, in the case of detainees the results are significantly lower than those of the visually impaired persons; (4) at the level of *Facial Action 15*, in the case of visually impaired persons the results are significantly lower than those of the persons detained; in the second analyzed situation (persons with suicidal ideation / with a history of suicide and people without suicidal ideation / without a history of suicide), differences were found (5) *in the duration of the response* in the context of the discussion on suicide, in the case of persons without suicidal ideation / without a history of suicide the results are significantly higher than those with a suicidal ideation / history of suicide.
At the level of the other measured variables: six universal emotions, seventeen Facial Actions and three elements of the head movement no statistically significant differences were found, which can be perceived as a high level of behavioral similarity between the participants in the emotional expressivity accompanying the verbal denial of suicidal ideation or suicidal behavior. Thus, the research hypothesis according to which there will be statistically significant differences in the head movements, the duration of the response to the questions regarding the suicidal ideation / autolytic behavior, at the level of emotions and identified Facial Actions, *between detained persons and* visually impaired *persons, and persons with suicidal ideation /with a history of suicide, and people without suicidal thoughts / without a history of suicide respectively*, has been partially confirmed.

III.3.7 Conclusions and implications

The large number of people who commit suicide has increasingly attracted attention, especially for suicidology researchers, but not only, for this reason, factors that may underpin suicidal behaviors have been addressed here. In the literature there have been identified the risk factors associated with suicide for various populations. Risk factors associated with suicide may be: mood disorders, schizophrenia or psychosis, substance abuse or dependence, personality disorders, feelings of futility, suicidal ideation, suicidal antecedents, psychiatric history, psychiatric history in the family (Mościcki, 1999, apud Brown , Beck, Steer & amp; Grisham, 2000); demographic and psychological factors (Brown, Beck, Steer, & Grisham, 2000), etc.
According to the World Health Organization (WHO) site, depression is a common illness worldwide, with about 350 million people affected (http://www.who.int/en/). Depression can lead to suicide, and more than 800,000 people per year commit suicide. According to the same site, suicide is the second cause of death for the age group of 15-29 years. The barriers to suicide prevention identified by World Health Organization specialists include lack of resources, lack of specialist training for health care providers, stigmatization, and inaccurate assessments (WHO, 2017; http://www.who.int/mediacentre/factsheets/fs36 /en /).
Another factor that can increase the suicide rate is the prison environment. Statistically, internationally, it is known that at the time of placing a prisoner, the risk of him committing a suicide act is quite high within the first 24 hours of being placed in prison (Towl, 2003). One of the roles of the psychologist in the prison environment is to identify such risks and to succeed in intervening as soon as possible to stop the act. Most of the time, thoughts about suicide plans are not clearly identified simply by the use of a screening or structured interview assessment (National Institute of Corrections, 1982). Thus, it can be infered that for prisoners is easy enough to lie about their emotional mood, but also about their thoughts.

Strengths of the present study

An important aspect of this study is the fact that it is a field-based, ecological study, the participants (detainees) are interviewed at important moments of their existence, and results similar to previous studies have been highlighted.
An advantage of the study may be the fact that the Facial Action Coding System (FACS), a standardized method of measuring and describing the expressions of facial behavior, was used. FACS is a useful research tool for measuring any facial expression that human individuals can produce. The Facial Action Coding System has been used in many clinical trials, many of which are related to the relationship between emotional triggers, emblems, conversational signs and affective disorders (Ekman & Fridlund, 1987; Ekman, Matsumoto & Friesen, 1997).
Besides the fact that all results are based on the interpretation and theory of the FACS (Facial Action Coding System) (Ekman, & Friesen, 1978), another benefit of the study is that the results were obtained using the FACET biometric platform (iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient), software that automatically recognizes universal emotions (surprise, fear, anger, sadness, happiness, disgust, contempt)

and identifies nonverbal behavior indicators (three dimensions in the head movement and twenty expressions and facial micro-expressions: AU1, AU2, AU4, AU5, AU6, AU7, AU9, AU10, AU12, AU14, AU15, AU17, AU18, AU20, AU23, AU24, AU25, AU26, AU28, AU43).

Limitations

From the point of view of the limitations of this study, one can first discuss the small number of participants (N = 32). Following the analysis of FACET (iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient), the number of participants analyzed is lower (N = 32) than the initial number of participants interviewed (N = 40), of which detained persons (N = 21) and visually impaired persons (N = 11).The lower number of subjects is due to external causes - the quality of the recordings (too strong light behind the subject, some subjects wearing glasses, frequent movements of the subject in the chair), and these situations significantly diminish the quality of the data analysis (up to 90%) with the FACET Biometric Platform.

In the case of detainees, sampling of convenience was used, they signed informed consent when they were psychologically assessed, which can be perceived as a limit of the study.

Another element that can be perceived as a limitation of this study is that the FACET biometric platform designates mouth level movements as Facial Actions at the time the participant speaks, which does not give much fidelity to the measurements.

The image of a potential pattern of denial of suicide is static and not dynamic, this being represented by the fact that the image of the facial model identified in this study is limited to only one time sequence (0.040 sec.) - the highest level of evidence for the universal emotion Surprise, even if the analysis was carried out for a maximum of 6 seconds, which may limit this study, because in the analyzed six-second interval the participants also expressed other universal emotions.

Recommendations/Applicability

Identifying facial expressions and analyzing them as potential patterns can be used in various contexts:

Educational environment (students) - identifying nonverbal behaviors specific to negative universal emotions (sadness, anger, contempt, disgust) that can predict depressive behaviors and suicide, on the one hand, and on the other hand , potential aggressive behaviors, bulling, etc.

Prison environment (inmates) - can be a way of predicting self-aggression and hetero aggression, or identifying depressive-suicidal behaviors, but also a way of identifying elements of nonverbal behaviors in limbo situations (negotiation, hostage-taking, riots, threats with suicide, etc.)

Polygraphic assessments, behavioral analyses (suspects) - identification and decryption of nonverbal messages in the psychological assessments made by the polygraph expert and by the behavioral analyst in order to outline a realistic, objective and detailed psychological profile. In this respect, during the doctoral studies a collaboration with the General Police Inspectorate - Behavioral Analysis Service was made (in 2016 and 2017, see Annex 6) - support granted for the scientific substantiation of the psychological profile of the suspects by explaining the verbal and nonverbal behavioral variables, but also with the County Police Inspectorate-Arad - Criminal Investigation Directorate (2015-2017).

Professional training for *judges* in order to identify the facial expressions and emotions of defendants cited in various criminal or civil cases; for *police officers* in order to decode possible hetero aggressive behaviors of people they come in contact with (Boureanu case); staff from the National Penitentiary Administration (*guarding agencies, psychologists, educators, visiting sector workers,* etc.); *psychologists certified in the field of educational psychology* in schools, high schools, etc; for *psychotherapists* because the ability to decode nonverbal behavior can be an element that helps to develop the therapeutic relationship, counteracting nonverbal elements that can trigger transfer and counter-transfer situations etc; *security and control staff at airports*, *secret services*; *the health system* (psychiatry, general medicine, pediatrics, etc.) and beyond, with the aim of identifying nonverbal behaviors and obtaining information from the unconscious sphere of the individual.

Future research directions

In the future, a behavioral analysis can be made to identify a dynamic pattern of nonverbal behavior in the context of the discussion on suicide targeting facial, postural and verbal measurements. The dynamic pattern could be outlined using binary analysis (the presence or absence of behavioral indicators) over the entire response period (duration of three to six seconds) to questions about suicide that highlight the type of elements of nonverbal behavior and the frequency of occurrence while answering questions.

In this study, the potential facial pattern for expression of emotions in the context of the discussion on suicide is realized through both negative and positive answers to questions about suicidal ideation and behavior. In the future, it is intended to approach a negative model only, but also a differentiation between the two categories (positive responses and negative answers to questions about suicidal ideation and behavior).

It would be useful to replicate research with a larger number of participants, to conduct a comprehensive analysis of nonverbal behavior, but also to use ethiology methods (eg, etogram) that could highlight the facial behavior sequences and their succession in case of denial of suicide.

The field of nonverbal communication is on the rise. Studies conducted since the 1840s have provided essential insights on a better understanding of emotions and nonverbal communication (Darwin, 1872; Tomkins, 1962), clarity in the identification and measurement of universal emotions (Tomkins, 1964, 1970; Ekman, Friesen & Hager 1978); and are used in research areas in the case of depression, where the client-therapist relationships concerned (Heller, et al., 2001), the autism domain (Deriso, et al., 2012), the human-machine relationship (Yeasin et al.), seductive behavior (Grammer, 1990; Troje, 2003; Andelin & Rusu, 2015) and beyond. At present, in Romania, the interest in this field of research (nonverbal communication) is increasing. In the present case, there is an image of a potential pattern of emotional expression that accompanies verbal denial in responses to questions about suicide, which is based on facial indexes identified by participants in this study. The automatic analysis of nonverbal facial micro-expressions on denial of suicidal behavior allows the identification of three significant components and eleven Facial Actions (eg AU14, AU24, AU6, AU7) for both groups of participants (inmates and visually impaired persons) in the following way:

1. in the case of the first component - 34, 25% of the variance for the persons detained and 26.58% of the variance for the visually impaired persons, there is a regularity of the Facial Actions at the lower level of the face;
2. the second component - 21, 24% of the variance for the persons detained and 20,99% of the variance for the visually impaired persons, shows the regularity of the Facial Actions in the wrinkles of the nose, eye and eyebrows;
3. third component - 14, 56% percent of the variance for persons detained and 11.76% percent of the variance for visually impaired persons, a regularity of the Facial Actions at the lip level is displayed.

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III.4. STUDY 4
The Image of Deception about the Suicide Attempt: Behavioral and Biometric Analysis of the Facial Expressions of a Detained Person during the Initial Psychological Assessment - Case Study

III.4.1 Introduction

The specialized literature points to two functions of emotion: (1) *the intrapersonal function* meaning the emotional functions to the individual experiencing them, and (2) *the interpersonal function* of emotion that facilitates the communication of intent but also establishes and maintains the social networks, the central conclusion is that emotions help regulate social norms (Hess, 2001).The involuntary nature of emotions through the communication channels (facial expressions, body language and voice) can provide information about the authenticity of nonverbal behavior even if controlling and concealing emotional signals is desired (Frijda, 1986; Ekman, 2003). Faking emotions in various contexts cannot be achieved easily because the difficulty of feign emotion can be high, and people less aware of the emotions experienced may involuntarily display behavioral indicators belonging to genuine emotions (Ekman, 2003). In 1985, Ekman and Friesen brought to light the famous case study "Mary", where the identification of hidden signs that can trace the intent of suicidal behavior is sought. They discuss facial micro-expressions and gestures, and the fact that the identified signs are difficult to access in the plan of conscious attention.

Taking into account the literature, in this case, the question is as follows: *Is it possible to identify a form of behavior at the level of facial expression which allows the prediction of a future attempt of suicide and the identification of facial expressions associated with a potential deceptive information about a future suicide attempt?*

In the prison environment, aggressive behavior against one's own person is frequently encountered among detainees (12% of suicides per 100,000 incarcerated persons, http://anp.gov.ro/wp-content/uploads/2017/04/bilant-ANP-2016.pdf).Therefore, this behavior is a problematic one that presents increased interest for the National Administration of Penitentiaries in order to prevent suicidal behaviors.

III.4.2 Research objectives and hypotheses

Objectives

The objective of this study is the behavioral and biometric analysis of the facial expressions of a suicide person in the context of the initial psychological assessment in the penitentiary, at the time of questioning the suicidal ideation and suicidal behavior.

Hypotheses

It is possible to identify behavioral reactions and emotional facial expressions accompanying the verbal denial (the answer given) to the questions that investigate the antecedents, the idea and the future thoughts on suicide, in the context of the initial psychological assessment in the penitentiary.

III.4.3 Problems history

The participant in this case study (female, 30 years of age, unmarried and without children, detained person in Arad Penitentiary, Romania) encountered difficulties in relation to the family environment (eg poor communication with her parents) beginning at the age of 14-15 when her parents divorced. Her professional qualification is in the field of alimentary industry (assistant chef). She comes from a family with social problems and low income. After the divorce of her parents, her mother remarried and her biological father committed suicide. Immediately after the divorce of her biological parents, the detainee started drinking alcohol. The first attempt at suicide occurred at the age of 15, by cutting the veins from both hands. Three years after the incident, alcohol consumption has become a daily routine, and the subject only consumed alcohol-rich beverages. At the age of 22, the subject attempted suicide for the second time by ingesting sleeping pills. At the age of 30 she killed her stepfather. The crime occurred amid alcohol consumption and repeated disagreements with her stepfather. Currently, she is imprisoned in the Arad Maximum Security Penitentiary, being convicted of killing the stepfather.

III.4.4 Identifying the objectives and establishing the therapeutic intervention plan

For the therapeutic intervention the following objectives were defined:

1. Achieving a complex psychological profile of the subject in order to initiate therapeutic approaches and identify possible deceptive behavior, knowing that the subject has a high risk of suicide and can hide the suicidal ideation;
2. Identification of "anchors" for better self-reporting to reality and the future;
3. Establishing a therapeutic intervention / counseling program (1-2 meetings / week, with a duration of about 50 minutes each session) for a period of 6 months;

4. Emotional stabilization of the participant;
5. Adaptation to alcohol withdrawal (imprisonment does not allow alcohol consumption).

III.4.5 Research methodology

A case study of a Romanian detained person aged 30 years is presented. All data from video analysis is confidential and used for scientific purposes only.

Method of work - Therapeutic goals

For this case study, therapeutic goals were specifically set to address suicidal ideation (ie decrease in suicidal ideation), postponement of suicide attempts, and the development of a beneficial therapeutic relationship based on mutual trust.

Choosing the right intervention

The psychological intervention aimed at cognitive restructuring, identifying the subject's potential and focusing on the issue in terms of "here and now". All these objectives have been achieved periodically and gradually during counseling sessions.

The equipment used

The interview was recorded with a video camera (Sony Handycam HDR-CX 190E, Full HD). The video was analyzed using the biometric platform - iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7.

Instruments

1. Psychological Screening

Questions from the psychological screening about the idea and the history of suicide (*Have you had suicidal attempts in the past?/ In the present moment do you have any suicide thoughts?*) are part of the field of specific psychological assistance, the subdomain - risk of suicide (see annex 5).

2. Biometric Platform iMotions Biometric Research Platform powered by FACET - Real-time identification of emotions expressed during discussions with the psychologist

The video was analyzed with the iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7. This platform identifies the emotions of the subject (Figure 20, Figure 22, Figure 25), the intensity of emotions, but also the facial micro-expressions, encoded with Action Units (AU) by the software (Figure 21, Fig. 23, Fig. 24).

3. *Video analysis by frame by frame method - Participant's behavioral analysis (facial macro-expressions, gestures, postural changes)*

The behavioral analysis of the subject was based on video recording and concerned behavioral elements in the sphere of nonverbal communication. Body behaviors such as postural changes (Figure 26), head movements, direction of sight, hand gestures, face touch etc. have been carefully analyzed.

Procedure

The detainee was informed in advance of the activity (initial psychological assessment and video recording of the interview) and was asked for a written consent (see Annex 4) to record the interview. The participant was recorded from shoulder to shoulder, focusing the audio-video camera on the face area. The person was seated, and the audio-video camera was placed approximately 40-50 cm in front of her. The interview lasted about 45 minutes. The recording took place in the psychological cabinet of the Arad Maximum Security Penitentiary.

III.4.6 Results

Results based on the automatic analysis of emotions

In the case of the analysis carried out with the iMotions Biometric Research Platform powered by FACET, a sensitivity threshold at a standard value of -1 was used to identify the evidence of universal emotions and Facial Actions in order to increase this sensitivity and identify as much accurate emotions and Facial Actions expressed by the participants. The evidence of a channel for the expression of a universal emotion or Facial Action represents the chances in the logarithmic scale in the base 10 as an expression to be present. For example, for the expression of the universal emotion of happiness, this standard value -1 of the evidence of universal emotion or Facial Action means that the observed expression is 10 times more likely to be classified by an expert coder as *NON Happiness* than *Happines*s (https://imotions.com/facial-expressions/).

The universal emotion of Sadness (Figure 20) and the Action Unit (AU) of this emotion (Figure 21) were identified in clear moments of the interview, such as questions about future suicide attempts, and when the answer the subject was *"... no ... I do not want to commit another suicide attempt ..."*.

The question asked by the psychologist during the interview was "*Do you want to commit suicide*?" To T: 00: 01: 488. During the addressing of the question and the answering the facial micro-expressions, gestures, postural changes, voice changes, etc. were analyzed.
The total period analyzed with the FACET Biometric Platform is T: 00: 28: 272. At this time two questions are asked: (1) *"Do you want to commit suicide?"* And (2) "*Do you still have suicidal thoughts*?". The analysis focused on the visible behavioral manifestations of the first question - *"Do you want to commit suicide?"*
The analysis period began with the identification of nonverbal behavior (emotions displayed, body language, voice tones) before and after the first question. The period ends when the second question is asked. The total period analyzed for the first question *("Do you want to commit suicide?")* is T: 00: 10: 256, the results (identification of emotions and specific AUs) obtained using the FACET Biometric Platform are shown in Figure 20.

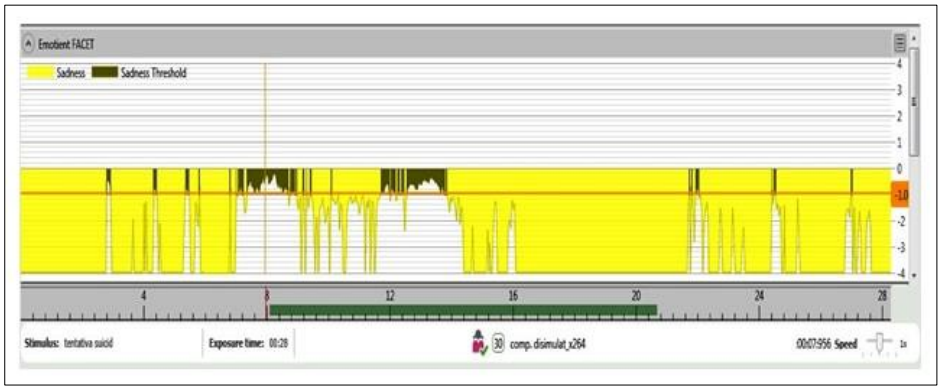

Figure 20. Representation of the universal emotion Sadness with the FACET Biometric Platform in the answer to the suicide questions

In this case, the verbal response of the subject is analyzed immediately after the participant states that he does not want to commit another suicide attempt. The level of the universal emotion Sadness is set to -1 (sadness threshold). The sensitivity threshold of Sadness is highlighted by FACET in the green color.

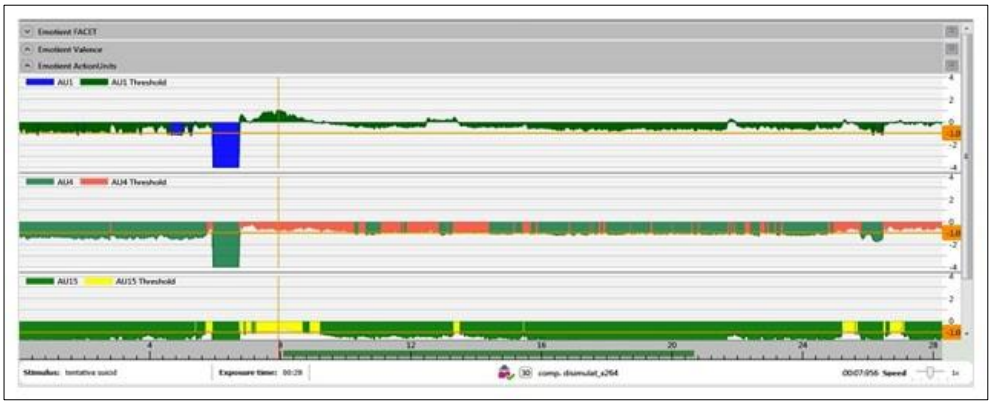

Figure 21. The Action Units specific for the universal emotion Sadness (AU1 threshold, AU4 threshold, AU15 threshold), identified by the FACET Biometric Platform, at AU evidence level, at -1.0.

At this time frame (00: 07: 956), all three specific indicators for the universal emotion Sadness (AU1, AU4, AU15) were activated. This confirms that the emotion is pure, even if its evidence is not very high over the time interval analyzed, meaning that the observed expression is 10 times more likely to be classified by an expert coder as *NOT Sadness* than *Sadness* (https://imotions.com/facial-expressions/).

Figure 22. The level of evidence of universal emotions Fear and Sadness identified with the FACET Biometric Platform. The threshold of sensitivity of emotions is highlighted by the FACET platform with the blue (fear threshold) and green (sadness threshold)

On the displayed time frame (00: 08: 041), the vertical line segment highlights the occurrence of the two universal emotions almost simultaneously, when the subject responds that he does not want to commit another suicide attempt. At this time, the Fear emotion is also identified as an element that complements the behavioral facial aspect. It is noticeable that the two emotions are activated almost simultaneously, the differences being made by the specific active indicators (AUs). In the time interval, the Fear emotion evidence is not very high, being identified at -1.0, according to FACET.

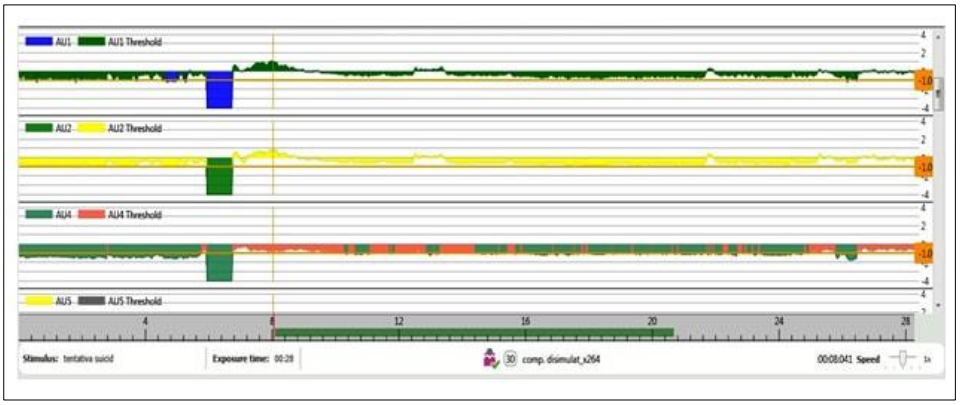

Figure 23. The Action Units specific for the universal emotion Fear (AU1 threshold, AU2 threshold, AU4 threshold) identified by the FACET Platform, at AU record level at -1.0.

On the displayed time frame (00: 08: 041), the vertical segment of the line highlights the appearance of the AU at the very end of the verbal behavior - the participant's response was *"... no, because I promised not to do it again"*.

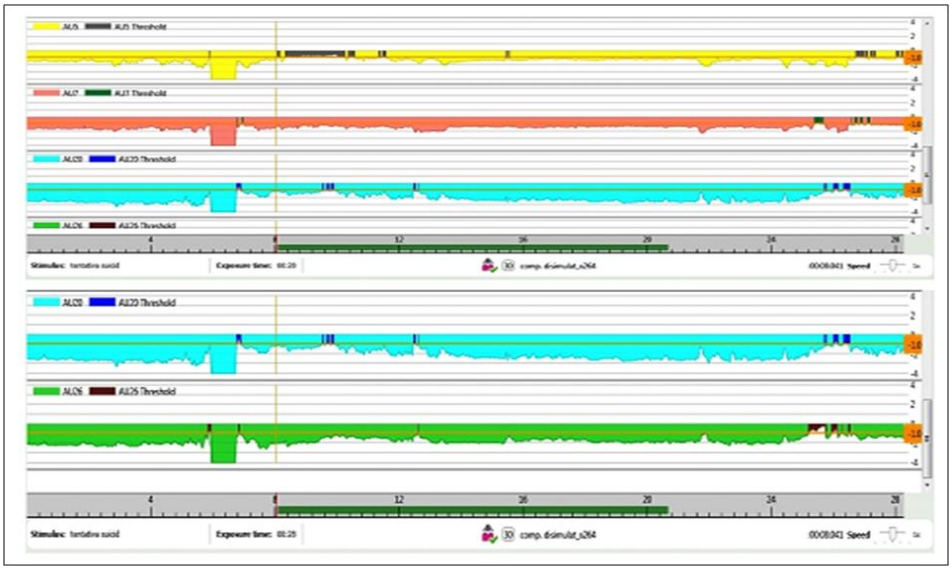

Figure 24. The Action Units specific for the universal emotion Fear (AU5 threshold, AU7 threshold, AU20 threshold, AU26 threshold) that were identified by the FACET Platform at the end of the verbal behavior "... no, because I

promised not to do it again"), but do not exceed the evidence of Facial Action set to -1.0, for the displayed time frame (00: 08: 041). Even if for the universal emotion Fear not all Facial Actions were activated, but only AU1, AU2, AU4, AU5, they confirm that the Fear emotion is present.

Figure 25. The evidence of universal emotions: Surprise, Fear, Sadness, identified with the FACET Platform at the end of the verbal behavior (the answer of the subject was: "... no, because I promised not to do it again").
These emotions (Surprise, Fear, Sadness) appear after returning to the initial position in the chair, the postural movement has come to an end, but facial expressions have been identified as surprises, fears and sadness. They appear as a facial emotional mix, telling about the participant that at the internal level she is experiencing emotions in relation to the topic (committing another suicide attempt), but she may try to hide them.

Results based on behavioral analysis (gestures, posts)
Postural sudden movements were observed when the participant had to answer questions about suicide plans (Fig.26). Also, a sudden shift in the direction of the eyes to the left of the participant was observed, which could indicate an activation of the right hemisphere, which is responsible for emotional responses (Matsumoto, Frank, & Hwang, 2013).

Figure 26. The postural change of the participant when responding to the question of suicide.

The postural movement in the chair is triggered by the question *"Do you want to commit suicide?"* And starts at T1: 00: 05: 325 and ends at T2: 00: 08: 704.This behavior is followed by the answer "... no, because I promised not to do it again", then it is accompanied by another verbal behavior (the subject clears her throat and adjusts her voice during the postural movement in the chair).

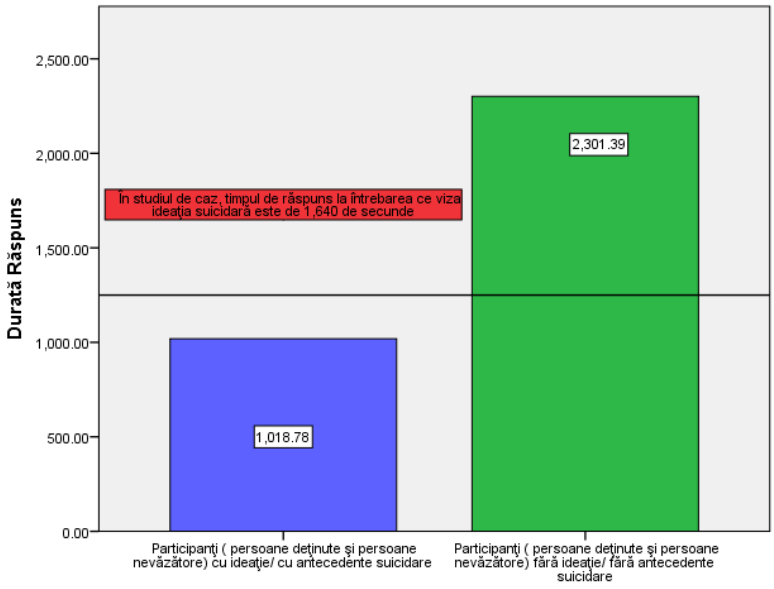

Figure 27. Graphical representation of the response time (seconds) for the participant in this case study, to the question that investigates the antecedents, the idea and the future thoughts about suicide, compared to the average response time of the participants with a suicidal ideation / history and the participants without suicidal ideation / without a history of suicide.

Related results

Correlated data analysis allowed the identification of emotional tension felt in the behavioral plane, discomfort associated with the question, possible deceptive behavior in relation to the answer to the question of future suicide attempts. These results were supported by the emergence of universal emotions Surprise, Fear and Sadness, when the detainee was asked about future suicide attempts, as can be seen in Fig. 20, Fig. 22, Fig. 25, as well as sudden postural changes (Figure 26).

III.4.7 Discussions and conclusions

A particular situation was identified in the response time of the case study participant, who is a detained person with a history of suicide and who attempted suicide two weeks later after the psychological interview. In the case study, the response time to the suicidal ideation is **1,640 seconds**. The duration of the response period does not fall into the values of the category of the participant (people with suicide ideation / history of suicide) (Figure 27), the duration of the response being much longer. From the perspective of deceptive behavior, the literature (Zuckerman, & all, 1981a) addresses two broad dimensions: (1) emotional and (2) cognitive, involving long pauses, repetition of words or phrases, situation that increases response time. For this case study, the duration of this participant's response may fall within the category of deceptive-specific indicators. Compared to other respondents surveyed in Study 3, for this participant, the answer of denial includes a complete expression of the universal emotion Sadness.

The analysis of the negative response to the suicide question revealed the following Facial Actions: AU1, AU4, **AU15** (Figure 28), indicating a deviation from the model of the negative pattern identified in Study 3.

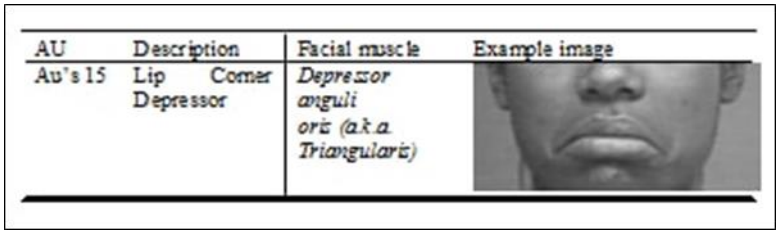

Figure 28. Taken after FACS - Facial Action Coding System (Ekman & Friesen, 1978). One of the facial indicators specific to the universal sadness of emotion.

The changes in posture when the question of suicide was answered may also indicate a discomfort associated with the question.

In terms of cognitive involvement, studies say the blink rate is lower (Bagley & Manelis, 1979), there are more mistakes in the speech, the subjects speak less often, break more often, and wait longer to give an answer (Eisler, 1968). When people are lying, and the context is important, the possibility of cognitive indicators (long breaks, repetition of words, etc.) is high (Vrij, 2012).
The behavioral patterns through which emotion is discharged are either facial (e.g., conversational signals, facial macro-expressions, facial micro-expressions), or at the body level, through postural movements (eg movements of the hands, feet, body direction, etc.).
After six months of regular meetings with the psychologist, during the counseling sessions, the suicidal ideation diminished, and the participant presented a better adaptation to the new environment, but also an optimal level of socialization with the other inmates.

Strengths of the present study
A positive aspect of this case study is the way to integrate the information resulting from the various tools used here, for example, the multidimensional analysis of the video recordings of the initial psychological assessment. Nonverbal behavioral analysis, the use of the iMotions Biometric Research Platform powered by FACET facial expression technology from Emotient, along with the information extracted from psychological screening, can help legal psychologists use behavioral indicators of denial and / or lying or behavioral discomfort in the context of specific questions related to self-aggression or hetero aggression, as preventive anchors for the development of personalized interventions in penitentiaries.
Although this case study does not allow to generalize conclusions about a potential lying pattern in relation to verbal response to questions about suicidal ideation, the multidimensional method used for data analysis (the FACET platform and behavioral observations during the suicidal ideation interview) helped gaining a valuable image (in the sense of identifying emotions and Facial Actions associated with possible deceptive behavior used by the person in question when addressing questions about future suicide plans.
The value of the case presented here resides in the possibility of differentiating the indicators of deceptive behavior associated with answers to specific questions with strong individual valency (such as future suicide attempts). The multidimensional identification of nonverbal indicators accompanying verbal denial (behavioral and biometric indicators) was made for nine other cases of suspected / suicidal persons, but no attempted suicide after imprisonment.

Limitations
One limit of this study may be the latency period between the participant's response to the initial psychological assessment and the suicidal behavior that happened after approximately two weeks after the initial psychological assessment was completed, meaning that during this time various variables that could have influenced the will of the detainee to try for the third time to commit suicide may have possibly occurred.
It can be assumed that the question of identifying the idea of suicide could be a trigger for suicidal behavior when assessing people who have been diagnosed with major depressive disorder or a major depressive episode. In such situations, when the clinical diagnosis is known, the initial psychological assessment identifies the factors underlying the suicidal desire, the time when the last suicide attempt occurred and the ways in which the person overcame the difficult moments (eg admissions to psychiatric medical units and medical treatment, family support or close relatives, psychotherapy, etc.) to prevent suicide attempts.

Recommendations
Starting from this study, the methods by which behavioral expressions associated with answers to specific questions about suicide have been identified can be applied in various areas:

- Staff assessment (army, police, gendarmerie, airplane pilots) to identify deceptive behavior targeting suicidal ideation / behavior, taking into account that there are areas of activity where suicide cases have been recorded (Andreas Lubitz - "The co-pilot of death" (http://www.digi24.ro/stiri/actualitate/evenimente/). The more so as the commander of the Victor Anastasiu National Aeronautical and Space Medicine Institute notes that the assessment of the airplane pilots are made only at the request of a physician (http://www.hotnews.ro/stiri/);
- Patient assessment in psychiatric hospitals, detainees assessment in prison, knowing that closed environments are a factor that can facilitate suicide. It is recommended that in cases where depressed persons are psychologically evaluated, questions that investigate suicidal ideation or another possible suicide attempt should be addressed with caution only after a very good knowledge of personal and medical history (psychiatric family history, psychiatric diagnosis, admissions to psychiatric medical facilities, etc.).
- Student assessment - Identifying nonverbal behaviors specific to negative universal emotions (Sadness) that can predict depressive, suicidal behaviors, (the "Blue Whale" case, this is an online game where tasks are given to the player by a supposed "mentor, and the ultimate task is the suicide of the player. This game comes from Russia and propagates on online social forums and networks and has been associated with the suicide of several

young people in both the former Soviet space and the European one. Romania has reported such cases (http://www.mediafax.ro/social/).

Future research directions

Although this case study does not allow for conclusions to be generalized about a potential lying pattern for suicidal ideation, it would be useful in the future to continue this type of study with a larger number of subjects and validate this multidimensional analysis method. This global assessment technique could be used in the future as a diagnostic tool to identify latent psychopathological trends, deviations from the established pattern of negation (eg, potential dishonest behavior), and assessing specific needs analyses and interventions to prevent and assess suicide risk.

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III.5 STUDY 5

Identifying the level of detection accuracy for authentic and deceptive / dishonest behavior in relation to the Emotional Intelligence level - comparative study between experts and novices

III.5.1 Introduction

A series of studies indicate that the ability to recognize emotions is related to the effectiveness of nonverbal communication (Capirci & Volterra, 2008). An important factor associated with inter-individual differences in emotional recognition abilities is given by emotional intelligence, which is defined as a list of personality traits that include empathy, motivation, perseverance, cordiality and social skills (Mayer, Salovey , Caruso, 2002).

Emotional intelligence

Seen from the perspective of applicability, emotional intelligence can provide numerous information in the environments where it is used. The assessment of IE can help in the field of human resources, in the field of organizational development, can also be used to assess the level of emotional functioning (Mayer, Salovey, Caruso, 2002). MSCEIT - Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer, Salovey, Caruso, 2002) allows the assessment of emotional intelligence from the perspective of the **four branches** model (Perceiving emotions, Facilitating thought, Understanding emotions, Managing emotions).

Recognition of nonverbal indicators of simulated/deceptive behavior - the degree of detection accuracy

Ekman (1985, 2001) makes the distinction between two important terms, deception and lie, terms that underlie his studies that concerned the behavior of the liar. Thus, deception is defined as an act or phenomenon that misleads someone, while lying is an act by which someone deliberately misleads another person and does so without informing the person that he or she will mislead. According to the multifactorial model of the lie (Zuckerman, DePaulo, & Rosenthal, 1981), the clues to simulated behaviors can be influenced by the presence of three factors: (1) emotional reactions; (2) cognitive effort; (3) behavioral control attempts. They can influence the nonverbal behavior of the mind and may emphasize a different aspect of the simulation so that elements of all three factors are found in the false behavior.

III.5.2 Research objectives and hypotheses

Objectives

The first objective is to identify differences in Emotional Intelligence (EI) between two categories of people with different levels of professional expertise in the penitentiary environment.

The second objective is to determine the level of accuracy of authentic / deceptive behavior detection based on the analysis of some of the videotaped situations encountered in the two categories of participants (novices and experts) and the possible association between Emotional Intelligence (IE) and the level of detection accuracy.

The third objective is to identify the level of self-perception (low / high ability) regarding the success of the choices made in the case of filmed situations, the self-perceived need for specialized training / training for the recognition / identification of emotions, the need for specialized training in the detection of deceptive / dishonest behavior and comparative analysis between two categories of persons with different levels of professional expertise in the penitentiary environment.

The fourth objective is the realization of a case study that consists of the multidimensional analysis of behavior (polygraph assessment and behavioral analysis) of a preventive arrested person in the context of the judicial investigation and initial psychological assessment in the penitentiary at the time of asking some questions regarding the identification of authentic / deceptive behavior,

This case study seeks to identify the deceptive behavior in the polygraph test, but also in the context of the initial psychological assessment, when similar questions are addressed that follow the degree of guilt of the alleged author of the offense. Physiological reactions to the relevant questions in the polygraph testing are compared, with the behavioral reactions to similar questions in the psychological assessment and it is desired to highlight the indicators of deceptive nonverbal behavior.

Hypotheses

- There are significant differences between the two categories of participants (experts and novices) at the Emotional Intelligence (IE) variable.
- There are significant differences between the two categories of participants (experts and novices) as the level of authentic / deceptive behavior detection accuracy based on the analysis of some videotaped situations.
- There will be an association between Emotional Intelligence (IE) and the level authentic / deceptive behavior detection accuracy

- There are significant differences between the two categories of participants (experts and novices) in the level of self-assessed accuracy in detecting deceptive behavior, the self-perceived need for specialized training for recognition / identification of emotions and the need for specialized training in the deceptive / dishonest behavior detection .

III.5.3 Research methodology

Design

In case of hypotheses 1 and 2 a quasi-experimental design is used.

In case of hypothesis 1, the independent variable is represented by the category of participants (experts and novices), while the dependent variable is the level of Emotional Intelligence (IE).

In case of hypothesis 2, the independent variable is represented by the category of participants (experts and novices), while the dependent variable is represented by the ability to recognize authentic / deceptive behaviors presented in filmed situations (three truth situations and three lies) - the detection accuracy.

For hypothesis 3, a correlational design is used. In this case, the independent variable is the level of Emotional Intelligence (IE), and the dependent variable is represented by the level of authentic / deceptive behavior detection accuracy.

In case of hypothesis 4, an explorational design is used. The independent variable is represented by the category of participants (experts and novices), while the dependent variables are the self-assessed degree of accuracy in detecting deceptive behavior, the need for specialized training / training for the recognition / identification of emotions and the need for specialized training in detecting deceptive/ dishonest behavior.

Participants

The participants in this study are divided into two categories: (1) **Experienced** agents and prison officers from the Arad Maximum Security Penitentiary (N = 34) aged 25-57 (M = 40.02, AS = 8.51); and (2) **novices**, pupils (future penitentiary agents) at Târgul Ocna School, Arad extension (N = 34), aged 18 to 31 (M = 21.55, AS = 3.43).

Participation in this study was conducted on a voluntary basis, based on the initial agreement of the National Administration of Penitentiaries (Annex 4), mentioning that the ethical norms were respected (Annex 7).

Instruments

1. Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (validated and adapted for the Romanian population by testcentral.ro)

MSCEIT performs Emotional Intelligence evaluation from the perspective of the four-branches model (Perceiving emotions, Facilitating thought, Understanding emotions, Managing emotions).

MSCEIT (Mayer, Salovey, & Caruso, 2002) comprises a total of 141 items, and about 30-45 minutes are required to complete the test. It can be applied from the age of 17 years. The test can be applied both individually and in groups, pencil-paper or online, and scoring is done online (Mayer, Salovey, & Caruso, 2002, apud Iliescu & Livinti 2011).

The minimum score is 50 and the maximum is 150. In this range, between the minimum and the maximum, MSCEIT scores the scores in 5 classes: (1) *improve* score between 50-70; (2) *consider developing* - scores between 70 and 90; (3) *competent* - score between 90 - 110; (4) *skilled* - score between 110 - 130; (5) *expert* - score between 130-150 (Mayer, Salovey, & Caruso, 2002, apud Iliescu & Livinti 2011).

The test was applied classically (pencil-paper method) and scoring was made online using the platform provided by the testcentral. For each participant, a personalized report was generated containing the results of the MSCEIT test, but also the qualitative interpretation of the results (Annex 8).

2. The questionnaire for identifying the degree of authentic / deceptive behavior detection accuracy based on the analysis of some recorded situations.

The questionnaire (Annex 9) contains demographic data (age, current work experience, time spent with people in custody, the category of people they have been working with), as well as questions related to: (1) self-perception of the skills regarding the identification of nonverbal indicators expressed by people in truth or lies; (2) needs analysis - the need to participate in any specialized training (recognition / identification of emotions); the answer to the two questions uses a 5-step Likert scale, from 1 (total disagreement) to 5 (total agreement); (3) potential nonverbal and verbal indicators identified and described by the respondent in order to support choices made as to truth or lies in the visualization of audio-video recordings with persons in custody.

3. Audio-video recordings of people in custody

For this study, audio-video recordings (fragments) of 3 people from previous studies on seductive behavior investigation (Study 2) and suicidal behavior investigation (Study 4) were used. Each record has two situations, of 3 participants, totaling 6 audio-video recordings of the detained persons:

1. *Recorded person number 1* - Audio-video recording 1 - True situation - Movie duration 22 sec. - Pre-trial detainee for murder, subsequently released; the court considered him innocent; the topic of the discussion - the way of committing the deed / the description of the deed.

2. *Recorded person number 1* - Audio-video recording 2 - True situation - Film duration 47 sec. - Participant preventively arrested for murder; the topic of the discussion - the way of committing the deed / the description of the deed.
3. *Recorded person number 2* - Recording 3 - true situation - movie duration 38 seconds - participant convicted definitively for murder; committed the third suicide attempt approximately two weeks after the psychological assessment, initially stating that he will not do so; topic of discussion - description of the idea of suicide.
4. *Recorded person number 2* - Recording 4 - Lying situation - Movie duration 22 sec. - participant convicted definitively for murder; the topic of the discussion - the denial of the idea of suicide.
5. *Recorded person 3* - Registration 5 - Lying situation - Movie duration 13 sec. - Participant preventively arrested for qualified murder, subsequently convicted; the court judged him to be guilty; the topic of the discussion - denial of the act / way of committing the deed / description of the deed.
6. *Recorded person* 3 - Recording 6 - Lying situation - Movie duration 16 sec. - Participant preventively arrested for qualified murder; topic of discussion - denial of deed / exculpation.

The certainty of the concealed behaviors in the case of the audio-video recordings of the detained persons is given by the fact that:

- Record number 3 and 4: In the case of a person who attempted to commit suicide for the third time, approximately 14 days after the initial psychological assessment - these facts might support the idea that at the time of the registration the person in custody could hide the desire to commit suicide (see Study 4);
- Record number 5 and 6: In the case of a pre-trial detainee for murder, this detainee did not pass the polygraph test, lied about his deeds, which contributed to his conviction for 15 years of detention. Another important criterion for selecting this record is the similarity of the questions addressed in the initial psychological assessment, in the pre-test and post-test interviews, as well as in the moments of the polygraph assessment.

Used equipment
An Epson video projector, a pair of audio speakers and a 3567, i5 Dell Inspiron Laptop have been used to project audio-video recordings.

Procedure
For the conduct of this study, the National Administration of Penitentiaries consent (Annex 4) was needed.
In the case of the novice category, the emotional intelligence measurement test - MSCEIT (Mayer, Salovey, Caruso, 2002) was applied in the group (8 participants) by the penitentiary psychologist. Questionnaires and audio-video recordings were applied in groups (17 and 18 participants respectively).
In the case of audio-video recordings, the method of application was as follows: (1) the recordings were played in turn, in the order specified above, (2) each record was played twice as follows: (a) for the first play the truth or the lie was chosen; (b) For the second play, the elements of the nonverbal or verbal behavior (communication-specific indicators) that were the basis of the decisions of the first play were listed.
In total, each participant watched the audio-video material 12 times: 3 people recorded X 2 situations (truth / lie and / or truth / lie) X 2 plays / situation (there were specific communication indicators).
The activity took place at the Center for Training and Specialization of Officers - Arad, the participation of the subjects was based on voluntary and informed consent. Data collection took place between January and April 2017.
For the category of experts, the Emotional Intelligence Level Test - MSCEIT (Mayer, Salovey, Caruso, 2002) was applied in the group (5-8 participants) by the psychologist in the penitentiary. Questionnaires and audio-video recordings (followed the same steps as for novices) were applied in the group (5-8 participants).
The activity was carried out within the Arad Maximum Security Penitentiary (training room). The selection of the participants was done on a voluntary basis and took into account the age of each participant in the system for joining the two groups. For inclusion in the category of experts, over one year work place experience was taken into account, and the participants who were in the novice category had to have up to three months of experience at the workplace. The testing and subsequent viewing of the audio-video recordings with the detained persons for both groups of participants took place between February and May 2017.

III.5.4 Results
Hypothesis 1: There are significant differences between the two categories of participants (experts and novices) at the Emotional Intelligence (IE) variable.
In the first phase, the total number of participants in this study was 70, but due to the fact that two participants (one in each category) failed to complete all the answers to the tools used, the number used in the statistical analyzes was of (N = 68), of which novices (N = 34) and experts (N = 34).

The collected data were entered into the SPSS program (version 19), then descriptive statistics for the groups of novices and experts were performed, with the means and standard deviations for each group being presented in Table 15.

Table 15: Mean and standard deviation for novices (N = 34) and experts (N = 34) for the age and years in the system variables.

Years in the system and Age

Participants		N	Minimum	Maximum	Mean	Standard Deviation
Novices	Years in the system	34	0.30	0.30	.3000	.00000
	Age	34	18.00	31.00	21.5588	3.43944
	Total	34				
Experts	Years in the system	34	1.00	24.00	12.8529	6.98541
	Age	34	25.00	57.00	40.0294	8.51197
	Total	34				

The statistical analysis was performed using the SPSS program, version 19, more specifically the *t* test for independent samples according means and standard deviations for the measured subscales. The significance level was set at p = .05.

Table 16. Means and standard deviations for the total scores on the Emotional Intelligence subscale by groups (novices and experts).

	Participants	N	Mean	Standard Deviation
Total score	Novices	34	101.7647	11.01255
	Experts	34	98.9118	13.09723
Perceiving Emotions	Novices	34	104.8529	9.47447
	Experts	34	97.8824	15.09117
Using Emotions	Novices	34	99.3824	12.24501
	Experts	34	99.7941	14.83399
Understanding Emotions	Novices	34	98.6471	10.48486
	Experts	34	99.1176	10.21219
Managing Emotions	Novices	34	105.4118	11.14401
	Experts	34	101.9706	12.41818
Faces	Novices	34	100.8824	13.13050
	Experts	34	98.2647	13.44643
Pictures	Novices	34	104.3824	8.70045
	Experts	34	97.2059	15.07713
Sensations	Novices	34	116.0000	18.24580
	Experts	34	116.2941	20.57437
Facilitation	Novices	34	91.3529	19.20051
	Experts	34	88.7353	9.68694
Blends	Novices	34	93.7059	12.54695
	Experts	34	93.0588	8.97451
Changes	Novices	34	103.0000	11.88072
	Experts	34	104.6765	14.61780
Emotions Management	Novices	34	106.1471	12.80656
	Experts	34	102.5882	10.79876
Relationships Management	Novices	34	103.2059	9.67590
	Experts	34	100.9118	13.28788

As we can see, there were no significant differences in the means between the two categories of participants. Significant means identified in this case are at the *Perceiving Emotions* and *Pictures* subscale (Table 16).

In order to verify whether there are significant differences between the novice group and the experts at the level of Emotional Intelligence, the t test for independent samples was performed. The results of the t test for independent samples are shown in Table 17.

Table 17. The t test for means equality for the two categories of participants (novices and experts) at the level of Emotional Intelligence.

	t	Degrees of freedom	Level of significance (2-tailed)	Means difference
Perceiving Emotions	2.281	66	**.026**	6.97059
Pictures	2.404	66	**.019**	7.17647
Total score	.972	66	.335	2.85294

As shown in Table 17, between the two categories (novice and experts), statistically significant differences were found in Emotional Intelligence scores, on Perceiving Emotions Scale in the case of novices (N = 34, M = 104.8529, AS = 9.47447) are significantly higher t (66) = 2.281, p bidirectional = .026, than those in the category of experts (N = 34, M = 97.8824, AS = 15.09117) , but also on the Pictures subscale, in the case of novices (N=34, M = 104.3824, AS = 8.70045), are significantly higher t (66) = 2.404, p bidirectional = .019, than the experts (N = 34, M = 97.2059, AS = 15.07713).

No other statistically significant differences in Emotional Intelligence were found in the scales: Total Score, t (66) = .972; p bidirectional = .335; Using Emotions, t (66) = -125; p bidirectional = .901; Understanding Emotions, t (66) = -187; p bidirectional = .852; Emotions Management, t (66) = 1.203; p bidirectional = .233; Faces, t (66) = .812; p bidirectional = .420; Sensations, t (66) = -0.062; p bidirectional = .950; Facilitation, t (66) = .710; p bidirectional = .480; Blends, t (66) = .245; p bidirectional = .808; Changes, t (66) = -.519; p bidirectional = .606; Emotions Management, t (66) = 1.239; p bidirectional = .220; Relationships Management, t (66) = .814; p bidirectional = .419.
These results indicate similarities due to the low number of significant differences in the EQ scale, which may indicate that the psychological profile of the participants is not very different.

Hypothesis 2: There are significant differences between the two categories of participants (experts and novices) in terms of the level of accuracy in authentic / deceptive behavior detection based on the analysis of some filmed situations.

In order to calculate the level of accuracy in authentic / deceptive behavior detection based on recorded situations, the records were encoded binary (1 = correct identification of authentic / deceptive behavior, 0 = incorrect identification of authentic / deceptive behavior). The next step was to create a new variable, namely **the accuracy of authentic / deceptive behavior detection.** This variable is built based on the cumulative frequencies that target the detection accuracy of the six records (filmed situations). A similar procedure was also used by Mann, Vrij & Bull (2004).
It was aimed for the identification of the authentic/deceptive behavior detection accuracy at the global level, that is, at the level of the six filmed situations with detainees (three truthful situations and three lies) presented to the participants. For every correct identification of the filmed situations a point was given, the minimum score being 1 and the maximum being 6. Afterwards, each situation was analyzed in part. Following the results of this new variable (the accuracy of the authentic / deceptive behavior detection), the analysis of data for the two groups of participants (novices and experts) was carried out (for more statistical information see Annex 10 C). Statistical analysis was carried out using the SPSS program, version 19, more precisely, the frequency analysis of the accuracy in authentic / deceptive behavior detection variable was performed by the Split File method for the two categories of participants (Table 18). Frequency analysis is used to identify the distribution of scores for a certain variable (Howit & Cramer, 2010).
Table 18. The frequencies for the correct identification of the recordings for the two categories of participants (novices and experts) at the level of the six situations with persons in custody.

Detection accuracy (correct identifications/ recordings number)

Participants	**Correct identifications score**	Frequencies (Subjects nr.)	Percentage	Valid percentage	Cumulated percentage
Novices	**1**	1	2.9	2.9	2.9
	2	4	11.8	11.8	14.7
	3	**14**	**41.2**	41.2	55.9
	4	**11**	**32.4**	32.4	88.2
	5	3	8.8	8.8	97.1
	6	1	2.9	2.9	100.0
	Total	34	100.0	100.0	
Experts	**2**	4	11.8	11.8	11.8
	3	**10**	**29.4**	29.4	41.2
	4	**13**	**38.2**	38.2	79.4
	5	6	17.6	17.6	97.1
	6	1	2.9	2.9	100.0
	Total	34	100.0	100.0	

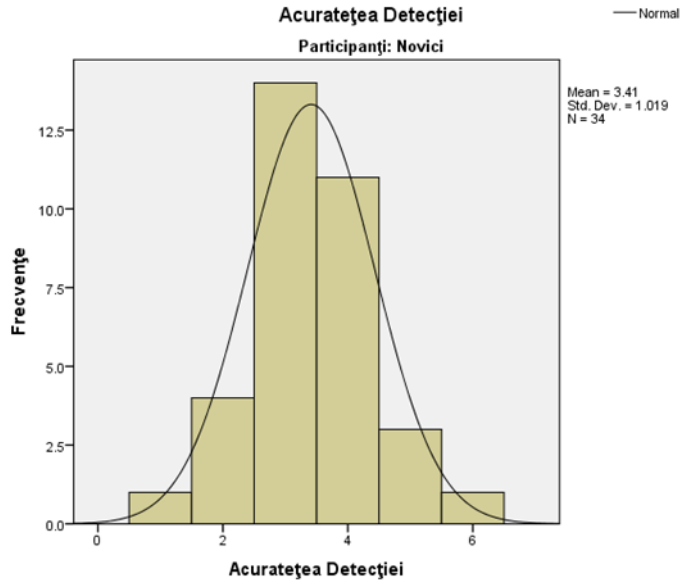


Figure 29. The graphical representation of the correct identifications (detection accuracy) of the six recorded situations with detained persons in the category of novices.

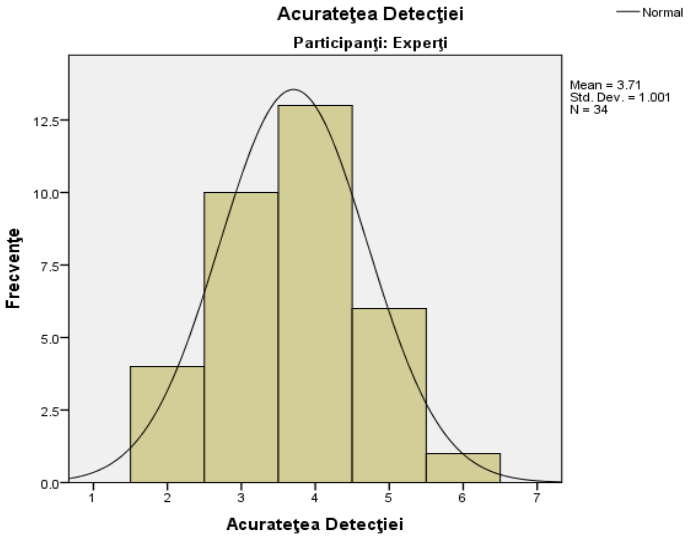


Figure 30. Graphical representation of the correct identifications (detection accuracy) of the six recorded situations with detained persons in the category of experts.

As shown in Table 18, the frequencies for the number of participants who correctly identified as many of the filmed situations with detained persons as possible (the lie situation was identified by the participants as a lie, and the truth situation was identified by the participants as a situation of truth) are not very high if they are related to the total number of possible recognitions (six possible correct recognitions).

For the 68 participants, the total number of possible correct recognitions should have been 408. For the two categories of participants, 242 correct admissions were recorded (Table 19).

Table 19. Total number of correct identifications for the two categories of participants (novices and experts) at the level of the six recorded situations with detained persons.

	N	Minimum	Maximum	**Total correct identifications**	Mean
Detection Accuracy	68	1	6	**242**	3.56

The total amount of correct recognitions (242) represents 59.31% of the total amount of 408 possible correct recognitions for both groups of participants.

If you consider the possibility that the correctly identified elections are based on the chance variable, then more than 50% of the total election could be influenced by the chance. In this respect, the binomial test was carried out to identify whether there is meaning in relation to the 50% chance.

Table 20. Significance of the binomial test for the level of significance in relation to the 50% chance, in the case of the accuracy of the detection.

Binomial Test						
		Category	N	Observed proportion	Specified proportion	Level of significance (2-tailed)
Detection accuracy	Group 1	<= 3	33	.49	.50	.904
	Group 2	> 3	35	.51		
	Total		68	1.00		

The binomial test is not significant, the significance level is greater than 0.05. The proportion observed in the sample for group 1 (correct answers less than 3) is 49% and does not differ significantly (p = .904, n = 68) from the proportion observed in the sample for group 2 (correct answers greater than 3) at a specified proportion of 50%.

The next step in this study was to identify the accuracy of authentic / deceptive behavior detection according to each situation (as described in point 3 - *Audio-Video Instruments*). The statistical analysis was performed using the SPSS program, version 19, more precisely, the analysis of the frequency of the variable accuracy of the detection of authentic / deceptive behavior was performed by the Split File method, for the six situations recorded with detained persons:

1. Situation 1 - Film1 Truth (A1);
2. Situation 2 - Film 1 Truth (A2);
3. Situation 3 - Film 2 Truth (A3);
4. Situation 4 - Film 2 Lie (M4);
5. Situation 5 - Film 3 Lie (M5);
6. Situation 6 - Film 3 Lie (M6).

Table 21. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 1 - Film1 Truth (A1);					
Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	Incorrect identification	22	64.7	64.7	64.7
	Correct identification	**12**	**35.3**	35.3	100.0
	Total	34	100.0	100.0	
Experts	Incorrect identification	27	79.4	79.4	79.4
	Correct identification	**7**	**20.6**	20.6	100.0
	Total	34	100.0	100.0	

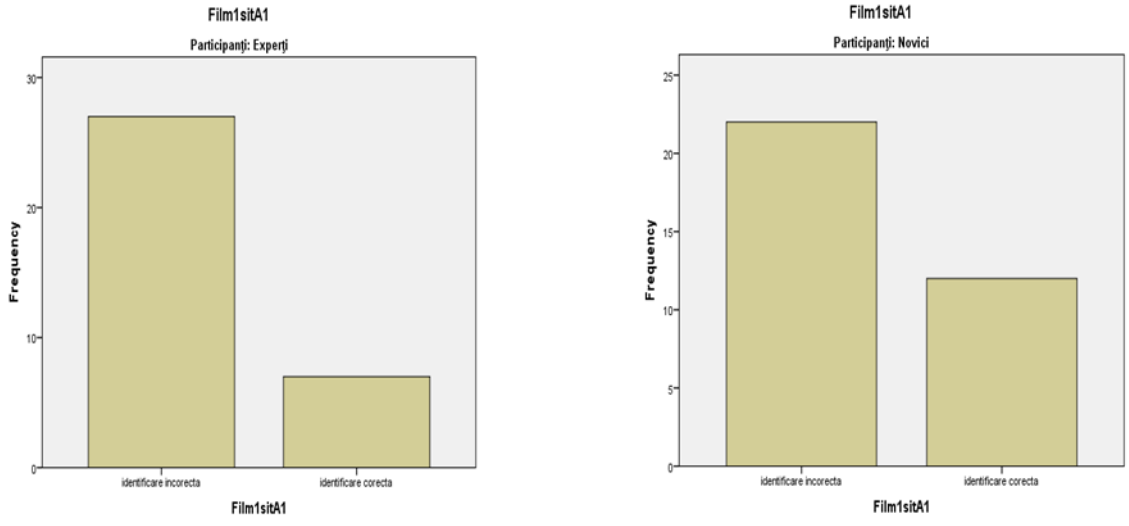


Figure 31. Graphic representation of correct / incorrect identifications for Situation 1 - Movie 1 Truth (A1) for the two categories of participants (novices and experts).

Individual 1 - Situation 1 - Film 1 Truth (A1) - Movie duration 22 sec. – the person is preventively arrested for murder, subsequently released; the court considered him innocent; the topic of the discussion - the way of committing the deed /

the description of the deed. In the case Situation 1 - Film1 Truth (A1), success rates for identifying authentic behavior are very small for both categories (novices and experts) (Table 21).

Table 22. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 2 - Film 1 Truth (A2)

Participants				Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices		Incorrect identification		24	70.6	70.6	70.6
		Correct identification		**10**	**29.4**	29.4	100.0
		Total		34	100.0	100.0	
Experts	Incorrect identification	19	55.9	55.9		55.9	
	Correct identification	**15**	**44.1**	44.1		100.0	
	Total	34	100.0	100.0			

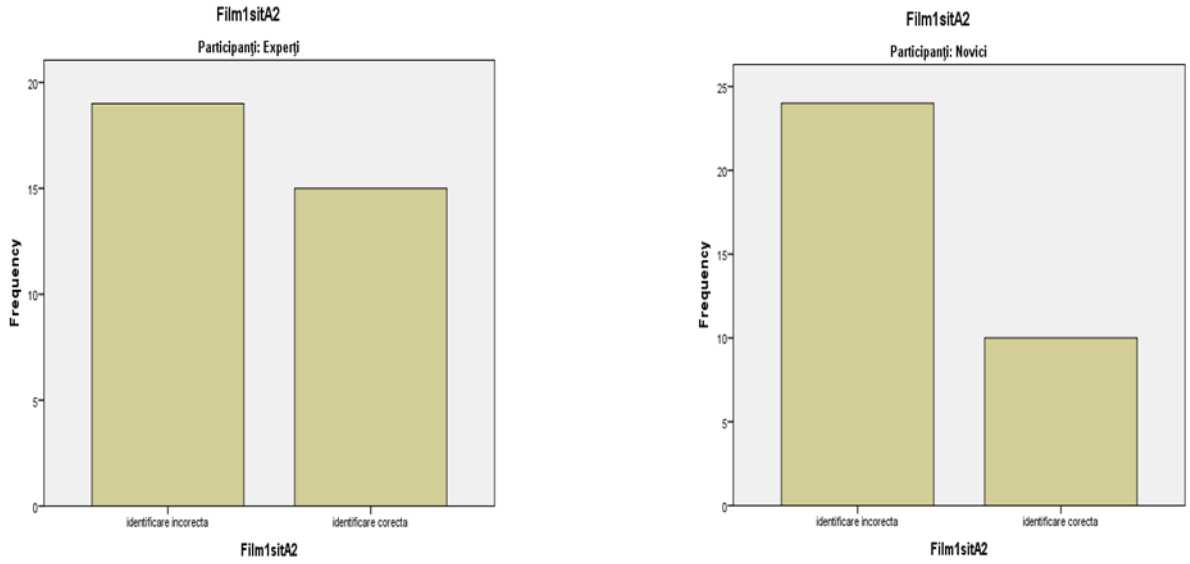


Figure 32. Graphic representation of correct / incorrect identifications for Situation 2 - Film 1 Truth (A2) for the two categories of participants (novices and experts).

Individual 1 - Situation 2 - Film 1 Truth (A2) - Movie duration 47 sec. – the person is preventively arrested for murder, subsequently released; the court considered him innocent; the topic of the discussion - the way of committing the deed / the description of the deed. For Situation 2 - Film 1 Truth (A2), the percentages of success in identifying authentic behavior are very low for the category of novices, and for the category of experts they are much higher than in previous elections (Table 22).

Table 23. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 3 - Film 2 Truth (A3)

Participants				Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	Incorrect identification	17	50.0	50.0	50.0		
	Correct identification	**17**	**50.0**	50.0	100.0		
	Total	34	100.0	100.0			
Experts	Incorrect identification	12	35.3	35.3	35.3		
	Correct identification	**22**	**64.7**	64.7	100.0		
	Total	34	100.0	100.0			

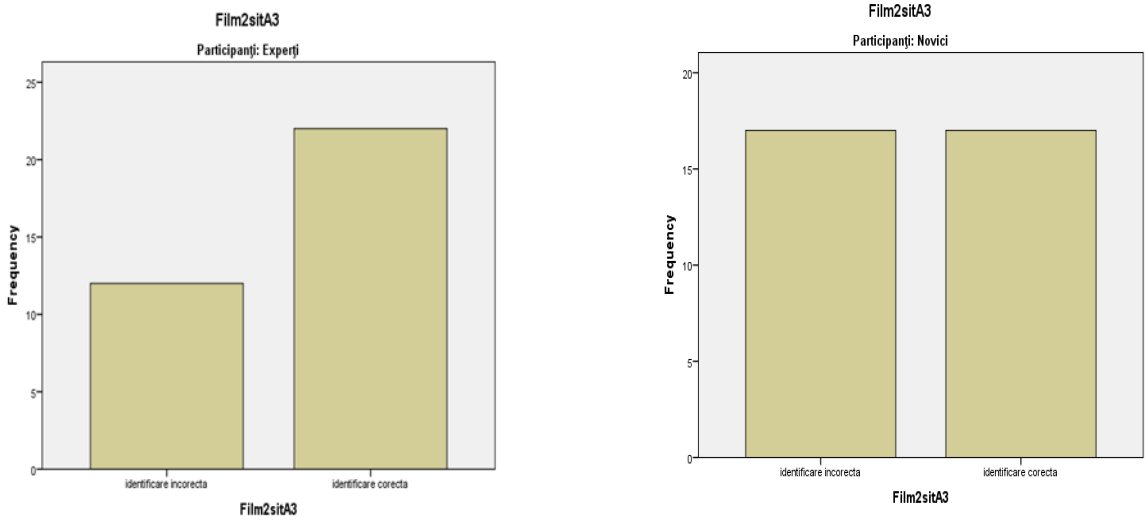


Figure 33. Graphic representation of correct / incorrect identifications for Situation 3 - Film 2 Truth (A3) for the two categories of participants (novices and experts).

Individual 2 - Situation 3 - Film 2 Truth (A3) - Movie duration 38 sec. – the person is definitively convicted of murder; committed the third attempt of suicide after the psychological assessment, initially stating that she will not do so; topic of discussion - description of suicidal antecedents. In the case of Situation 3 - Film 2 Truth (A3), the percentages of success in identifying authentic behavior are much higher in both categories compared to previous elections (Table 23).

Table 24. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 4 - Film 2 Lie (M4)

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	Incorrect identification	15	44.1	44.1	44.1
	Correct identification	**19**	**55.9**	55.9	100.0
	Total	34	100.0	100.0	
Experts	Incorrect identification	12	35.3	35.3	35.3
	Correct identification	**22**	**64.7**	64.7	100.0
	Total	34	100.0	100.0	

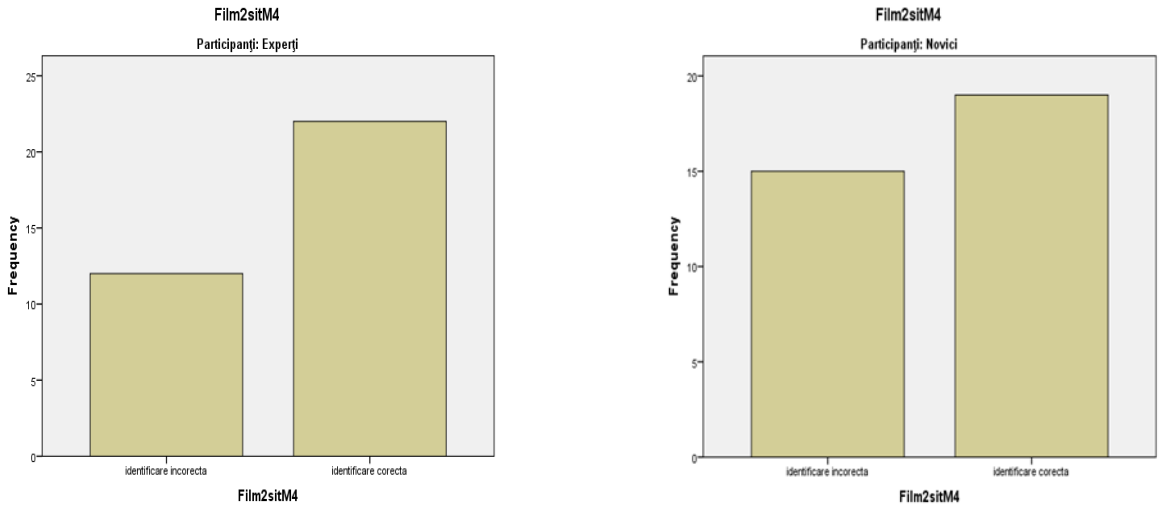


Figure 34. Graphic representation of correct / incorrect identifications for Situation 4 - Film 2 Lie (M4) for the two categories of participants (novices and experts).

Individual 2 - Situation 4 - Film 2 Lie (M4) - Movie duration 22 sec. – – the person is definitively convicted of murder; committed the third attempt of suicide after the psychological assessment, initially stating that she will not do so; topic of discussion the denial of the idea of suicide.. For Situation 4 - Film 2 Lie (M4), the percentages of success in identifying disguised behavior are much higher in both categories than previous elections (Table 24). Let us mention that this is the first situation in which the deceptive behavior appears.

Table 25. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 5 - Film 3 Lie (M5);

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	Incorrect identification	2	5.9	5.9	5.9
	Correct identification	**32**	**94.1**	94.1	100.0
	Total	34	100.0	100.0	
Experts	Incorrect identification	2	5.9	5.9	5.9
	Correct identification	**32**	**94.1**	94.1	100.0
	Total	34	100.0	100.0	

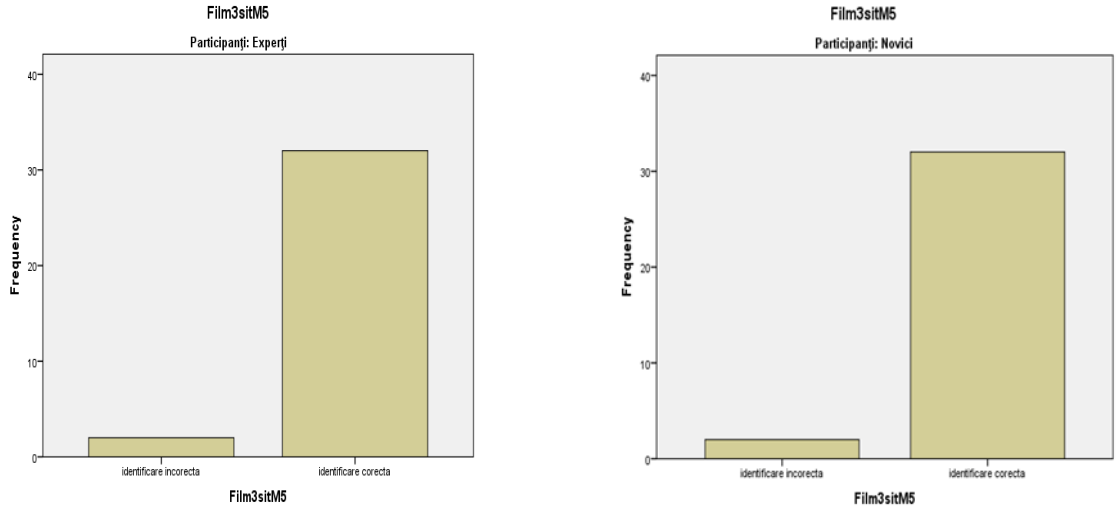


Figure 35. Graphic representation of correct / incorrect identifications for Situation 5 - Film 3 Lie (M5); for the two categories of participants (novices and experts).

Individual 3 - Situation 5 - Film 3 Lie (M5) - Movie duration 13 sec. – the person is preventively arrested for murder; later on further convicted; the court judged him to be guilty; the topic of the discussion - denial of the act / way of committing the deed / description of the deed. For Situation 5 - Film 3 Lie (M5), the percentages of success in identifying deceptive behavior are significantly higher. Only two cases in each category failed to correctly identify the concealed behavior (Table 25).

Table 26. Frequencies of correct identifications of recordings for the two categories of participants (novices and experts) depending on the situation with the persons in custody.

Situation 6 - Film 3 Lie (M6).

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	Incorrect identification	9	26.5	26.5	26.5
	Correct identification	**25**	**73.5**	73.5	100.0
	Total	34	100.0	100.0	
Experts	Incorrect identification	7	20.6	20.6	20.6
	Correct identification	**27**	**79.4**	79.4	100.0
	Total	34	100.0	100.0	

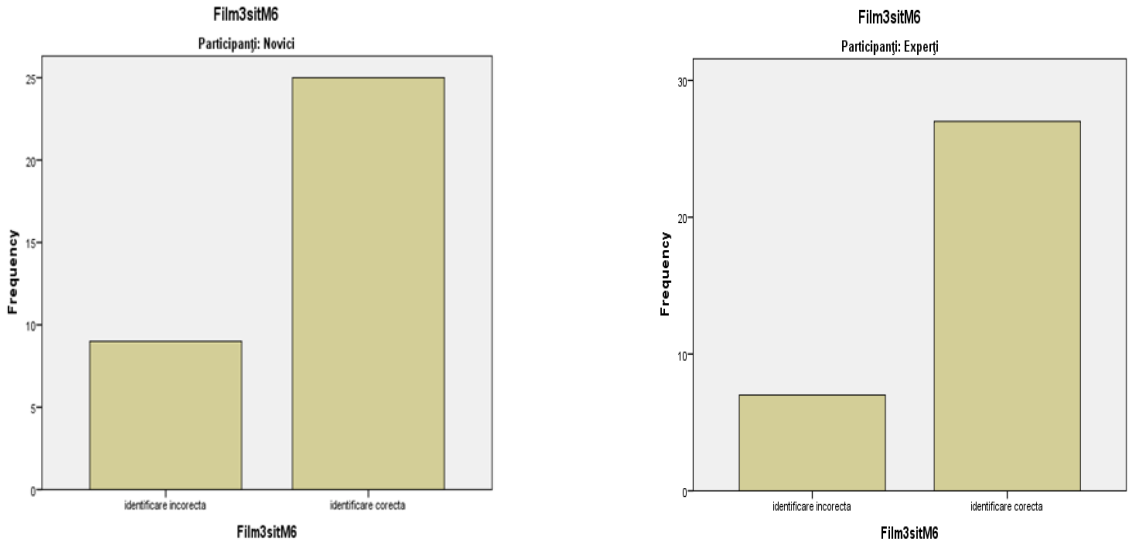


Figure 36. Graphic representation of correct / incorrect identifications for Situation 6 - Film 3 Lie (M6) for the two categories of participants (novices and experts).

Individual 3 - Situation 6 - Film 3 Lie (M6) - movie duration 16 sec. - the person is preventively arrested for murder; later on further convicted; the court judged him to be guilty; the topic of the discussion - denial of the act /exculpation. In the case of Situation 6 - Film 3 Lie (M6), the percentages of success with regard to the identification of deceptive behavior (Table 26) are lower than in Situation 5 (Table 25) and higher than in Situation 4 (Table 24). It is highlighted that election scores aimed at identifying deceptive behavior are higher compared to choices concerning authentic behavior (Table 21, Table 22, Table 23).

The next step in this study was the t test for independent samples to identify possible differences between the mean of the two groups (novices and experts) at the level of authentic / deceptive behavior detection accuracy based on the analysis of some filmed situations.

The results obtained are not statistically significant t (66) = -1.201, p bidirectional = .234 NS (for more statistical details see Annex 10 N, O).

Hypothesis 3: We anticipate an association between emotional intelligence (IE) and the level of authentic / deceptive behavior detection accuracy.

We also calculated possible correlations at the level of existing variables (Emotional Intelligence and Detection Accuracy), but no statistically significant correlations were reported in this case (r = -.023, n = 68, p> 0.01) (Annex 10 P).

Taking into account that no significant correlations have been identified to explain the possible relationships between the measured variables, the Population Pyramid function in the SPSS program - version 19 was used to better elucidate the possible effects of the Emotional Intelligence scores obtained by the two categories, in relation to the accuracy, and the effects of the age in relation to the accuracy.

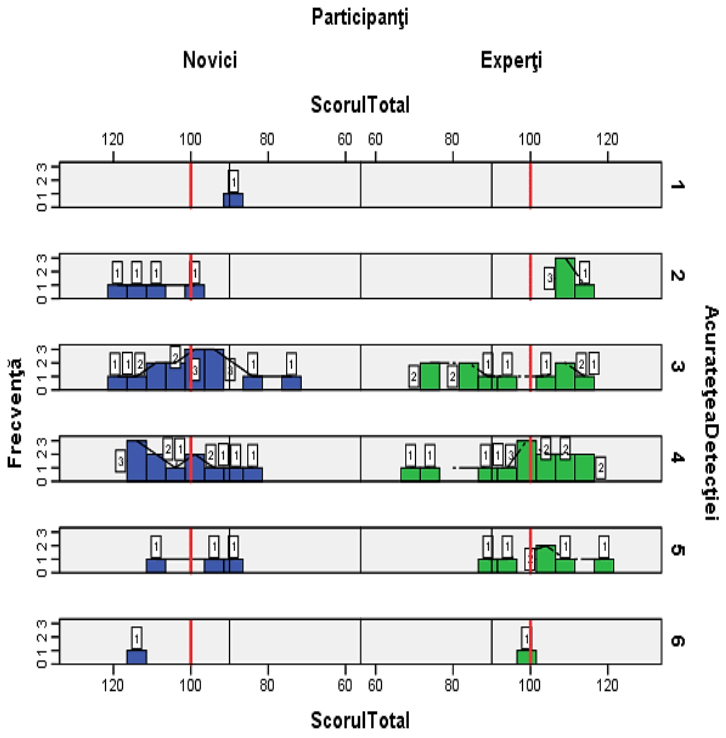


Figure 37. Distribution and Frequency of Participants Based on Total scores on the Emotion Intelligence Tests (Experts N = 34, M = 98.9118; Novices N = 34, M = 101.7647) vs. Number of Identifications of Authentic /Deceptive Behavior (accuracy of detection) (experts - M = 3.71, novices - M = 3.41). The red axis at 100 is the Competent score range in the MSCEIT Emotional Intelligence Test.

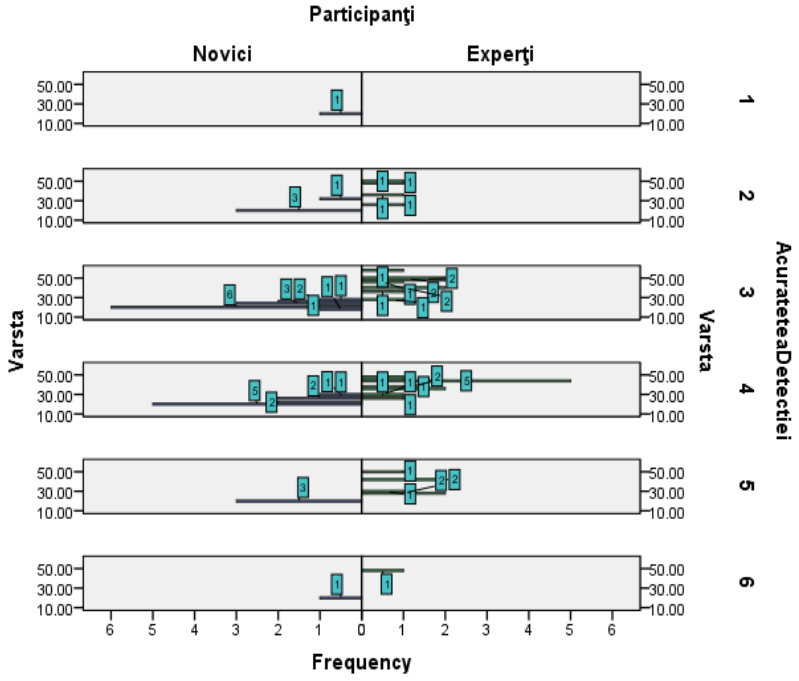


Figure 38. Distribution and frequency of participants by age level (experts - N = 34, M = 40.0294, novices-N = 34, M = 21.5588) versus Number of Identifications of Authentic /Deceptive Behavior (accuracy of detection) (experts - M = 3.71, novices - M = 3.41).

Hypothesis 4: There are significant differences between the two categories of participants (experts and novices) in the level of self-assessment of the degree of accuracy in detecting deceptive behavior, self-perceived need for specialized training for recognition / identification of emotions and the need for specialized training in detecting deceptive/ dishonest behavior.

In the case of the self-assessment of the degree of accuracy in detecting the deceptive behavior, *only recordings with deceptive (dishonest) behavior* (ie recordings 4, 5 and 6) were targeted.
Statistical analysis was performed using the SPSS program, version 19, more specifically the t test for independent samples taking into account these variables (for more statistical details see Annex 10 Q, R).
Table 27 presents the means and standard deviations for the measured variables. The significance level was set at p = .05.
Table 27. Means and standard deviations for total scores *in the self-assessment of the degree of accuracy in the detection of deceptive behavior, the need for specialized training for the recognition / identification of emotions and specialized training for detecting deceptive / dishonest behavior*, depending on the groups (novices and experts).

	Participants	N	Mean	Standard deviation
Deceptive behavior identification	Novices	34	3.8824	.68599
	Experts	34	4.0000	.65134
Emotional recognition training	Novices	34	**4.0000**	.81650
	Experts	34	**3.4706**	1.07971
Deceptive behavior detection training	Novices	34	3.8824	.84440
	Experts	34	3.5294	1.23669

Between the two categories of participants (novices and experts) statistically significant differences were found only in the scores for the dimension - *emotional recognition training*, in the case of novices (N = 34, M = 4.0000, AS = .81650), they are significantly higher t (66) = 2.280, p bidirectional = .026, than those in the expert category (N = 34, M = 3.4706, AS = 1.07971).
For a clearer overview, using the SPSS program, version 19, the frequency analysis of the above mentioned variables was also performed using the Split File method for the two categories of participants. Frequency analysis is used to identify the distribution of scores for a certain variable (Howit & Cramer, 2010).
Table 28. Frequencies for self-assessment of accuracy in detecting deceptive behavior in video recordings (Situations 4, 5 and 6) for the two categories of participants (novices and experts).

Self-assessment of accuracy in detecting deceptive behavior

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	disagreement	1	2.9	2.9	2.9
	indifference	7	20.6	20.6	23.5
	agreement	**21**	**61.8**	61.8	85.3
	total agreement	**5**	**14.7**	14.7	100.0
	Total	34	100.0	100.0	
Experts	disagreement	1	2.9	2.9	2.9
	indifference	4	11.8	11.8	14.7
	agreement	**23**	**67.6**	67.6	82.4
	total agreement	**6**	**17.6**	17.6	100.0
	Total	34	100.0	100.0	

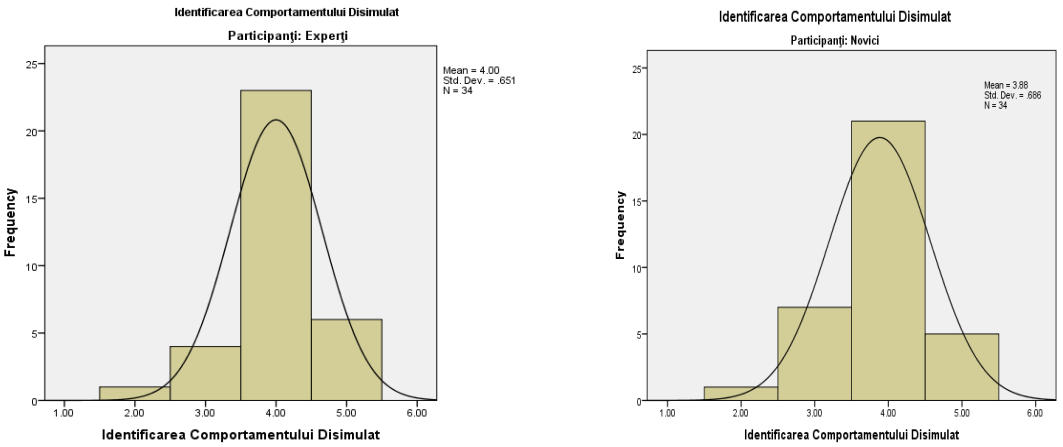


Figure 39. Graphic representation of the self-evaluated accuracy degree in detecting the concealed behavior in video recordings (Situations 4, 5 and 6) for the two groups of participants.

Table 29. Frequencies for the need for specialized training for recognizing / identifying emotions for the two categories of participants (novices and experts).

Emotional recognition training

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	disagreement	2	5.9	5.9	5.9
	indifference	5	14.7	14.7	20.6
	agreement	**18**	**52.9**	52.9	73.5
	total agreement	**9**	**26.5**	26.5	100.0
	Total	34	100.0	100.0	
Experts	disagreement	2	5.9	5.9	5.9
	indifference	5	14.7	14.7	20.6
	agreement	6	17.6	17.6	38.2
	total agreement	**17**	**50.0**	50.0	88.2
	Total	**4**	**11.8**	11.8	100.0
	disagreement	34	100.0	100.0	

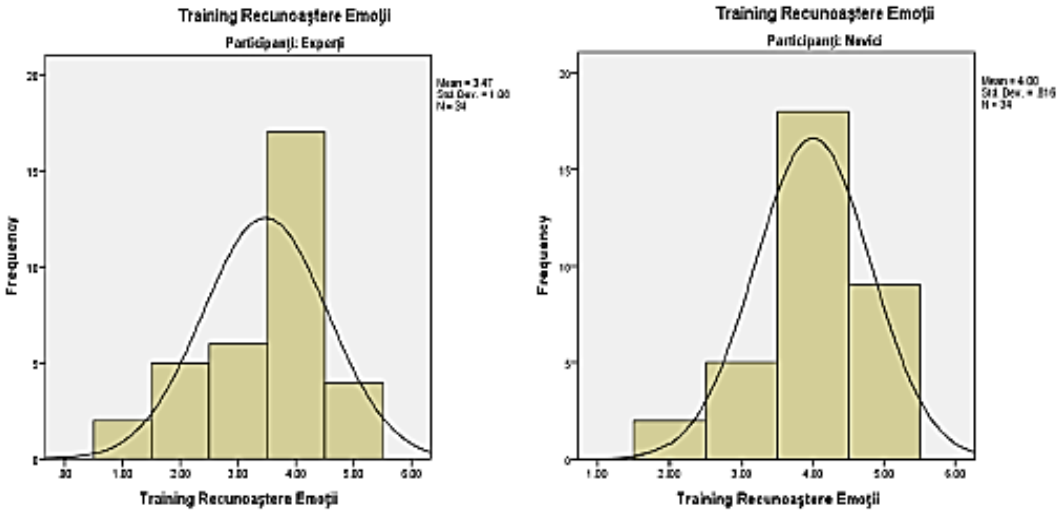


Figure 40. Graphical representation of values for the expressed need for participation in the training of emotion recognition for the two groups of participants.

Table 30. Frequencies for the expressed need by for specialized training in detecting deceptive / dishonest behavior in the two categories of participants (novice and experts).

Deceptive behavior detection training

Participants		Frequencies	Percentage	Valid percentage	Cumulated percentage
Novices	disagreement	2	5.9	5.9	5.9
	indifference	8	23.5	23.5	29.4
	agreement	**16**	**47.1**	47.1	76.5
	total agreement	**8**	**23.5**	23.5	100.0
	Total	34	100.0	100.0	
Experts	disagreement	4	11.8	11.8	11.8
	indifference	3	8.8	8.8	20.6
	agreement	4	11.8	11.8	32.4
	total agreement	**17**	**50.0**	50.0	82.4
	Total	**6**	**17.6**	17.6	100.0
	disagreement	34	100.0	100.0	

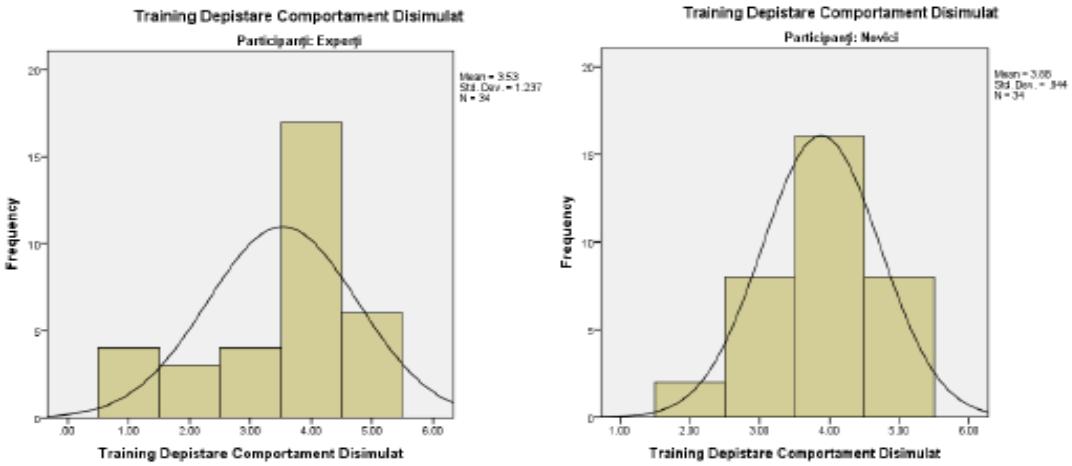


Figure 41. Graphical representation of values for the expressed need for specialized training in detecting deceptive / dishonest behavior for the two groups of participants.

III.5.5 Discussions and conclusions

The hypotheses of this study were partially confirmed. In this regard, the first hypothesis of this study proposed to identify the differences between the two groups of participants (novices and experts) at the level of Emotional Intelligence. Significant statistical differences were noted at the Perceiving emotions and Pictures scales, in the case of novices, they are significantly higher than those in the category of experts

The second hypothesis of the study was not confirmed. It was focused on highlighting the differences between participants (novices and experts) at the level of authentic / deceptive behavior detection accuracy based on the analysis of some filmed situations. The number of people who have managed to make the right choices is rather low. If these results are related to the total number of possible correct identifications (regardless of the situation: correctly identifies the truth, correctly identifies the lie) and considering the possibility that the correctly identified elections are based on the variable chance, then more than 50% total choices may be influenced by chance. The binomial test is not statistically significant, the significance level being greater than 0.05. The specialized literature reminds that accuracy in detecting deceptive behavior was very rarely more than 60%, and in some groups much lower values were recorded (Zuckerman,

DePaulo, & Rosenthal, 1981). In the present study, the total amount of correct recognitions represents 59.31% of the total amount of 408 possible correct recognitions for both groups of participants.
From the perspective of a more detailed analysis of the authentic / deceptive behaviors identification accuracy, it can be observed that for the first three situations where identification of authentic behavior is concerned, the two groups of participants (novices and experts) score very poor results. An important element to which Ekman refers (2009) is the error in detecting the lie.
The specialized literature classifies the errors in detecting the lie in two categories (Ekman, 2009): (1) *The Brokaw hazard* - which refers to the inability to take into account individual differences (the possibility of wrong judging others) and (2) *The Othello error* - defined as being incapable of identifying those who say the truth, but who are suspected of lying. In the present case, it seems that the two errors (Brokaw Hazard and Othello Error) greatly influence the decisions of the participants in the first three situations, the truths. For the following three situations, the lie, the results for these two categories of participants (novice and experts), compared to the first three truth situations, are very different, meaning the participants record significantly higher values in the frequencies (Table 24, 25, 26).
Vrij (2012) recalls that both lying and truth-telling people can express emotion, mental effort, or behavioral control. These indicators may be visible when someone conceals the truth (lies 4, 5 and 6) or when he is afraid he will not be believed (truths 1, 2 and 3).
In order to provide a clearer picture of this study, it was highlighted the distribution of Emotional Intelligence scores and the age level, both in relation to the degree of accuracy.
Even if the mean values in the total score for the two categories (novices and experts) in the Emotional Intelligence test fall into the Competent category, it seems that this variable does not influence the results in this study. The same applies to the age variable. A possible variable that could have influenced the results when identifying deceptive behavior is that the detainee in situations 5 and 6 is of Roma origin.
In case of hypothesis three, this was partially confirmed and statistically significant differences were only found in scores regarding the *emotion recognition training* dimension, in the case of novices it is significantly higher than those in the category of experts. More than half of the participants (novice and experts) in this study agree / totally agree that they *can easily identify the dishonest behavior* of detainees, with a percentage of success for lies standing between 50% and 94%. As in the previous case, participants (novice and experts) who feel they need training for the recognition of emotions represent more than 50%, a percentage that can be perceived as a conscious need for the proper performance of penitentiary activity in the workplace with the detainees. With regard to the need for *training to detect deceptive behavior*, the percentage is more than 50% for the two groups of participants (novice and experts).
In conclusion, it can be said that the needs for continuing training in the acquisition of new skills and abilities are quite large for both categories of participants in this study. In the future, specialized trainings with this category (penitentiary agents) can be carried out on topics such as: identifying authentic / concealed behaviors, emotion recognition, emotion management, etc.
Firstly, this study investigates the differences between the two categories of participants (novices and experts) across several variables: Emotional Intelligence, the degree of accuracy in identifying authentic / deceptive behaviors, self-perception of the degree of accuracy in identifying deceptive behaviors, as well as the continuous training needs for the various abilities, skills, necessary for the penitentiary staff to work with the detainees. The fact that no very large differences between the two categories were found in the Emotional Intelligence "Total Score" variable can be perceived as an issue that refers to the abilities held (the values of the total scores in the case of novices) as well as abilities possibly developed during the professional activity (the values of the total scores for the experts). These aspects can be perceived as a positive element that certifies the professional quality of prison officers. It should be emphasized that the results of the two categories (novices and experts) on the *Perceiving emotions* and *Pictures scales*, even if they are statistically significant (Table 3), these results are framed according to the evaluation report in the Competent category, i.e. the participants are aware of the emotions of others and theirs, can communicate, identify and transmit emotions, associate emotions with the environment and have a good analytical capacity. These issues have been identified by some authors (Rice, 1999, apud Iliescu & Livinti 2011).
The prison environment is a special one, and the way in which penitentiary agents manage to cope with day-to-day challenges is also due to personal abilities. The way of interaction between prison officers and detained persons can also be found in Smith's (1982) theory of evolutionary strategies of competition, if the climate is analyzed and the fact that, almost all the time, interpersonal skills, recognition of emotions, facial expressions , emotional intelligence, analysis and synthesis capability, and time-based projective skills are used by both categories for adaptive and survival in extreme cases.
Later on, the results were analyzed, focusing on the ability to identify authentic / concealed behaviors. The results obtained by the two groups of participants in identifying obscured behaviors reveal that they have a higher level of recognition compared to the results obtained with authentic behaviors. This case may also be due to other variables that could have influenced the participants' choices, variables that were not considered in this case.

Strengths of the present study

An important element of this study is the professional quality of the participants, who are employees of the Arad Penitentiary, as well as future penitentiary agents. Another original point is that this study is a field study and highlights important aspects of the interaction between hired staff and individuals - elements of nonverbal communication (indicators of authentic / deceptive behavior). Another advantage of this study is provided by video footage (in the case of preventive arrested persons) that could be done in high-stakes situations in relation to possible release (Situation 1 and 2) or possible conviction (Situation 5 and 6). Another advantage is that interviews take place in the prison environment; access to this category of participants is not an easy one, they are tested in their natural environment and can be a starting point for future studies.

Limitations

A first limit can be reported to the experts test condition - an issue that could have influenced the low results of the experts compared to the novices may be that the experts were tested before entering the service (between 6.30 and 7.30 AM) or at the end of the program hours (after 12 hours of work between 19:30 and 20:30), meaning the degree of concentration to resolve the Emotional Intelligence test may be lower. Another possibility regarding the low results of the experts compared to the novice results could be the fact that this category (the experts), along their professional activity, they could have adapted to the penitentiary environment, and the existing coping mechanisms msy provide other information that could replace these abilities of Emotional Intelligence.

An aspect that may fall within the limits of research may be that groups of participants are heterogeneous, regarding significant differences in experience and age, participants are periodically tested from a psychological point of view. The profile required for this kind of activity could have favored scores from the Emotional Intelligence test as well as the results for identifying the degree of accuracy of recognizing authentic / deceptive behavior based on the analysis of some recorded situations.

Another limit may be that the scores for identifying the concealed behavior could be influenced by social prejudices (the individual in situation 5 and 6 is of Roma ethnicity, the penitentiary agencies did not know the quality of the recorded ones - two persons were arrested preventively and hence, all persons in these records are detained, so all may lie), by the fact that there could have existed features from the sphere of paranoid personality (suspicion, distrust and interpretation), which may be more serious along with the age in the penitentiary system. In the future, it would be useful to use a questionnaire that measures these traits of paranoid personality (suspicion, distrust and interpretation) which could be related to the degree of accuracy in detecting authentic / deceptive behavior based on the analysis of some filmed situations.

The small number of participants for the two categories may be another limit for this study, with a larger number of participants needed in the future. For this study, sampling of convenience was used, involving all participants at our disposal.

The records of the six situations (3 truths and 3 lies) were not validated on the Romanian population, this study being of exploratory value.

Recommendations/Applicability

Nonstandard training programs can be developed to improve emotional skills of perceiving, using, recognizing, understanding and managing emotions, programs that can be applied to different professional categories and that can be personalized according to identified needs or requirements.

The ability to identify authentic / deceptive behavior nonverbal indicators can be used in various contexts:

- Political environment - can be used as a source of nonverbal behavior information in negotiations where a good level of knowledge, control and decoding of nonverbal elements is needed;
- Marketing and sales - techniques of persuasion can be based on elements of nonverbal behavior that require good knowledge for success in these areas;
- Career environment - it is necessary to know and correctly identify nonverbal behaviors in the high-risk situations (negotiation, hostage taking, riots, suicide threats, etc.) in order to adopt the best ways to intervene;
- In polygraph assessments, behavioral analyzes (suspects) - identifying and decrypting nonverbal messages in the psychological assessments made by the polygraph expert and by the behavioral analyst in order to outline a realistic, objective and detailed psychological profile.

Future research directions

In the future, we propose an analysis of the nonverbal indicators that underpin the decisions regarding the identification of authentic or deceptive behaviors.

Data collected between January and May 2017 in Study 5 highlight about 1,000-1300 indicators of nonverbal behavior (facial expressions and micro-expressions, elements of body language, postural changes, verbal channel specific elements) expressed by 68 of participants after viewing the 6 audio-video recordings. Data is currently being collected

and under review. These indicators of nonverbal behavior that have been collected can provide a higher level of understanding of how to decide whether to identify authentic or concealed behaviors.
Another variable that should be taken into account in the future is "*confidence in decisions made*", a variable that should be measured by applying a Likert scale questionnaire as the literature reminds that this variable can influence decisions with regard to the identification of deceptive behavior (DePaulo et al., 1997; Mann, Vrij, & Bull, 2004).
It would be useful to replicate research with a larger number of subjects including another category of participants (students or civilians).

-CASE STUDY-

The multidimensional analysis of the behavior of a preventively arrested person in the context of the judicial investigation (polygraph testing) and initial psychological assessment in the penitentiary at the time of addressing questions aimed at identifying authentic / deceptive behavior

Introduction
From the physiological point of view, the polygraph method concerns changes in the abdominal and thoracic breathing at the cardiovascular level (heart rate and pulse) and at the electrodermal parameter/ galvanic skin reaction (Bus, 2000, Vrij, 2012). Vrij (2012) states that the phrase "lie detector" is attributed to the polygraph. This name is wrong because the polygraph does not detect the lie, but the physiological activity (Vrij, 2012).
This case study seeks to identify the deceptive behavior in the polygraph test, but also in the context of the initial psychological assessment, when similar questions are addressed that follow the guilt of the alleged author of the offense. Physiological reactions to the relevant questions in the polygraph testing are compared with behavioral responses to similar questions in the psychological evaluation and it is desired to highlight the indicators of deceptive nonverbal behavior.

Objectives
The objective of this case study is to identify behaviors that are concealed in highly emotionally charged situations in the context of initial psychological assessment and in the context of polygraph testing in the case of a preventively arrested person.

Hypotheses
Emotional trigger questions will activate / will be associated with intense emotions expressed at the facial level through facial micro-expressions but also with physiological responses (changes in the airways, changes in the electrodermal pathway, changes in cardiovascular pathways) evaluated using the polygraph system.

Methodology
A case study of a preventively arrested person in Romania, a 32-year-old female adult, is presented. The video recording of the semi-structured interviews was based on the informed consent of the participant, as well as on the official approval of the institution's leadership (Arad Maximum Security Penitentiary, Romania).

Participants
The participant in this study is 32 years old (when she is placed in prison in 2013), she is a woman, preventively arrested for murder, and she is in trial.

Working method
The semi-structured interview was conducted by one of the penitentiary psychologists (PhD student EI). The pre-polygraph testing and post-polygraph testing interview, as well as the polygraph assessment, were conducted by the forensic expert authorized to detect simulated behavior (G.A) within the IPJ-Arad.

The equipment used
Recording was done with a Sony HDR-CX 190 camcorder, based on informed consent.

Instruments
The Psychological Screening
It covers the following dimensions: (1) identification data; (2) general psychological support (family of origin, quality of family environment, social support network, educational level); (3) specific psychological support (suicide risk, aggressiveness management, substance abuse, psychic disorders, sexual impulses, victimization / marginalization, additional information).

The Pre-Polygraph Test Interview

Psychological reactivity is evaluated in the pre-test interview during the polygraph examination, with the possibility of inventorying the verbal and nonverbal reactions of the subject by using an observation grid or audio-video recording (with the prior consent of the participant).

The Facial Action Coding System (FACS)

The facial reactions of the person in custody were measured with the Facial Action Coding System (FACS), a standardized method of measuring and describing facial expressions. Ekman and Friesen developed for the first time FACS in 1978 by tracking and measuring facial muscle contractions of each facial muscle (individually and in combination with other muscles).

The polygraph test

The verbal stimulus in the forensic examination using the polygraph technique activates the footprint of the memory (Bus, 200; Vrij, 2012). The physiological reactivity is emphasized exclusively in the examination under the control of the polygraph and it provides any specific notes for simulated behavior in physiological routes (chest and abdominal neuromuscular innervation, bioelectric G.S.R., blood pressure) as follows: changes in the respiratory tract; changes in the electrodermal route; changes in cardiovascular pathways (Vrij, 2012).

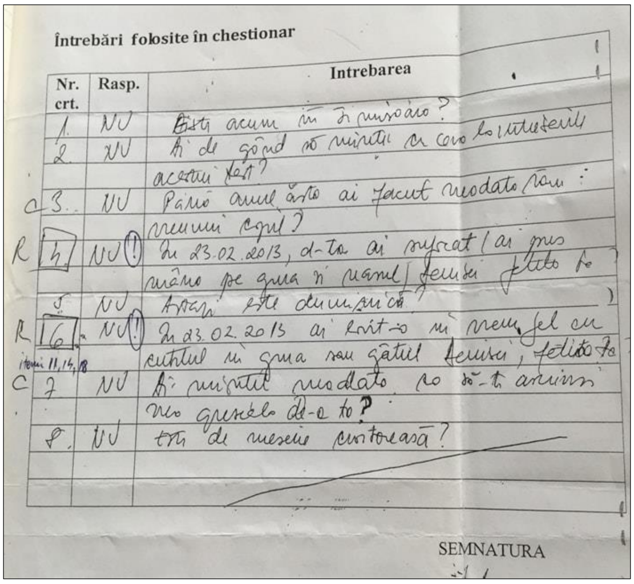
Procedure

The procedure is similar to study I and study IV. The participant was informed in advance about the activity (the semi-structured interview and video recording of the interview in the penitentiary), and she was asked for the written agreement to record the interview (see Annex 4). The participant was recorded from shoulder to shoulder, focusing the audio-video camera on the face area. The attendant sat in the chair and the audio-video camera was placed approximately 40-50 cm in front of her. The interview lasted about 40 minutes. A frame-by-frame analysis of the interview was performed to extract behavioral data (Facial Actions, Emblems, and Conversational / Conventional Signs).

The pre- and post-test interview, as well as the polygraph testing, were conducted in accordance with the IPJ-Arad internal procedures.

Mention*: It is worth noting that some questions that related to the description of the deed (the central theme that had the purpose of emotional stimulation of the participant) were addressed both in the penitentiary interview (psychological assessment in the penitentiary) and in the polygraphic evaluation (the pre-polygraph testing and relevant questions during polygraph examination).*

For the emotional stimulation of the participant, questions were asked (Fig.42) which had the role of triggering reactions at physiological level (Fig.43, Fig.44) (such as polygraph testing) or nonverbal behavioral reactions (Table 34) (such as psychological assessment in penitentiary). In the polygraph testing, questions (Table 31) are determined by the forensic expert authorized to detect simulated behavior, following discussions with the case prosecutor.



Întrebări folosite în chestionar

Nr. crt.	Rasp.	Intrebarea
1.	NU	Ești acum în Timișoara?
2.	NU	Ai de gând să minți cu ceva la întrebările acestui test?
C 3.	NU	Până anul ăsta ai făcut vreodată rău : vreunui om?
R 4	NU (!)	În 23.02.2013, d-ta ai sufocat / ai pus mâna pe gura și nasul femeii [illegible]?
5.	NU	Astăzi este duminică?
R 6 (itemi 11,14,18)	NU (!)	În 23.02.2013 ai lovit-o în vreun fel cu cuțitul în gura sau gâtul femeii, [illegible]?
C 7	NU	Ai mințit vreodată ca să-ți ascunzi vreo greșeală de-a ta?
8.	NU	Ești de meserie croitoreasă?

SEMNATURA

Figure 42. Questions addressed during the polygraph assessment in the case of a preventively arrested person.

Table 31. Questions addressed during the polygraph testing in the case of a preventively arrested person.

Nr. Crt.	Question addressed by the forensic expert	The subject's answer
1	Are you in Timişoara now?	NO
2	Are you planning on lying in this test's questions?	NO
3	Have you ever harmed a child by this year?	NO
4	On February 23, 2013, did e you suffocate your little girl Denisa (put your hand on her mouth and nose)?	NO
5	Is today Sunday?	NO
6	On February 23, 2013 did you hit Denisa, your little girl, in any way, with the knife in her mouth or throat?	NO
7	Have you ever lied to hide a mistake of yours?	NO
8	Are you a seamstress?	NO

In the case of psychological assessment in the penitentiary, the questions asked by the psychologist have the role of knowing the way of committing the act and of identifying the degree of assumed responsibility for the committed offense.

The fact that similar questions were used in the two evaluation techniques may be an advantage in objectively drawing a conclusion regarding the identification of deceptive behavior.

Results

Results obtained in the polygraph technique

For the polygraph testing a set of 10 questions was administered (Table 31). After the polygraph testing of the participant, the specific diagrams were recorded, which recorded the physiological reactions during the interview (Fig.43, Fig.44).

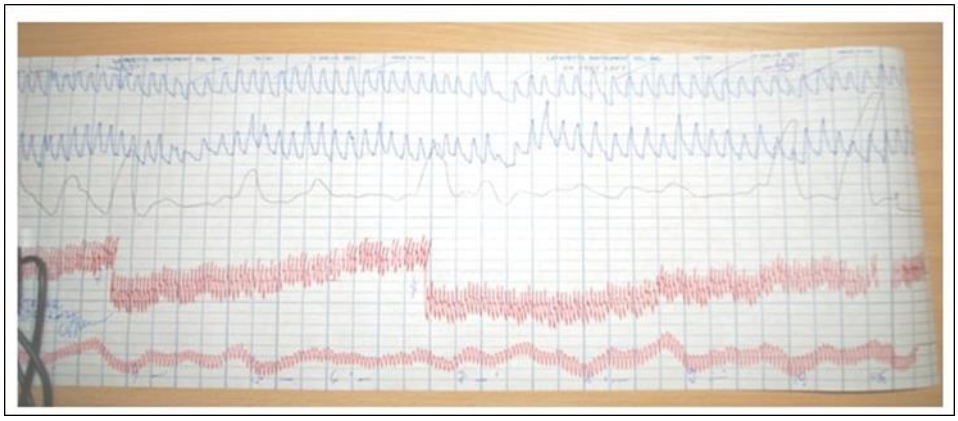


Figure 43. Highlighting the reaction to the verbal stimulus in the physiological plane: Respiratory (thoracic and abdominal - the first two diagrams in blue); Electrodermal (galvanic skin reaction - third black color chart); Cardiovascular (brachial and distal pulse - the last two diagrams in red).

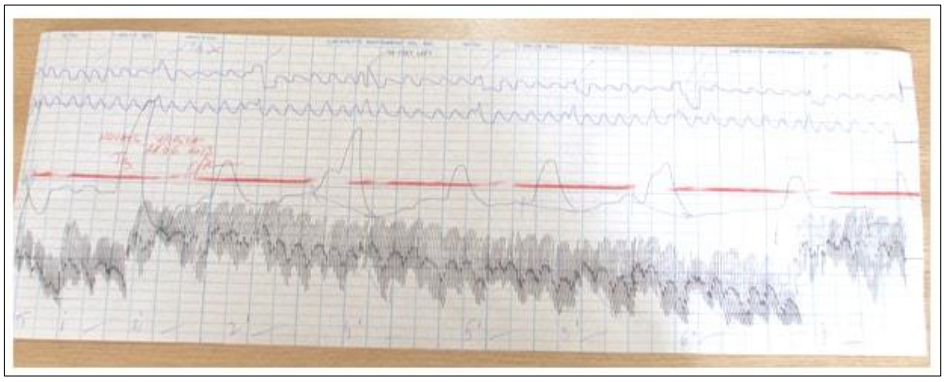


Figure 44. Highlighting the reaction to the verbal stimulus in the physiological plane: Respiratory (thoracic and abdominal - the first two diagrams in blue); Electrodermal (galvanic skin reaction - third black color chart); Cardiovascular (brachial and distal pulse - the last two charts in black).

The relevant questions (Table 32, 33) are those that directly target the offense (eg "*Did you steal the wallet?"*, Response of the tested person - "NO.") For the interpretation of the diagrams, a numerical scoring was used. Interpretations are given below for the relevant questions (Table 32).

Table 32. RELEVANCE 1 (Question No.4)

On February 23, 2013, did e you suffocate your little girl Denisa (put your hand on her mouth and nose)?

Test /diagram	**Respiratory route**	**Electrodermal route**	**Cardiovascular route**
Test 1	Controlled route ☑	Singular amplitude 5 monoflexion ☑☑ Duration of 2 quadrants ☑	Changes to the width of the route; ☑☑ Changes in the baseline
Test 2	Changes in the baseline Stages routes ☑☑	6 quadrants biflexion (in relation to double biflexion on control) ☑☑	Changes in rhythm and width with return to baseline ☑
Test 3	Double precipitated response with major discomfort Changing the ratio between duration of inspiration and expiration ☑☑	5 biflexion (in relation to monoflexion of 4 on control) ☑	Steep change with reversing of the route Changing the width of the route ☑ ☑

Table 33. RELEVANCE 2 (Question No.6)

On February 23, 2013 did you hit Denisa, your little girl, in any way, with the knife, in her mouth or throat?

Test /diagram	**Respiratory route**	**Electrodermal route**	**Cardiovascular route**
Test 1	Routes with with minimal reactivity	Biflexion, amplitude of 7 in relation to the monoflexion of 4 on the control ☑☑	Strong changes, reactivity type M ☑
Test 2	Changing the base level on both routes; Stepping on the thoracic route; Changing the inspiration / expiration ratio ☑☑	Monoflexion (biflexion on control)	Changing the baseline, and route width, high arousal degree ☑;☑
Test 3	Changing the base level on both routes; Changing the ratio between duration of inspiration and expiration ☑☑	Biflex of 9 (in relation to the 4 monoflexion on the control) Response time 3 quadrants (vs. 1 ½ per control) ☑☑☑	Changing the baseline of the route width abruptly ☑☑

Results obtained in the behavioral assessment

Name: K. V .; age: 32 years old;

Acts: Qualified homicide;

The initial mood displayed - fearful, submissive. The assessment of the first contact with the detainee was based on criteria for expressive / non-expressive persons (Andelin & Rusu, 2015)

Table 34. The type of emotions and facial micro-expressions identified during the penitentiary interview.

Nr. Crt.	Emotion type pure/ mixt	Time of appearance	Action Units	Emotional Trigger	Mood	Observations/ Psychological significance
1	Anger	'47	4+7	Have you had any law problems?	Irritability	Positive presentation of one's self List of situations that she did NOT encounter, exculpation
2	Sadness	2'35	4+17+26	*"How hard it is without the children ..."*	Bitterness, gloom, pain	Longing for the children, fear of being in detention
3	Disgust/Contempt	5'05	9+10+12	How many educational grades do you gave?	Contemptuous	
4	Happiness	5'20	10+11+12+14	*"What is your name?*	Euphoria	Social approach, openess to the evaluator, looking for an ally.
5a	Surprise Astonishment, Misunderstanding the Question	7,33	2+25	Why haven't you thought about suicide?		
5b	Surprise	7,34-7,36	2+5+51+ 10	Why haven't you thought about suicide?		... does not understand the question, but responds as if I accuse her of committing the crime.
6	Anger	9'36		Who sent you to the hospital to take your analysis?		There is no emotional congruence with the micro-expression displayed.
7a	Anger/shame (head down)	12'20	4+54	How did you get arrested?	Irritability, shame	She is disturbed by the question, updates events, ashamed of what happened.
7b	Anger	12,56	4+7+10+ 62			
8a	Contempt	13'04	12	How did he get to you/? Did you called him that way?		A defiant attitude towards the person who interrogated her in police custody - the prosecutor.
8b	Anger. Surprise	13'05	2+7+18	*"he thinks I did that stuff ..."*	Aggressiveness Anger Hostility	Hostility to the prosecutor that dares to accuse her, who loves children "like the apple of her eyes".
9	Shame/Anger	14'00	4+54	Who was with you at the hospital?		Repeats the question, long latency, memories are reactivated, prepares the answer, shame.
10	Contempt/Surprise	14'30	2+10+12+25	Who called the ambulance?		Exculpation "I did not do that stuff.."
11	**Surprise/Anger Mixed emotion**	**Trigger time 15'38,** **Maintained time 15'42**	**2+51+62+16+25**	**Where was the little girl cut with the knife?** (Commune theme question 6 -polygraph) 		Maintaining the facial emotion more than is normal, **possibly a lie** (Ekman, 2009).
12	Contempt	15'43	2+43+10+12+25	*"I did not see that she was cut with a knife…"*		Attitude of superiority, disgust, arrogance, as if the preventively arrested person held the truth.
13	Sadness	15'51 16'10	1+7+17+12+14	*"I know it's bad without her, if I knew…"*		sadness, shame, regret - blockage, updating events, agony, crying loudly.
	Surprise/	**TD**		**What do you think happened there? Who do you think hurt her?**		Maintaining the facial emotion more than is normal, **possibly a lie**

14	**Anger – Mixed emotion**	**23'05, TM 23'08**	**2+51+ 62+10+ 15+17**	(Commune theme question 4/ 6 -polygraph)		(Ekman, 2009).
15	Anger, Disgust	24'22	4+10+12	*„The children did not see anything happening there?"*		She becomes aggressive, "*the children do not know anything, they fear ...*" all-knowing, the justification of the events "*Gypsies are doing nice in the house, maybe it was on the dunes ...*"
16	Sadness	26,30	1+7+15+17+43	After whom are you crying now?	Bitterness, pain, agony	Regret about child's loss, authentic behavior
17	Surprise/Anger	5,59- part 2 of the interview (P2)	2+4+43+ 10+26	*"I did nothing wrong…"* 		Facial specific indicators for surprise / anger: raised and close eyebrows (Au4), wrinkles at the forehead. What is interesting is the fact that the eyes are not open. This action does not support the affirmations of the subject, as if she did not want to see what happened - **possibly a lie** (Ekman, 2009).
18a	Surprise	8,00-P2	2+52+61+14+23	Who else…else who?		Maintaining the micro-expression longer than normal. In this situation it denotes a simulated behavior - **possibly a lie** (Ekman, 2009).You can already talk about a **possible behavioral pattern in this situation** that can be compared with the situation in the last interview - 18 b.
18b	Bringing to knowledge the judge's verdict					**This situation of "I do not know" has a totally different facial dynamics - this time is authentic. The reaction time is considerably lower, the intensity of micro-expression is much lower (Ekman, 2009).**
19	Astonishment	8,20		But who is?		Cognitive blockage, silence, shame,

Psychological interpretation of behavioral analysis

Following behavioral analysis, the following psychological conclusions can be drawn:

- Emotional detachment regarding the description of the events that occurred at those times (emotional non-implication, rationalization, logic in description of events);
- a great emotional discrepancy between how she relates to events and the way in which she relives at high emotional intensity the moment when she talks about the relationship with the child and about the fact that "it is bad without her" - where she feels intense sadness;
- good ability to withdraw on her own needs; increased interest in the image of an "innocent" person;
- good emotional transition from the negative emotions to the sphere of positive emotions; - normal emotional attitude;
- focusing on one's own person and on how to identify solutions to the problem she is facing.

Discussions

Firstly, this case study highlights once again that the field of nonverbal communication is important because the information obtained in the polygraph assessment as well as the information extracted from the behavioral analysis can provide a higher degree of fidelity of the results obtained in particular in the sphere of psychological assessments and, of course, in the field of judicial psychology.

The reactions of the preventively arrested person can be mutually supportive at the level of the two types of assessment (polygraph testing and psychological assessment in penitentiary) because there is a highly emotional central theme (questions about the committed act), and the physiological and nonverbal responses measured lead to common conclusion - simulated behavior displayed by the person preventively arrested.

The reactions identified at attitudinal, emotional, cognitive and behavioral level are as follows:

1. Short transition from the emotional to the rational plan (denotes that change is animated by personal interests);
2. Lack of emotion of hatred, vengeance, towards a possible suspect;
3. Loss of the child is devastating, "*does not like it without her",* she is aware of the loss, but does not accept the situation of detention.
4. Argumentation - the answer to all the questions "*has God*", even if she "*put her hand on the Bible*", the prosecutor "*does not believe either way*" because "*he's bad*."
5. No micro-expression of aggressiveness "directed" towards someone else; there is no other person who can be suspected, only "*God knows*" that she is "*repented*" and she "*did not do that*."
6. The ability to distinguish between the situation when the prosecutor may accuse her on the basis of solid evidence and the situation when they would be completely absent.
7. Holds that "*without any evidence she cannot be condemned, without any evidence ...",* the pattern of behavior is predetermined, the responses are automatic;
8. The emotional transition capacity of the subject is enviable for any individual - after about 30 minutes of intense emotional experiences, at the end of the initial psychological assessment, she still has resources to ask for help and clarification about her future.

The specialized literature refers to the criteria underlying the identification of liars using nonverbal behavioral analysis (Vrij, 2012), as follows:

1. it is preferable to use flexible decision-making rules, which urges caution when it comes to a clear conclusion;
2. Indicators of simulated behavior may also exist when intense emotions, cognitive tension or self-control are present;
3. it is preferable for the evaluator to have a suspicion;
4. decisions should not be taken very quickly;
5. Increased attention to verbal and nonverbal indicators from the category of the indicators of lies;
6. verbal and nonverbal indicators should be analyzed simultaneously;
7. Increased attention to changes in behavioral responses;

Ekman (2009) suggests that objective conclusions about simulation it is needed a good knowledge of the clues of fraud.
This example highlights the findings in the literature on the occurrence of nonverbal behaviors in highly emotionally charged situations, and the importance of a good knowledge of the clues of deceptive behavior that can give greater certainty to decisions about the accuracy of identifying authentic or deceptive behavior, precisely because the polygraph assessment is accompanied by behavioral assessment.

Conclusions

In this case study, it was desired to highlight the impact of emotional stimulation and to identify the reactions of deceptive behavior (physiological reactions and facial reactions) in the context of polygraph testing and psychological assessment in prison in the case of a preventively detained person. Some sequences filmed with the participant in the context of psychological evaluation in the penitentiary were situations 5 and 6 (recordings of deceptive behavior) that were also used to test the hypothesis 2 of Study 5.
Following general analyzes, it can be considered that emotional triggers (questions describing the way of committing a deed) can be associated with physiological reactions (polygraph testing) but also with nonverbal behavioral responses (facial micro-expressions) in the case of psychological assessment.

Strengths of the present study

A positive aspect of this case study is how to integrate the information resulting from the various techniques used here. Although this case study does not allow to generalize conclusions about a potential lying pattern in relation to the verbal response to questions about committing a crime, the multidimensional method used for data analysis (polygraph testing and behavioral analysis during the interview) allowed for obtaining a valorous image (in the sense of identifying emotions and facial actions associated with possible deceptive behavior used by the person in question when addressing questions about committing a crime). The case value presented here resides in the possibility of differentiating the indicators of deceptive behavior associated with answers to specific questions with strong individual valency (such as committing a crime). In this respect, the analysis of nonverbal behavior can provide a lot of information about the emotional states of the interviewed persons, information that is needed in the interactions between the prison staff and the detainees, the specialized conclusions and the criminal investigations in progress and not only.

Acknowledgments: *The automatic data scoring and reports generated on the MSCEIT test were supported by the Research Grant PN-II-PT-PCCA-2013-4-0781 (director: Alina S. Rusu). Interpreting the polygraph test was performed by Chief Police Commissioner Gianina Alexa, a forensic expert authorized to detect the simulated behavior, of the County Police Inspectorate in Arad. Specialized literature (lying detection and deceptive behavior) was provided by George Visu-Petra.*

CHAPTER IV. GENERAL CONCLUSIONS AND IMPLICATIONS

The main objective of this research was to optimize and develop techniques for the recognition of nonverbal behaviors (facial expressions and micro-expressions) displayed in different contexts (prison environment, therapeutic relationship, psychopathology) in order to identify emotions and dominant behaviors at the level of manifestation, activated by specific triggers. The theories, paradigms and models of emotions were presented diachronically, starting from *The theory of facial expression anatomy (Bell, 1806),* The theory of human physiognomy *mechanisms (Duchenne, 1862), The theory of the universality of emotion expression (Darwin, 1872) , 1962, 1963, 1991), The theory of fixed action patterns (1981*) and, last but not least, *The theory of universal emotions (Ekman, 1971*). The theories and models presented argue that emotions are based on the function of individual adaptation, survival (Darwin, 1872; Tomkins, 2008), but also universality (Darwin 1872, Ekman, 2003). At the application level, studies in the field of nonverbal communication highlight the role of emotions in organizing behavior (Ekman & Davidson, 1994) and the influence of fixed action models (MAF) in order to alleviate the individual (Lorenz, 1981). Emotions produce unique and specific nonverbal behaviors such as facial expressions, voice, posture, gestures, and all these expressive behaviors are universal (Matsumoto, 2013). Tomkins (1964) conducted the first study that demonstrated that facial expressions are associated with emotional states (Tomkins & McCarter, 1964). Subsequently, in the early 1970s, Tomkins and Ekman conducted studies that demonstrated the universality of emotions and implicitly the existence of seven universal facial expressions for universal emotions Surprise, Happiness, Anger, Fear, Disgust, Contempt, Sadness (Ekman, 1972, 1973; & Friesen, 1971; Ekman, Sorensen, & Friesen, 1969; Izard, 1971).

This research aimed at a multidimensional approach to identifying specific facial patterns in different contexts (eg, suicide, lie) and proposed new techniques in this respect, techniques that can be used in the future as diagnostic tools in the direction of assessment and preventing the risk of suicide, and identifying deceptive behaviors.

The first study of the doctoral thesis proposed the analysis of emotional triggers and the different types of emotions (positive / negative) expressed on the face of a detained person diagnosed with dissocial personality disorder. Facial micro-expressions were measured using the Facial Action Coding System (Ekman & Friesen, 1978).

The second study investigated the interaction between detained persons (females) and psychologist (male), targeting the analysis of nonverbal behavior or the seductive behavior displayed by the detained person in the context of initial psychological assessment in the penitentiary. The elements of nonverbal behavior that can provide useful information about the emotional state of the detained persons, types of posture, micro-facial expressions and indicators of seductive behavior have been analyzed. It was also investigated the association of seductive behavior indicators with the value of the evolutionary fitness (reproductive potential) calculated on the basis of a psychological screening formula and a standardized assessment scale of evolutionary fitness from the field of Evolutionary Psychology (High-K Scale Strategy, Giosan , 2006).

In **the third study** was presented a multidimensional and comprehensive way of initial psychological assessment of people who come into contact with the prison environment and who have a history of suicide attempts or suicidal ideation. In order to identify denial and / or lying indicators of attempted suicide in detention, an exploratory method of detecting the pattern of negation was proposed in answers to questions about suicidal behavior (ideation and attempts). The behavioral analysis of suicide talks from the perspective of theories and methods of pattern detection has been approached by comparing facial micro-expressions of visually impaired civilians and recently convicted persons.

In **the fourth study**, we sought to investigate a psychological assessment technique that combines psychological screening with behavioral observation / analysis and facial micro-expression analysis using the FACET software (iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7 - real-time identification of expressed emotions) in order to achieve a detailed psychological profile.

In **the fifth study**, it was intended to identify the differences between experienced penitentiary agents (experts) and future prison officers (novices), Emotional Intelligence (IE), the level of accuracy in identifying concealed behaviors presented as a result of viewing audio-video recordings with detainees (preventively arrested, or permanently convicted) in various situations. A special feature was the *case study*, where the results from the polygraph technique were analyzed and correlated with behavioral analysis (facial micro-expressions, body language, voice) in order to establish a concealed behavior pattern specific to context. The following subchapter will briefly describe the conceptual and theoretical contributions of this thesis.

IV.1 Theoretical and conceptual contributions

The first chapter of the thesis presented the theories, paradigms and patterns of emotions. The elements of nonverbal communication were described, as well as facial muscles and specific indicators to the seven universal emotions (presentation of facial micro-expressions). There was talk of emotional triggers and deceptive behavior. There were briefly presented the techniques of identifying the emotions and the deceptive behavior, but also the model of Emotional Intelligence (IE) (Mayer, Salovey, & Caruso, 2002). Finally, the prison environment and the criminal motivation from an evolutionary perspective were described.

Within this thesis, the main objective was to identify nonverbal behaviors in different contexts of the prison environment. This research has proposed the measurement of nonverbal behavior by specific techniques already used, but also by new techniques, in which a multidimensional approach to the identification of nonverbal behaviors was sought in order to obtain information about emotions of the psychologically assessed persons.

The objective of the first study is to investigate the facial micro-expressions displayed by a person in detention (with the diagnosis of dissocial personality disorder) in various highly emotionally charged situations in the context of the therapeutic interview. The behavioral data analyzed showed an image that prefigured the specific pattern of the psychopathic personality, dominated by facial expressions of negative emotions. However, facial expressions of positive emotions were also numerous and expressed in a clear way, being directly associated with negative triggers (physical aggression and lie expressed at the verbal descriptive level).

The second study addresses the psychological assessment in terms of interaction between a person (woman) and a psychologist (male), targeting the analysis of nonverbal behavior or the seductive behavior of imprisoned women. Recent studies in the sphere of evolutionary psychology have indicated that the use of wooing signals in different social contexts (without direct sexual relevance) may be an indicator of the behavioral and social intelligence of the transmitter (Gersick, 2014). The first part of the study analyzed those elements of nonverbal behavior that can provide useful information about the emotional state of the person being detained, types of posture, micro-facial expressions and seductive behavior indicators. These elements allowed two categories for detained people to be generated: (1) expressive and (2) non-expressive. The second part of the study investigated the association of indicators of seductive behavior with the value of the evolutionary fitness (reproductive potential), calculated on the basis of a psychological screening formula and a standardized assessment scale of evolutionary fitness from the field of Evolutionary Psychology (High-K Strategy Scale, Giosan, 2006). The interviews of 33 detainees at the Arad maximum Security Penitentiary in Arad, Romania, were analyzed taking into account the fact that five women had attempted suicide before conviction. Seductively expressive women (N = 14) achieved higher evolutionary fitness values compared to the non-expressive category (N = 19), but the difference was not statistically significant. Women with suicidal tendencies have expressed non-seductive behavioral indicators despite moderate-to-high evolutionary fitness values, which implies a reconsideration of the assessment of the value of evolutionary fitness in the context of suicidal behavior. Even without a statistical significance, the data obtained with female detainees indicates small differences in the individual evolutionary fitness score between persons in seductively expressive and non-expressive behavioral categories in the non-sexual context of the initial psychological interview in the penitentiary (persons in detention - female and psychologist - male).

Study three presented a multidimensional and comprehensive way of initial psychological assessment of people who come into contact with the prison environment and who have a history of suicide attempts or suicidal ideation. In order to identify denial and / or lying indications of attempted suicide in detention, an exploratory method for detecting the negative pattern was proposed here in the responses to questions about suicidal behavior (ideation and attempts). The behavioral analysis of suicide talks from the perspective of theories and methods of pattern detection has been approached by comparing facial micro-expressions of visually impaired civilians and recently convicted detainees. The control group consists of visually impaired civilians (N = 11) from Arad, Romania, who were interviewed in the same way. The automatic analysis of facial micro-expressions of denial of suicidal behavior allowed the identification of eleven common Facial Actions for both groups of participants.

Facial expressions highlighted by statistical analysis can be an indicator of a potential pattern of emotional expression that accompanies verbal negation about suicide that can be used in the future as a diagnostic tool, allowing identification of pattern deviations to assess and prevent the risk of suicide.

Study four outlines the way to psychologically assess recently arrived persons in the penitentiary environment. Behavioral observation and supplementary questions in conjunction with the analysis of facial micro-expressions are the sources of information that outline the psychological profile and draw psychological recommendations specific to the problems identified. We wanted to present a psychological evaluation technique that combines psychological screening with behavioral observation / analysis and facial micro-expression analysis (iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7 - real time identification of emotions expressed) with the aim of achieving a detailed psychological profile. The information gathered through this combined method has enabled the identification of valuable psychological peculiarities of a detained person, such as the tendency to express deceptive behavior while talking about suicide plans.

The fifth study aims at identifying the differences between experienced prison officers (experts) and future penitentiary agents (novices) in Emotional Intelligence (IE). The fact that no very large differences between the two categories were found in the Emotional Intelligence "*Total Score*" variable can be perceived as an aspect that can refer to the abilities held (the values of the total scores in the case of novices) and skills developed in the course of the professional activity (the total scores for the experts). These aspects can be perceived as a positive element that certifies the professional quality of prison officers. It should be emphasized that the results of the two categories (novices and experts) on the *Perceiving emotions* and *Pictures* subscale, even if they are statistically significant, are ranked according to the evaluation report in the *Competent* category, ie the participants are aware of the emotions of others and theirs, can communicate, identify and transmit emotions, associate emotions with the environment, and have a good analytical ability.

In the second part, the study proposed to identify the differences between the two categories (experts and novices) at the level of: (1) the degree of accuracy in identifying the deceptive behaviors presented as a result of watching audio-video recordings with detainees (preventively arrested, permanently convicted) in various situations; (2) the degree of self-perception (low / high skill) regarding the success of the choices made in the case of filmed situations, the self-perceived need for specialized training for the recognition / identification of emotions and the need for specialized training in the discovery of the deceptive/dishonest behavior.
In case of identifying the differences between the participants (novices and experts) at the level of *accuracy in the detection of authentic / deceptive behavior* based on the analysis of some recorded situations, the results obtained were not significant. More than half of the participants (novice and experts) in this study have agreed / totally agreed that they can *easily identify the dishonest behavior* of people in custody. The percentage of success in the cases of lies ranges between 50% and 94%.
The number of participants (novice and experts) who consider that they *need training for the recognition of emotions* is more than 50%, a percentage, fact that can be perceived as a conscious need for the proper performance in the penitentiary staff activity regarding the work with the detained persons. Statistically significant differences were found only in scores concerning the dimension of *emotion recognition training*, in the case of novices, they are significantly higher than those in the category of experts, and in terms of the *need for training to detect deceptive behavior*, the percentage is more than 50% in the case of the two groups of participants (novices and experts)
The obtained results indicated that the need for continuous training in order to acquire new skills and abilities is well known and can be of interest to both categories of participants in this study. A special feature in this study was the *case study* that combines polygraph technique with behavioral analysis (micro-expressions, body language, voice), as well as establishing a deceptive behavior specific pattern depending on context.
The presented case highlighted the findings in the literature on the occurrence of nonverbal behaviors in highly emotionally charged situations. The information obtained here can be a starting point in the future trainings performed with different professional categories. The results obtained may be a first step towards optimizing and developing techniques for recognizing nonverbal behaviors (facial expressions and micro-expressions) displayed in different contexts to identify emotions and behaviors that are dominant at the manifestation level.

IV.2 Methodological innovations

This thesis, together with the theoretical and conceptual aspects, proposed offering answers to both classical hypotheses (such as the relationship between emotional triggers and emotions), but also to new hypotheses in the literature, in the field of nonverbal communication (eg. the emergence of behavioral patterns in different contexts), by addressing the studies presented here from an innovative perspective.
Study 1. The case study provided the opportunity to "test" some psychological assessment techniques, as well as hypotheses from the literature on emotional triggers (Ekman & Fridlund, 1987), but it can also be perceived as a useful method of analysis of an isolated case of a person diagnosed with dissocial personality disorder in detention. The Behavioral Action Coding System (FACS) based on behavioral observations, together with a semi-structured interview containing specific emotional triggers, could function as a behavioral assessment tool for psychologists working in penitentiaries.
Study 2. This study proposed the identification of nonverbal indicators of seductive behavior in the context of initial psychological assessment in the penitentiary, which can be considered when making objective assessments. Data collection, that is, all interviews were conducted in the penitentiary, even at the first meeting with the male psychologist, which gave this study an ecological character. The study was treated from an evolutionary perspective, approached theories of evolutionary psychology in a special context (the penitentiary environment), a situation that gives the study an innovative aspect.
Study 3. Using a quasi-experimental design to identify behavioral patterns in the context of discussions about suicide in detained persons and visually impaired people, can be an important step for future nonverbal communication studies. This study was a field study, ecological, the participants were interviewed at important moments of their existence. The fact that the Facial Action Coding System (FACS), a standardized method for measuring and describing facial expressions, was used together with the iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7 - the real-time identification of the expressed emotions, allowing the accurate identification of the evidence of emotions and Facial Actions, was another methodological contribution.
Study 4. The second case study in this thesis merged the techniques of identifying nonverbal elements and proposed an innovative method of analyzing nonverbal behavior. This has allowed generalization of conclusions about a potential pattern of deceptive behavior in the context of suicide talks. The innovative feature was also provided by the Biometric Platform Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7, for the automatic identification and measurement of emotional and factional evidence. This case study was a field study.
Study 5. A quasi-experimental design was used for this study, it was done in an ecological context in which the differences between the two categories of participants (experts and novices) were highlighted, but also the important aspects of the interaction between the hired staff and detained persons - elements of nonverbal communication (indicators of authentic / deceptive behavior). The innovative character of the study was provided by the video footage (in the case

of preventively arrested persons) that could be done in high-stakes situations with regard to possible release or possible conviction.

The case study was conducted in an innovative manner in terms of the multidimensional character of the reactions of the deceptive behavior (physiological reactions and facial reactions) in the context of polygraph testing and psychological assessment in the penitentiary in the case of a preventively arrested person.

IV.3 General conclusions

The conclusions that emerged from the studies presented in this thesis are the following:

1. The analyzed behavioral data indicated an image that prefigured the specific pattern to the psychopathic personality, dominated by facial expressions of negative emotions. However, facial expressions of positive emotions were also numerous and expressed in a clear way, being directly associated with negative triggers (physical aggression and lie expressed verbally) (**Study 1).**
2. Two categories of participants were identified: expressive people (tend to show that they have social skills developed both in verbal communication and in nonverbal communication) and non-expressive people (have low social skills, poor ability to adapt to the environment and interpersonal relationship, low level of expressiveness). Without a statistical significance, the data obtained showed small differences in the individual evolutionary fitness score between expressive and non-expressive seductive persons in the non-sexual context of the initial psychological interview in the penitentiary.

   Regression analyzes of the age and score of individual evolutionary fitness have indicated the predicted evolutionary relationship between evolutionary fitness and age for non-expressive women (the higher the age, the lower is the score of the evolutionary fitness), but not for expressive women, where the relationship seems to be inverse (the higher the age, the higher the value of the evolutionary fitness) (**Study 2**).
3. Nonverbal elements common to the two categories of participants (inmates and visually impaired persons) were highlighted when identifying a potential pattern of facial expressions associated with verbal negation about suicidal ideation / behavior, allowing the identification of three major eleven common Facial Actions for the two groups of participants. Data suggests that participants tend to display more facial activity in the lower part of the face, especially at the mouth, in the context of the discussion of suicide.

   Differences were found: (1) at the level of evidence for the emotion Surprise, in the case of the detained persons the results were significantly higher than the visually impaired persons; (2) at Facial Action 6 and (3) at Facial Action 7, in the case of detained persons the results were significantly lower than those of the visually impaired; (4) at the level of the Facial Action 15, in the case of visually impaired persons the results were significantly lower than those of the persons detained.

   Differences (5) in the duration of the response were identified in the context of the suicide discussion; in the case of people without suicidal ideation / without a history of suicide, the results were significantly higher than those with a suicidal ideation / history of suicide. At the level of the other measured variables: six universal emotions, seventeen facial actions and three elements of head movement, statistically significant differences were not identified **(Study 3).**
4. The multidimensional method used for data analysis (FACET platform and behavioral observations during the suicidal ideation interview) allowed to obtain a valuable image for identifying emotions and facial actions associated with possible deceptive behavior used by the person in question when asking questions related to future suicide plans (**Study 4**).
5. There were no statistically significant differences between the two categories (novices and experts) in the *Total Score* subset of the Emotional Intelligence Test, but statistically significant differences were found on the *Perceiving Emotions* and *Pictures* subscales, in the case of novices the results are significant higher than those in the category of experts. No other statistically significant differences in Emotional Intelligence between the two categories of participants were identified.

   No statistically significant differences were found between the media of the two groups (novices and experts) at the level of authentic / deceptive behavior detection accuracy based on the analysis of some filmed situations.

   There were no statistically significant correlations between Emotional Intelligence (IE) and the level of authentic / deceptive behavior detection accuracy.

   Statistically significant differences were found only in scores regarding the dimension *emotion recognition training*, for novices it was significantly higher than those in the category of experts. At the level of self-assessment of the degree of accuracy in the detection of deceptive behavior and the need for training to detect the deceptive / dishonest behavior no statistically significant differences were found.

   In the case study case at the end of Study 5, after general analyzes, it could be considered that the emotional triggers (the questions that concerned the description of the mode of committing the deed) can be associated with physiological reactions (polygraph testing) but also with reactions at the level of nonverbal behavior (facial micro-expressions) in the case of psychological assessment (**Study 5**).

IV.4 Limitations and future directions

Within this thesis were presented the limits identified for each study. Below are the limits that can be considered as general in this thesis and which can be regarded as future research directions.

The first limit is the low level of generalization, but it is recommended that future studies include people in the general population (such as students) to increase the degree of generalization of results.

Another limit refers to the results obtained in the context of the initial assessments in the penitentiary, namely the woman (detainee) - male (psychologist) relationship at the level of the nonverbal elements identified in this situation. An analysis in the context of a woman (psychologist) - male (detained) relationship, would also be useful in the future, in the hope of identifying other possible nonverbal behavioral responses.

Another limit refers to the fact that only the static behavioral pattern in facial micro-expression was analyzed, a pattern that has been reported over a timeframe delimited by the iMotions Biometric Research Platform powered by FACET - facial expression technology from Emotient, version 5.7- real-time identification of expressed emotions. In the future, we propose a behavioral analysis to identify a dynamic pattern of nonverbal behavior in different contexts, targeting facial, postural, and verbal measurements, and relating to a longer time frame. The diamic pattern can be outlined with the help of binary analysis (the presence or absence of behavioral indicators) over the entire period of question response, which highlights the type of nonverbal behavior elements and the frequency of their occurrence during the answer to the questions.

Case studies do not allow generalizing conclusions about a potential pattern of deceptive behavior, it would be useful in the future to continue this type of study with a larger number of participants.

At national level, researches aiming at nonverbal communication in the prison environment are relatively few or in the exploratory phase, and in this sense we consider that the present work can make an important contribution through the information it provides, both at the theoretical level, but also practically, for the field of judicial psychology, penology and clinical psychology. Also, the studies included in this thesis allow generous directions of future research, some with interdisciplinary value.

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