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Coordinates of Nonverbal Expressions in Educational Settings for the Structuring of Artificial Intelligence Programs: Simulation and Lying

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Abstract: *Through the comparative examination of 30 subjects of clinical psychiatric relevance including 10 experts examined in prison, 10 psychiatric patients and 10 drug addicts with dual diagnosis in comparison with the expressions of 30 university students specifically involved in the research (60 subjects in total, all videotaped), we wanted to ascertain whether all of them expressed real feelings or whether there were pretenses or problems of some kind. The research starts from previous research in our possession already drawn from the studies of Ekman and Friesen (1969) and subsequently developed by other authors more recently Khan, R. A., Jawaid, M., Khan, A. R., & Sajjad, M. (2023), and therefore with today's artificial intelligence proposed by Diemerling et al., 2024, as well as by Kamil Yurtkan who recently presented the intervention "Facial Expression Recognition: From Artificial Intelligence and Psychological Perspectives" using a facial model with 83 characteristic points called. In reality, as we will see later: 1) Expressive differences in cultural variability (finance between northern and southern Italy) 2) States of tension capable of distorting real feelings for the simple fact of fear of not being interpreted correctly (a sort of paranoid fear) 3) If the individual decides to lie, he can do so by also hiding the physiological variations in facial expressions (see the Stanislavsky technique of actors), the highest percentage occurred among drug addicts (8 cases found by us) 4) Lack of judicial sentences in the courts, Despite this, the decoding of non-verbal messages in the educational field and the possession of the meaning of the simple message is more precious than ever and if computerized through artificial intelligence can be of enormous advantage not only in the hiring of personnel but in every other academic and educational field.*

Keywords: *nonverbal communication; education; artificial intelligence.*

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1. Introduction

The latest research on facial expression recognition (FER) based on artificial intelligence is used to recognise patients' emotional expressions, helping doctors identify signs of stress or depression (Khan et al., 2023; Cohn et al., 2009).

Today's artificial intelligence can also use other elements to provide information on the emotionality of the patient in front of it. Recent research (Diemerling et al., 2024) has shown that machine learning (ML) models can accurately identify emotions from short audio clips, reaching an accuracy comparable to that of humans. Kamil Yurtkan and Demirel (2014) recently presented the talk “Facial Expression Recognition: From Artificial Intelligence and Psychological Perspectives”, focusing on how AI can be exploited for emotional pattern recognition. Facial Acting Coding System (FACS): a system for coding facial expressions and facial movements via action units (AUs) of facial muscles; MPEG-4 Facial Animation Parameters (FAPs): a facial model with 83 feature points called Facial Definition Parameters such as eyebrows, eyes, nose, and head movements; Active Appearance Models (AAMs): statistical models that combine shape and texture information to represent variations in the face.

An automatic facial recognition system, in the field of psychology, can be used to recognise factors related to:

- Psychological disorders such as depression, stress, or autism;
- Education and learning such as, for example, student involvement;
- Health and therapy, such as the recognition of pain states;
- Non-verbal communication, such as the recognition of lies.

Yurtkan highlights the interesting application of these systems in the world of work and, in particular, in the personnel selection phase, where applications can be used to analyse a candidate's facial expressions in a video presentation and, for example, verify whether they are lying or their degree of trustworthiness. Our team has been specifically dedicated to this topic for some time now, also in the educational and instructional fields.

The present experimental research began in 1982, was partially published in 1998 by Mastronardi, and was then integrated by the same author in 2012 (Franco Angeli ed.), addressing the coordinates and parameters reported below.

The research aimed to examine 30 individuals affected by mental pathology and 30 university students, focusing on the differences in their emotional connotations, as well as comparing both groups across the following parameters: the scale of nonverbal communication (Scherer & Ekman, 1982), logical signs, "alogical" (emotional) signs of nonverbal communication also defined as indicators of "unconscious leakage of nonverbal information", the research of the CIA and the Pentagon on simulation and lying, unconscious regulatory gestures, the face and the manifestations of emotion, unconscious adaptive or manipulative gestures (auto-adaptors, alter-adaptors, object-adaptors), vocal and nonverbal aspects of speech, prosodic signs and paralinguistic signs (Austin et al., 1983; Dilts et al. 1982; Lucarini et al., 2020), emotional content of speech detectable from nonverbal vocal signs, verbal, vocal, and prosodic traits of lying (Benzirar, Hamidi & Bouami, 2025; Castagna et al., 2012; Ding & Zhang, 2023).

The moods filmed on multiple occasions of setting and were matched with very specific variations of the alterations and face thus highlighting: 1) - fear; 2) - sadness; 3) - anger; 4) - joy; 5) - interest; 6) - surprise; 7) - contempt/disgust; 8) - shyness; 9) - shame; 10) - guilt; 11) - elements of attack; 12) - elements of escape - avoidance. Among others, we find: 13) - sulking; 14) - smiling and laughing; 15) - tendency to cry. These are interesting variations between psychiatric patients who took neuroleptics and those who did not take neuroleptics.

In the meantime, let's look at the Non-Verbal Communication Scale. Let's get straight to the heart of the not always known part of communication (Mastronardi, 2013) that most interests the observer:

The Nonverbal Communication Scale
(Mastronardi 2012-2020); da Crystal (1969), Argyle (1982),
Laver and Trudgill (1979)

1) Presentation
- aspect,
- gait and clothing,
- spatial behaviour,
- posture,
- physical contact.

2) Logical Signs (conscious)
- emblems (*e.g. the Americans' ok! sign*)
- illustrative gestures (*e.g., "he had caught a fish this big"*)
- intentional)
- regulatory gestures (*regulate and influence the flow of the conversation*)

3) Alogical Signs (innate, instinctive, metacommunication)
- the face and the manifestations of emotions
- adaptive gestures (or manipulative)
  - *auto-adaptive*
  - *alter-adaptors*
  - *object-adaptors*
- prosodic signs (connected to speech)
  - *rhythm (pauses)*
  - *tone*
  - *sonority and timbre*

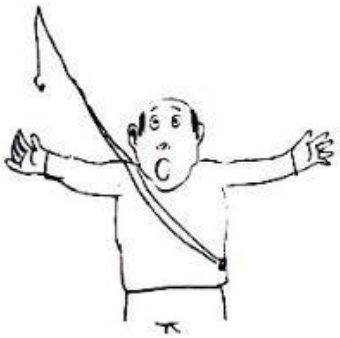
4) Vocal Signs Nonverbal
- paralinguistic signs (*independent of speech*)
- emotional noises (*e.g., smiling, crying, sighing, moaning, humming with closed mouth, emotional coughing*)

However, in light of the most recent international discoveries, there are two major categories within which to group all human gestures in relation to the intentionality or otherwise of the message sent: 1) logical signs, which express conscious and intentional contents and represent the fruit of a conscious and intentional setting of the subject (Morris' "primary" gestures); 2) alogical signs, which manifest unconscious contents and can reveal the state of mind, feelings of anxiety, or emotional tension of the individual; they are also called "metacommunicative" (identifiable with Morris' "accidental" gestures or with Morris' "non-verbal information leakage") (Morris, 1982). Waving the hand in greeting certainly represents a primary gesture, as it has the purpose of sending

the recipient a type of pre-determined and intentionally well-defined signal; on the contrary, the student who rests his head on his hands while listening to a lesson that bores him, makes a predominantly unconscious gesture that testifies his weariness towards the speaker's speech. The studies by Ekman & Friesen, (1969); Ekman, Friesen, & Scherer, (1976), and Ekman, (1989; 1993) aimed at establishing the meaning of the specific action, that is, of "a class of movements distinguishable from another class of movements by its distinctive visual (Joseph, 1982; 1988) appearance [...]. Covering an eye would be an action, massaging a temple, another, caressing the forehead another [...]. Such actions have a specific content, and can be related in various quite specific ways" (Ekman & Friesen, 1969; Ekman, Friesen, & Scherer, 1976; Ekman, 1989, 1993). In psychopathology, the act of covering one's eye is found more frequently in depressive syndromes, where in particular the depressive themes are associated with shyness or shame and is not found in the same subjects, when they go through a period of improvement of the depressive symptomatology with an associated speech, and transmit messages to the observers (Chen, 2025). The first 2 of the 5 categories of nonverbal behaviour identified by the aforementioned research by Ekman and the emblems can be fully included in the group of logical signs of Nonverbal Communication. A typical emblem sign can be represented, for example, by the sign "OK!", typical of Americans, which is obtained by joining the thumb and index finger of the same hand like a circle, or shaking the hand to greet, calling through signs, making a fist as a sign of anger, or shaking the fist to express the act of hitting (iconic-kinetic emblem). Another example is tracing with the hands, the outline of a curvy woman (iconic-illustrator emblem):

The illustrative gestures

The sentence: "he had caught a fish this long", for example, is a sentence that can usually be accompanied by a gesture of the two hands which, loosened between them, indicate the length of the fish as if to "illustrate" its dimensions.



Pictographic movements correspond to Greimas' mimetic gestures, and draw a figure as a whole (so-called illustrated codes), for example: "he was a huge man", raising both arms as if to draw the enormity of the person. the "alogical" (emotional) signs of non-verbal communication (Mastronardi, 1991; 2016) are also defined as indicators of "unconscious escape of non-verbal information". The CIA and Pentagon's research on simulation and lying is the most interesting from

the point of view of the evaluation of the person under observation and can reveal a frank penalisation related to the topic discussed, whether a clear tendency to simulation or to lying.

This category of nonverbal behaviours includes all the actions performed without the rigid control of consciousness, instinctively, often revealing a hidden emotion, frequently in contrast with the same words simultaneously pronounced: the nervous tapping of the fingers on the table indicates a tension charge that could be skillfully concealed by a forcedly calm and relaxed tone of voice, and so on. These signs can also be related to the "masks" that each of us wears daily to relate to others. As Morris (1982) explains very well: "The leakage of nonverbal information represents the failure of the social mask (Gazzaniga, 1989). Often, in public, we 'put on a happy face', while in reality we feel nervous, tense, or scared (Gombrich, Hochberg, & Black, 2002). But certain small actions can reveal the truth to our companions" (Morris, 1982). Among the alogical signs of nonverbal communication (Hinde, 1977), we can include the other three types of gestures identified by Ekman and Friesen: we therefore find *regulatory gestures, facial expressions of emotion, and adaptive gestures* (Ekman & Friesen, 1969).

2. Unconscious Regulatory Gestures

This group includes all those actions that regulate the flow of conversation that, "tell the speaker to continue, to repeat, to elaborate, to affect, to become more interesting, less scurrilous, to allow the other to speak, etc. (Ekman & Friesen, 1969); unlike the illustrators, who are intertwined with the individual and specific contents of the speech, with the individual verbal images, the regulatory gestures are aimed precisely at regulating and modifying the flow of the conversation; they are not subject to rigid rational control, but are difficult to inhibit: they can be placed "on the periphery of awareness". Scheflen (1978) distinguished three levels of regulators: points, positions, and presentations.

2.1. The Face and the Manifestations of Emotion

Argyle himself also identifies non-verbal signals that support verbal communication, which can be grouped into three categories depending on the role they play in the interaction:

A) Signals relating to the distribution of turns: they are essential because during a conversation in which several people participate, especially when they meet for the first time and have not yet had the opportunity to synchronise their respective speaking styles, they serve to avoid too many interruptions and silences. They consist of movements of the head or changes in the direction of the gaze, aimed at signalling that the speaker is about to conclude his speech, when he wants others to intervene, or they are gestures that signal the intention of the interlocutor to actively intervene.

B) Feedback signals: the speaker needs an intermittent but continuous feedback that informs him of the interlocutor's response, so that he can continue in the same tone or possibly modify what he is saying. In this way, he will be able to verify whether the listener is attentive or distracted, amused or bored, surprised or disappointed, whether or not he understands the meaning of the speech, etc. This information can also be collected by listening to the audience's murmurs, but in the common practice of dual meetings or of a few friends, it is obtained above all by examining the listener's face.

C) Attention signals (also essential for a conversation to continue) that must constantly be addressed by each of the conversationalists to the others. To signal their attention (Argyle, 1982) "interactors use: - a) proximity (i.e. they remain within the conventionally described area; - b) orientation (since they are positioned according to the orientation suitable for the conversation in question); - c) gaze (they often look at others); - d) nods; - e) posture (a listener adopts an alert and appropriate posture (Mehrabian, 1969), with the head slightly tilted), or - f) physical movements, which reflect the verbal and non-verbal signals of the speaker". Gaze plays, as already noted, a role of the utmost importance in the dynamics of interpersonal relationships (Greene, 1980). Looking at a person means communicating our interest, which is of the kind indicated by the concomitant

expression facades. The "amount of gaze" (Argyle & Dean, 1965) would be a signal of intimacy: we look more when the other person is further away, meaning that gaze and proximity, as signals of intimacy, can replace each other. According to Argyle, in humans, facial expressions send us three different types of messages related to: 1) personality traits, 2) emotions, 3) interactive signals and speech-related signals.

- *Emotions:* according to several authors (Izard, 1977; Pătruț & Spatariu, 2016), there are universal facial movements, distinct for each of the primary states of emotion. Trying to compose a geography of the face in relation to emotional states, Ekman and Friesen (1969), after having examined a very rich history case obtained by filming, photographing, and recording the human face in various cultures, have identified seven pan-cultural primary emotions: Happiness, Surprise, Fear, Sadness, Anger, Disgust, Interest. The same authors have therefore proposed, as we have already seen, the Facial Action Code (FAC), which establishes the correlation between primary emotions and certain configurations of neuronal impulses which correspond to each of the muscles of the face, whose sequences would be largely natural and independent of any learning.

- *Interactive signals and signals linked to speech*: they are sent with rapid movements of portions of the face, such as raising the eyebrows. They have the function of complementing and supporting speech, differing from emotional ones by involving only parts of the face. They exhibit a complex syntactic structure, convey precise meanings related to reward or punishment, approval or disapproval, and are capable of influencing the interlocutor's behaviour. Birdwhistell (1970), based on a detailed examination of a very rich filmed material, has provided a classification scheme of such movements.

Ekman and Friesen (1969) also examined the complicated mechanism of facial musculature, which allows for countless differentiated aspects in a very short space of time, through the technique of slow-motion decomposition of films of facial behaviours into "exhibitions of microemotions"; but, unlike Birdwhistell, who, while reducing the human face to minimal morphological units, interprets it only within the type of context in which the behaviour is located, they come to the conclusion that it is possible to obtain exact information from the examination of the face, even without knowing the context in which the interaction occurs. Subsequently, the same authors have scaled down the scope of these assertions, maintaining that in social life there are precise rules that modify the facial manifestations of emotion and establish the conditions of use in various social environments (Laver & Trudgill, 1979), in different roles, etc. Ekman and Friesen themselves distinguish at least four rules for the manifestation of emotions and therefore of emotional self-control (disintensification, intensification, cancellation of every emotional trace, simulation).

2.2. Unconscious Adaptive or Manipulative Gestures (Self-Adaptors, Alter-Adaptors, Object-Adaptors)

Ekman and Friesen (1969) still call adaptors all those gestures that, first learned in childhood "as part of adaptive efforts to satisfy oneself or bodily needs, or to perform bodily actions, or to direct emotions, or to develop and maintain interpersonal contacts", reappear, almost casually, in the mimicry and gesticulation of the adult. According to the same authors, when the adaptor is learned in childhood (Ricci Bitti & Attili, 1984), it is associated in a given environment with certain impulses, with certain experienced emotions, with anxieties, and with certain types of interpersonal exchanges. It then reappears later in the adult, when something in the current environment is connected to that emotion, that relationship, or that environment originally associated with the learning of those adaptive gestures that therefore are not intended to intentionally transmit a message and therefore are usually made below the threshold of conscious perception. A fascinating example of an adaptive gesture in the baboon is reported by Washburn in 1967, in (Ekman & Friesen, 1969). In the course of his research, he noted that during adult threatening behaviour, the baboon often turns its head to one side, making a gesture that is unusual compared to other behaviours usually used during the threat, and without any functional value.

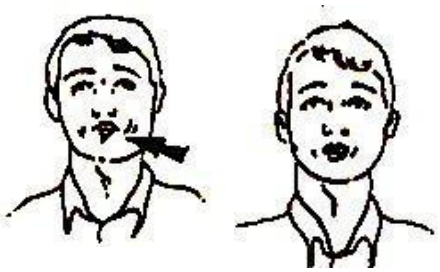
When the baboon as a child learns to fight by attacking another member of the group (Montag et al., 2024; Montagner, 1980), it does so only in the presence of its mother. The act of looking sideways is thus learned as a necessary part of aggressive behaviour, in order to be able to check whether the mother is there to assist it. This act then becomes rooted and preserved as a result of habit, although subsequently, in adult threatening behaviour, it no longer has the same value. Ekman and Friesen themselves underline how, once the mechanism of the genesis of adapters has been verified, this gestural category can be of considerable help to the operator, the psychiatrist, the speaker, anyone who finds themselves in a position to be able to obtain through the co inficiated by the mechanisms of rational self-control dictated by the rules of social behaviour (Ricci Bitti & Zani, 1983). Three categories of unconscious adaptive gestures can be distinguished: self-adaptors, alter-adaptors, and object-adaptors. Non-verbal behaviour of the interlocutor, authentic information, as well as certain data.

2.3. Unconscious Gestures

Auto-adapters defined by Rosenfeld (1967), "auto-manipulators" and then later also by Ekman (1985), as "manipulators" have to do with a part of the body that contacts the other (scratching, rubbing, lightly tapping). According to several authors, different auto-adapters transmit specific information and are generally activated both by interpersonal events (the interlocutor), and as a consequence of a particular situation (for example: discomfort during a nerve-wracking wait), therefore by emotions that are experienced at that moment, and by intrapsychic events (for example: the recurrence of a particular emotion or situation, pleasant or not). The particular auto-adaptor movement varies with the life history of each person, although all adapters generally provide similar information between people who come from the same culture, subculture, and the same social class. Some auto-adapters are originally learned to facilitate or block any sensory stimuli arriving through hearing, sight, smell, taste, or touch. Some others are instead inherent to the ingestive or excretory functions; others, to autoerotic activity (those concerning hetero-erotic activity are included in the alter-adapters). Some auto-adapters are instead learned to take care of, clean, or modify one's own attractiveness of the face and body: they are the "self-care auto-adapters" (the self-intimacy seen previously). Some others are instead originally learned to prevent oneself from forming a sound or word (e.g., hand covering the mouth if there is fear of speaking). The easiest to decode are the hand-face ones, which constitute a rich source of information for the operator. There are many examples of unconscious self-adapting gestures, all discovered with scientific and methodological rigor after decades of filmed experiments on multiple populations by multiple accredited authors, including Ekman and Friesen, Rosenfeld, Soreson, and others. We cite only a few below:

1) Drying the lips with the tongue and hand: this movement can sometimes be accompanied by the dry sound of the tongue hitting the palate. The latter was originally learned to remove food leftovers from the mouth or lips, after a satisfying meal. It can appear in adults during a conversation, when nothing has been eaten but the person feels quite satisfied with something (said, seen, or done) that he has figuratively or emotionally appreciated a lot, for example, the face of a woman, or vice versa, of a charming man. These sensations can be extended to almost all movements of the mouth [see for example the "alogical kiss" (left), movement of the lips that adapt as if you were about to

kiss someone), the tongue on the right, (in which you can notice the tongue rolling around your lips),



2) Wiping the corners of the eyes with the hands: a self-adaptive gesture originally learned for the purpose of removing tears; it may appear in adulthood during a conversation, regardless of the presence of tears, when a reason for pain or sadness is perceived or anticipated.

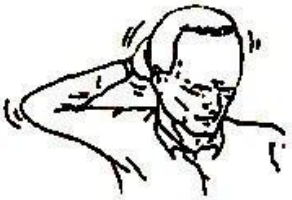
3) Hypothetical tearing of cuticles from the face (bottom left) or scratching portions of the face (bottom right) = something of what the interlocutor is saying or something that is being thought about is somehow challenging, that is, requiring a certain "reflective commitment".

4) Rubbing or massaging the face = unconscious request for psychological caress or reassurance.

5) Holding one's head with one's hand, or if one's head rests on one's hand (= need for psychological self-support and/or request for support and help to oneself). See below

6) The hand on the forehead (bottom right) or at the back of the scalp (bottom left) expresses the activity of thinking in progress, as well as

7) scratching the head, which can also express the activity of daydreaming.



8) Rubbing one's forehead expresses a challenging, boring, or otherwise penalising thought in progress.

9) The hand covering the eye expresses an obstacle put in place almost to prevent oneself from seeing, observing, or being seen and/or observed (it has to do with reluctance, shame, or sometimes more simply with the fear of "not being up to the situation".

A very frequent unconscious self-adapting gesture, which indicates that the subject is considerably embarrassed by what the interlocutor has asked him, or by the topic being discussed, consists of touching and scratching the tip of the nose with the thumb and forefinger of the hand. Criminal lawyer Cordero della Faculty of Law says (unpublished): "touching the nose is a common attitude among many guilty people".

If the subject makes the same gesture while alone or in silence (as can happen for example when driving a car stopped at a red light) it indicates the considerable embarrassment created in him at that moment or in relation perhaps to an unpleasant person to meet or for an unsatisfactory dialogue that took place, or even for his fear that something that is pressing on him is not going the right way. Some auto-adaptive gestures appear on the same level as the unconscious alter-adaptive gestures which in and of themselves include: - a) movements regarding giving or taking from another person; - b) movements regarding attack, protecting oneself from attack, retreat and escape;

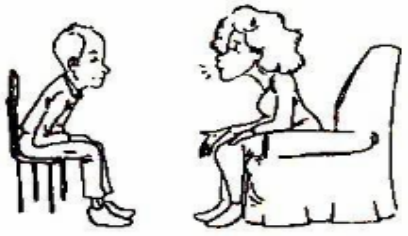
- c) movements regarding requests for affection and intimacy, sexual contact, invitations, flirting, courtship. Many alter-adapters are made with hand-space movement (and in this case they are to be distinguished from illustrative movements which are intimately connected with the meaning of the speech), or sometimes in contact with the body (Lalljee, 1971).

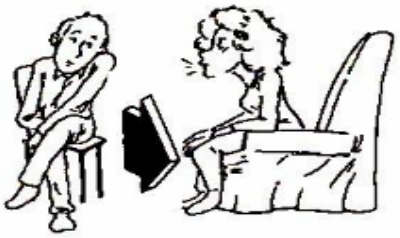
Changes in body position (Horowitz, Duff & Stratton, 1969) or modification of spatial distance (proxemics) are considered as alter-adaptors (Hall, 1980). Let's now see from the next table some examples of unconscious alter-adaptor gestures:

1) Protective movements performed with the instinctive purpose of protecting part of the body from a feared attack; it often occurs in sexophobic, frigid women.

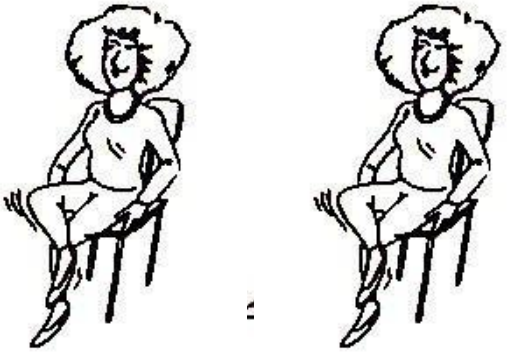
2) Body position to attract attention (left) or
3) to convey an invitation (right),

4) or vice versa, a refusal of contact with the other (see the passage from the first to the second part of the following figure).

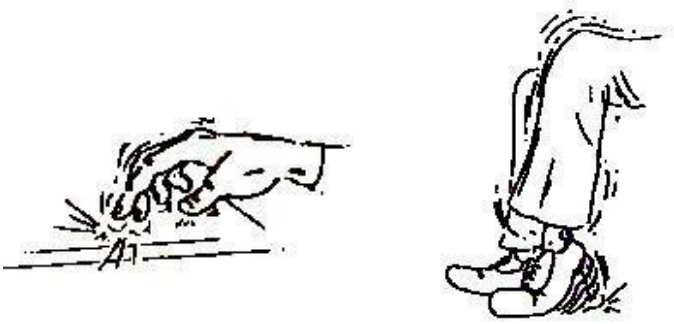




5) Leg movements that demonstrate residues of an assault, even sexual, suffered with consequent relational escape (on the right), or vice versa, an invitation, or simply no embarrassment of a sexual nature (on the left).



6) Many incessant movements of the hands and feet, usually considered as indicators of anxiety (figures below), are instead catalogued among the residues of alter-adapters expressing a desire to escape from that encounter (even if only for moments) with that certain person



Unconscious object-adaptor gestures are movements learned only later in development and, unlike the first two (auto and alter-adaptors), they can be expressed consciously (e.g., driving a car, smoking, handling a tool, etc.). According to Ekman and Friesen themselves, many "auto and alter-adaptors", once rationalised and therefore assumed with full awareness, could be used intentionally to communicate subliminally (in the context of more incisive communications) and thus modify the behaviour of the interlocutor in a very specific predetermined direction “Every feeling has its own tone of voice, gestures and expressions. And this correspondence, good or bad, pleasant or unpleasant, makes people like or dislike.” (François de la Rochefoucauld « Maxims »).

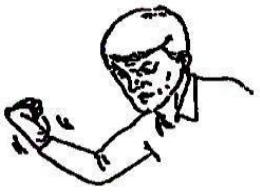
Ultimately, the signals of liking are (Pacori, 2003; Mastronardi, 2010):
• running the tongue over the lips;
• biting the lower lip;
• caressing the face, the lapel of the jacket;
• bringing the lips inward or pushing them outward;
• place your index finger (or other objects) near or on your lips;

• position yourself with your hands in a "vagina" position;
• run a hand through your hair;
• play with a ring, a necklace, caress the object you are holding, etc.
• insert a pencil or pen between your teeth;
• cross your legs towards the other person;
• lift your dress a little with your hand while sitting (for women); move your pelvis forward (for men);
• postural echo: imitate the other person;
• bring an object towards you;
• move closer to the other person;
• go from a 90° position to a frontal position;
• take care of the other person's physical appearance (adjust your tie, remove a piece of hair…).

Studies carried out at the Institute of Criminology and Forensic Psychiatry of the University of Bari and the Department of Psychiatric Sciences and Psychological Medicine of the University "La Sapienza" of Rome (Mastronardi, 2020, 2024; Mastronardi & Calderaro, 2022; Mastronardi, Calderaro, & Leo, 2021) have allowed us to ratify the meaning of the following gestures:

• Emblematic gestures: for example, shaking the fist for a fraction of a second (expression of anger), during an apparently and/or pretended calm conversation.

ANGER



• Or, the completely involuntary realisation of the mimic expression of surprise. We still find sweating and frequent swallowing.

SURPRISE

SWEAT

SWALLOWING

3. Verbal, Vocal, and Prosodic Traits of Lying

1. Where a higher-**pitched voice appears**, the negative emotion is linked to feelings of anger and/or fear.
2. Conversely, in the case of a **lower-pitched voice**, the negative emotion is characterised by feelings of sadness.
3. If the consistency of a **higher voice and accelerated speech appears**, feelings of anger, fear, and/or excitement may rightly be suspected.
4. Another sign worthy of attention is **slowed speech and a lower voice, which**, thanks to the combination of multiple signs, may lead to suspicion of feelings such as sadness and/or boredom.
5. In the case of **pauses and errors in language**, the negative emotion will be characterised above all by fear, and in any case, it will be an "unprepared defence".
6. The same considerations mentioned above apply to circumstances in which a certain involution of language occurs for a limited period and, in any case, always during the conversation.
7. **Slips of the tongue** and so-called **oratorical tirades** which represent real compensatory speeches for something that one wishes to conceal at that moment, attempting to divert the interlocutor's attention towards nuances of other arguments.

Both of these two signs can be specific to a certain emotion that is taking shape in that particular moment, but can also, vice versa, reveal other information not pertinent to the emotion itself. In the meantime, the kilometers of "video film" flow, to support the same research currently underway.

4. Other Signs of Lying

• the voice has a slightly higher pitch than normal;
• the pupils dilate (already mentioned);
• the body assumes a more rigid attitude;
• there is a tendency to avoid direct eye contact;
• the answers to questions will be “dry and rapid”, with sentences repeated automatically, and in which denials will be more frequent;
• the pauses before answers are longer than normal; there is excessive attention to details and particulars in order to make the lie more credible. Finally, Allan and Barbara Pease (2005) trace all the gestures indicating lying to three fundamental typologies well characterised by the three monkeys that represent the attitudes “I don’t hear” (covering the ears), “I don’t see” (putting the hands in front of the eyes) and “I don’t speak” (putting the hands in front of the mouth).

5. Conclusion

Based on previous research on recognising emotional connotations through facial expressions, such as Scherer (1974), Khan et al. (2023), and Davitz (1964), and current advancements in artificial intelligence, including the work of Diemerling et al. (2024) and Kamil Yurtkan's recent presentation "Facial Expression Recognition: From Artificial Intelligence and Psychological Perspectives", which employs a facial model using 83 characteristic points known as Facial Definition Parameters (e.g., eyebrows, eyes, nose, and head movements), these tools have indeed proven useful in identifying psychological disorders like depression, stress, or autism (Russell & Norvig, 2010).

However, our study, involving 60 subjects, has revealed the following evaluation difficulties:

- expressive differences in cultural variability (finance between northern and southern Italy)
- states of tension capable of distorting real feelings for the simple fact of fearing not to be interpreted correctly (a sort of paranoid fear)

- if the individual decides to lie, he can do so by also hiding the physiological variations in facial expressions (see the Stanislavsky technique of actors), the percentage highest occurred among drug addicts (8 cases found by us)
- lack of judicial decisions in the courts.

Let's not forget that the Dexter project also emerges as a pioneering initiative in the panorama of public safety and the prevention of terrorist attacks in crowded and sensitive places such as subways, train stations, airports, and seaports. Funded by NATO under the "Science for Peace and Security Programme (SPS)", the project is coordinated by the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), an Italian agency dedicated to research, technological innovation and the provision of advanced services in the fields of energy, environment and sustainable development. (The experimental phase of the anti-terrorism project "Dexter" has concluded (25/05/2022). Ministry of the Interior. https://www.interno.gov.it/it/notizie/conclusa-fase-sperimentale-progetto-antiterrorismo-dexter). For further information, please refer to the Volume by Mastronardi (2020) and Mastronardi (2024). We reiterate that, despite this, the decoding of non-verbal messages in the educational field and the possession of the meaning of the simple message is extremely precious and, if computerised through artificial intelligence, can be of enormous advantage not only in the hiring of personnel but in every other academic and educational field.

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