Nonverbal Communication in Interrogation: Deception and Decoding Signals

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Double Major BA Study Program in English Language and Literature and German Language and Literature

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Bachelor's Thesis

Supervisor: Alma Vančura, Ph.D. Assistant Professor

Osijek, 2024

J.J. Strossmayer University of Osijek

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Dvopredmetni sveučilišni preddiplomski studij engleskoga jezika i književnosti i njemačkoga jezika i književnosti

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Završni rad

Mentorica: doc.dr.sc. Alma Vančura

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Abstract

This paper discusses the indicators of deception observed during police interrogations. Through interrogation, law enforcement officers seek to uncover crucial details about the committed crime, yet guilty suspects attempt to conceal the truth, often oblivious to the fact that their nonverbal communication betrays them. While there may not be many signals that directly indicate deception, there are numerous indicators that demonstrate a person is experiencing stress and discomfort, which can potentially suggest deception. The goal of this paper is to analyse nonverbal cues that hint at deception, providing examples and explanations of the internal bodily processes. Additionally, it explores how nonverbal messages are conveyed through changes in pitch, quality, and rate of the voice.

Key Words:
nonverbal cues, interrogation, deception, decoding signals

Sažetak

Ovaj rad raspravlja o pokazateljima obmane promatranima tijekom policijskih ispitivanja. Tijekom ispitivanja policijski službenici nastoje otkriti ključne pojedinosti o počinjenom zločinu, dok istovremeno krivci pokušavaju prikriti istinu, često nesvjesni da ih neverbalni znakovi razotkrivaju. Iako možda nema mnogo signala koji izravno upućuju na obmanu, postoje znakovi koji ukazuju da osoba doživljava stres ili nelagodu, što potencijalno može sugerirati na pokušaj obmane. Cilj ovog rada je analizirati neverbalne znakove koji ukazuju na prijevaru, dajući primjere i objašnjenja unutarnjih tjelesnih procesa koji se odvijaju kod ispitanika. Dodatno, raspravlja kako se neverbalne poruke prenose kroz promjene u visini, kvaliteti i brzini glasa.

Ključne riječi:

neverbalni znakovi, obmana, osumnjičenik, dekodiranje signala

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1. Introduction

Communication is a process by which individuals exchange information, and therefore, it is a fundamental aspect of social interaction (Schlegel & Scherer, 2017). It emerges from the combination of three distinct selections: the "selection of *information*, selection of the *utterance* of this information, and a selective *understanding* or *misunderstanding* of this utterance and its information" (Luhmann, 1992, p. 252). For communication to occur, these three components must be combined simultaneously.

Although Luhmann (1992) mentions utterance in his definition of communication, which exclusively implies verbal exchange, communication is divided into verbal and nonverbal. Matsumoto, Frank, and Hwang (2013) define any information that is not communicated verbally or in writing as nonverbal. More specifically, Matsumoto and Hwang (2012) list nonverbal factors as "facial expressions, nonverbal vocal cues, gestures, body postures, interpersonal distance, touching, and gaze" (p. 130). Nonverbal cues not only convey information but also reinforce verbal information. For instance, police officers observe a suspect's nonverbal signals during questioning to determine whether their statements are substantiated by their body language. A statement is likely a lie if the body language and the spoken words do not coincide, although this may not always be the case.

"Lying is a cognitive, or mental, process" (Walters, 2000, p. 7). Alpert and Noble (2009) define a lie as "any intentionally deceptive message communicated either verbally or in writing" (p. 3). They classify lies as part of the broader category of deception, which "consists of any intention to trick others by communicating messages meant to mislead and to make the recipients believe what the person performing or committing the act either knows or believes to be untrue" (p. 3). To identify the deceptive behaviour, police officers monitor respondents' body language and employ certain tactics, which will be elaborated upon in this paper. The more motivated a person is to deceive, the easier it will be to expose them, as their body language will reveal their true intentions (DePaulo, Kirkendol, Tang, & O'Brien, 1988, as cited in Ekman & O'Sullivan, 1991).

This paper will briefly define the nonverbal communication and the system that influences it. The topic will then be contextualized within the framework of interrogation, discussing various interviewing techniques employed by the police officers to manipulate the suspects. The main objective of the paper is to list and explain the body signals that indicate possible deception.

2. Nonverbal Communication

Humans use various forms of communication cues in their interpersonal interactions. Apart from verbal communication, certain conscious and unconscious movements and body postures also convey messages. This form of communication is known as nonverbal communication. Since the ancient times, people have been fascinated with nonverbal signals and have studied them extensively. This interest is supported by researchers who discovered a papyrus fragment dating back to 900 BC, which documents an analysis of a dishonest person from that time period: "He does not answer questions, or gives evasive answers; he speaks nonsense, rubs the great toe along the ground, and shivers, he rubs the roots of his hair with his fingers" (Goleman, 1982, as cited in Hromadka, 1993, p. 6).

It is important to understand the difference between verbal and nonverbal communication. Stacks et al. (2011) describe verbal transmission of a message as "intentional and manipulated" (p. 230), whereas "nonverbal communication is often seen as unintentional and 'true'" (p. 230). Speech can be controlled and manipulated depending on the situation, while body language reflects various conscious and unconscious processes that occur in the nervous system. Hall, Horgan, and Murphy (2019) define nonverbal communication as the "non-linguistic, informative aspect of behaviour and appearance, including head and body movements, touch, interpersonal distance, and paralanguage" (p. 272). Additionally, Darwin (1955, as cited in Ekman & Friesen, 1969), who researched emotions in humans and animals, concluded:

> Some actions ordinarily associated through habit with certain states of mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognize as expressive. (p. 88)

2.1. The Brain and Nonverbal Expressivity

Comprehending the fundamental brain systems involved in communication helps understand why nonverbal signals are difficult to control. Despite the common misconception that there is only one brain within the human skull, the brain is actually composed of three interconnected brain systems that collaborate to transmit signals to the rest of the body. These systems are the reptilian brain, the mammalian or limbic brain, and the human brain or neocortex, together forming the so-called *triune brain* (MacLean, 1973). According to MacLean (ibid.), the

limbic brain has "strong connections with the hypothalamus which plays a basic role in integrating emotional expression" (p. 12). When an emotion is triggered, "the inner limbic system of the brain sends signals that engage the autonomic and somatic nervous systems, which then alter blood flow, blood pressure, muscle tension, mucus secretion, respiration, and so forth" (Robinson, 1972, as cited in Frank et al., 2013, p. 56). Owing to limbic system, it is impossible to fake body language. For example, even though open palms may indicate honesty (Navarro & Karlins, 2008), a person who is lying with open palms will be unable to control the other micro gestures that give them away. Their "pupils may contract, one eyebrow may lift, or the corner of their mouth may twitch, and these signals contradict the open palm gesture and the sincere smile" (p. 27). On the other hand, Navarro and Karlins (ibid.) refer to the neocortex as the complete opposite of the limbic brain, as it is responsible for critical thinking and creativity due to its capacity to "compute, analyse, interpret, and intuit at a level unique to the human species" (p. 24-25). According to Abe (2011), neocortex, as "the phylogenetically most recent part of the cerebral cortex" (p. 561), is responsible for complex processes such as "memory and language" (p. 561). Thus, it is logical to suggest that "the biological evolution of the human brain enabled people to make use of deception, and that deception is closely linked to the function of the neocortex" (p. 561). As stated by Abe (ibid.), this hypothesis is strongly supported by "recent findings from neuroimaging studies of human deception" (p. 561).

2.2. Signs of Deception

Navarro (Navaro and Karlins, 2008, as cited in Akçay, 2012) claims that during a police interrogation, the guilty suspect's neocortex denies the crime committed, while the limbic system warns of falsehood "by giving signals like sweating, motion freezing, dry mouth, etc." (p. 51). Ekman (1985, 2001, as cited in Cohen, Beattie, Shovelton, 2010) states that liars focus more on the verbal message than nonverbal cues because "they know that they will be held more accountable for their words than for the sound of their voice, facial expressions or most body movements" (p. 166). According to Schober (1996 as cited in Akçay, 2012), the most accurate sign of deceit is the position of the legs and feet since a person, in this context the suspect, focuses entirely on facial expressions while ignoring foot placement. Additionally, Mehrabian's research (2007, as cited in Akçay, 2012) asserts that since facial expressions are more controllable, they cannot be used as valid proof of deceit. He also pointed out that as stress levels increase, individuals minimize their "affirmative nodding and foot movements" (p. 52).

Numerous studies delve into the question of whether movements increase or decrease during deception. Vrij et al. (1996) discuss differing perspectives, where some researchers (Knapp, Hart & Dennis, 1974; Köhnken, 1989; Kraut & Poe, 1980, as cited in Vrij et al., 1996) argue that the number of movements increases, while others claim that it decreases. Vrij et al. (ibid.) suggest that the number of movements decreases because the person attempts to control their body to avoid suspicion (DePaulo, 1988, 1992; DePaulo & Kirkendol, 1989; Ekman, 1989; Köhnken, 1990, as cited in Vrij et al., 1996). According to them (ibid.), "the controlled behaviour will appear planned, rehearsed, and lacking in spontaneity" (p. 545). Hurley and Frank (2011) discovered through their research on facial expressions that people who lie significantly reduce their movements, though they cannot fully control them. They (ibid.) attribute this to the increased cognitive load experienced during lying (Ekman, 2001; Hocking and Leathers 1980; Knapp and Comadena 1979; Zuckerman et al. 1981, as cited in Hurley & Frank, 2011), which prevents individuals from focusing on "all the minutiae of movement, thus allowing these movements to leak despite the efforts to conceal" (p. 129). However, although most studies indicate that liars often control and reduce their movements, some researchers claim there is an increase in certain cues. For instance, DePaulo et al. (2003, as cited in Leach et al., 2020) assert, based on their meta-analysis, that deception is associated with pupil dilation, increased hostile facial expressions, fidgeting, and nervousness. Similarly, Speth et al. (2021) observe "a statistically significant increase in eye movement rate" (p. 5).

Riggio and Friedman (1983) think that "more detailed research is needed" (p. 901) and suggest that "the display of various deception cues may differ, and differ systematically, depending on the type of individual who is attempting the deception" (p. 901). Vrij, Hartwig, and Granhag (2019) also conclude that further research is essential. They (ibid.) emphasize the need to examine nonverbal behaviours in contexts where "nonverbal veracity assessments" (p. 29) are unavoidable, believing this approach will generally produce more credible results.

3. Training, Education, and Interviewing Techniques

Investigators must undergo appropriate education and training to acquire comprehensive knowledge of techniques for mastering the identification of nonverbal signals. This equips them to effectively uncover the important clues and successfully solve the cases.

As stated by Cleary and Warner (2016), there is a lack of scientific studies that discuss the implementation of training and education of police officers. Given that American data is prohibited

to the public and international data being limited, the only methods known are the ones provided in the "training manuals of commercially marketed interrogation training programs" (p. 271).

The Reid Technique is considered the most frequently used strategy in collecting and analysing information during the interrogation process (Inbau, Reid, Buckley, & Jayne, 2013; Meyer & Reppucci, 2007, as cited in Cleary & Warner, 2016). Trainees receive instruction on determining interviewees' verbal and nonverbal cues to detect indications of guilt (Cleary & Warner, 2016). When the interrogator is "reasonably certain of the suspect's guilt" (Inbau et al., 2013, p. 5, as cited in Cleary & Warner, 2016), the interaction shifts to an accusatory examination. During this phase, the interrogator implements a variety of "persuasive tactics such as overcoming objections, developing themes, and handling denials in order to secure a confession" (Cleary & Warner, 2016, p. 271). In their approach, Inbau et al. (2001, as cited in Kassin, 2004) propose that interrogators deliberately include minor errors, such as incorrect names, dates, or addresses, into written confessions, prompting suspects to identify and correct the changes. "Because only guilty suspects should be in a position to spot these errors, this technique has diagnostic potential" (ibid., p. 186). While this method involves written errors to test the suspects, the interrogator's skill in interpreting both verbal and nonverbal reactions is crucial, as it directly influences the effectiveness of the interrogation. One of the key nonverbal indicators in the Reid technique is the subject's posture (Inbau et al., 2015, as cited in Chapman, 2019) because the "interrogators are taught the posture of a subject reveals his emotional involvement, confidence and level of interest" (ibid., p. 414).

Other than the Reid techniques there are various other techniques of interrogation, such as the good cop/bad cop method, emotional style, friendly approach, and aggressive style (Polák & Kubík, 2017). The strategy of emotionally manipulating the suspect, making it harder for them to lie, involves reassuring them in an empathetic and friendly manner about their loving family at home and emphasizing that lying will only worsen their situation (ibid.). As the suspect contemplates this, they may exhibit "signs of nervousness" (p. 101) due to feeling of being "emotionally exposed" (p. 101). The friendly approach is particularly effective when "questioning an emotionally, sensitive and cooperative accused" (p. 100). By entering the suspect's personal space, the police officer can "trigger feelings of confusion, nervousness and uncertainty" (p. 100). In such circumstances, it is more challenging to deceive, and if the person does attempt to lie, their nonverbal signals are likely to give them away.

Interrogators use different techniques to provoke or amplify cues to deceit if liars do not "spontaneously display" (Vrij & Granhag, 2012, as cited in Vrij, 2014, p. 5) them. To successfully

solve a case, they must be skilled at recognizing these deception signals. However, they must be cautious, as "when officers believe they are highly skilled at detecting lies, there is a huge potential for abuse and for the interrogation to be particularly accusatorial because of the belief that suspect is already 'guilty'" (Chapman, 2019, p. 413).

4. Deception and Decoding Signals

The relation between deception and decoding signals is particularly meaningful in the context of interrogation. Deception is defined as "a statement or action that hides the truth, or the act of hiding the truth" (Cambridge Dictionary, n.d.) and the duty of the interrogator is to recognize and decode it with the help of the signals. Vrij (2008, as cited in Cook et al., 2012) claims that deception is "a cognitively demanding task that requires planning, comparison, and execution of purposefully incorrect responses" (p. 15). The mental effort involved in planning and executing deception is reflected in body movements, as "an individual may ironically think more often about a *thought* he or she is asked to suppress than about the thoughts not asked to suppress" (Wenzlaff & Wegner, 2000, as cited in Hurley & Frank, 2011). Therefore, Wenzlaff and Wegner's statement aligns with Matsumoto and Hwang's (2012) assertion that body movements reflect an individual's "emotions, attitudes, physiological states, and other mental states" (p. 130). During interrogation, body movements provide police officers an insight into the interviewee's mental and emotional state, indicating potential attempts at deception. "Liars and truth-tellers both have the same goal: to seem honest. Both will want to convey an impression of honesty" (DePaulo & Morris, 2004, p. 17). The distinction lies in the fact that the liar feels guilt that manifests itself in the form of nervousness, uncooperativeness and unpleasant demeanour (ibid.). "Nervousness, fear, confusion, hostility, a story that changes or contradicts itself – all are signs that the man in an interrogation room is lying. Unfortunately, these are also signs of a human being in a state of high stress" (Simon, 1991, as cited in DePaulo & Morris, 2004, p. 174). Nonetheless, it is important to consider that there also exist innocent individuals who speak the truth, yet are afraid of not being believed, thereby exhibiting similar indicators as those who deceive (DePaulo & Morris, 2004).

Vrij (2004) asserts that detecting deception is easiest during an initial interview when the suspect is unprepared and lacks the time to construct a convincing lie. Furthermore, after the first interview, the suspect might feel threatened and alter their behaviour, changing the dynamics of future questioning (ibid.). Additionally, the interrogation process is further complicated by the "chameleon effect" (Chartrand & Bargh, 1999, as cited in Vrij, 2004, p. 305), which is an

unconscious imitation of the nonverbal signs of the persons participating in the conversation. Lakin et al. (2003) believe that the tendency to imitate movement is an evolutionary adaptation. This behaviour, along with freezing in place, helped ensure the survival of the human species during certain dangers (Lakin et al., 2003).

In a study conducted by Bogaard et al. (2016), police officers and undergraduate students were surveyed on their ability to recognize cues to deception. The participants were initially asked to elaborate on their definitions of reliable signs for detecting lies. The results showed that the most prevalent nonverbal cues that indicate hiding information and lying are gaze aversion, nervousness, sweating, body movements, blushing and facial expressions. Other nonverbal cues mentioned include stuttering, postural shifts, pupil dilation, shaking, twitches, pauses, grammatical errors, repetitions, leg and feet movements etc. Bogaard et al. (ibid.) acknowledge the problem with most of the previously referenced signals because they suggest the idea that "lying causes liars to feel distressed, and that this distress is shown in their facial expressions (i.e., blushing, sweating, blinking) or their body" (Bogaard et al., 2016, p. 13). They emphasize the significance of situational factors that might affect the behaviour with the example of a nervous person telling the truth but showing nervousness out of fear of being accused of lying or just being accused of conducting a criminal act. Therefore, successful deception detection relies on a comprehensive understanding of both the context and the psychological state of the interrogated individual. It goes beyond merely observing nonverbal cues, as these signals can be influenced by variety of factors, including stress and anxiety, which may not necessarily indicate deceit.

5. Facial Signs of Deception

During a face-to-face interaction, the speaker's face garners the most attention, enabling one to discern their inner mood and emotions. However, as they can often be manipulated (Riggio & Feldman, 2005), facial expressions are not the most reliable means of detecting deceit. This is because many people begin to learn how to control their expressions in childhood, what makes them after some time "automatic and misleading" (Hromadka, 1993, p. 15). Nonetheless, Navarro and Karlins (2008) refer to facial expressions as a "human crosscultural lingua franca" (p. 165), while Matsumoto and Hwang (2012) describe them as "universal" (p. 16). In other words, recognizing facial expressions facilitates communication with anyone, regardless of their background or language (ibid.).

Birdwhistell (1970) states that a person has the ability to convey "around 250,000 facial expressions" (p. 8), allowing the face to display a wide array of emotions. Undoubtedly, "one of the most important signals the face displays is emotion" (Matsumoto & Hwang, 2013, p. 15). Tooby and Cosmides (2008, as cited in Matsumoto & Hwang, 2013) claim emotions are "rapid information processing systems" (p. 17) that enable us to quickly interpret and respond to situations without needing to consciously think through every detail. According to Hromadka (1993): "The face is capable of showing more than one emotion at a time. It can show happiness in the mouth, anger in the eyes, and a surprise in the eyebrows and forehead all at the same time" (p. 15).

During the interrogation, police officers observe the suspect's facial expressions to determine whether they align with the verbal statements. They pay special attention to the left side of the face because the part of the brain responsible for control of facial expressions is situated in the right hemisphere (Dimberg & Petterson, 2000). Right hemisphere transmits signals to the left side of the body, accentuating "more intense" (p. 693) expressions on the left side of the face (ibid.). Dimberg and Petterson (ibid.) add that "according to the valence hypothesis, the left hemisphere is the seat of positive emotions and the right hemisphere the seat of negative emotions" (p. 693), which means that positive emotions "should be more intensely expressed on the right side of the face and negative expressions should be more intense on the left side of the face" (p. 693). Research conducted by Mondal et al. (2016) confirms that the left side of the face is more likely to reflect genuine emotions, while the right side tends to display "deceptive emotional expressions" (p. 81). Aubry and Caputo (1980, as cited in Hromadka, 1993) state:

> When facial expressions are spontaneous, muscle movements tend to be about the same on both sides of the face; but when muscle movements are deliberate, such as when a subject is deceitful, the muscles on the left side of the face move more than those on the right. (p. 15)

Navarro and Karlins (2008) explain that the negative states of an individual, such as "displeasure, disgust, antipathy, fear, and anger, " (p. 167) simultaneously manifest on the face in the form of "tightening of jaw muscles, flaring of nose wings, squinting the eyes, quivering of the mouth or lip occlusion" (p. 167). Kádár (2017) adds that anger is particularly indicated by "drooping, frowning eyebrows" (p. 80), "vertical wrinkles"(p. 80) between the eyebrows, tense eyelids, and a fixed, "sometimes bulging" (p. 80) stare. Additionally, Matsumoto and Hwang (2013) claim that fear, which helps us avoid danger and minimize potential harm, is expressed through "a raising and drawing together of the brows, a raising of the upper eyelids, tensing of the

lower eyelids, and stretching the lips horizontally" (p. 35). An experienced police officer will recognize these cues, which indicate that the subject is tense and might be hiding something.

5.1. Micro expressions

Facial muscles are relatively simple to manipulate, except when it comes to micro expressions. Ekman (1992, 2006 as cited in Porter & ten Brinke, 2008) defines micro expression as "a fleeting but complete facial expression discordant with the expressed emotion and usually suppressed within 1/5 to 1/25 of a second, so that it is difficult to detect with the naked eye" (p. 509). Due to the difficulty of detection with the naked eye, the inspectors sometimes employ video evidence during interrogation, which can be subsequently slowed down and further analysed (ibid.). According to Matsumoto and Hwang (2013), when an emotion is triggered but the person tries to hide it, "the two distinct neural pathways that mediate facial expressions fire at the same time" (p. 38). This simultaneous activation creates a conflict between the pathways, causing brief and subtle micro expressions to leak through. A person who lies will not be able to control the micro expressions (Dubey et al., 2020), what will prompt the inspector to conduct a more thorough investigation, despite the liar's efforts to conceal the nonverbal cues that reveal him. However, people often manage to rapidly suppress micro expressions, thus it is simple for untrained officers to miss them (Ekman, 1985, as cited in Vrij, 2004).

5.2 Forehead and Eyebrows

Setiawan et al. (2019), indicate that forehead furrowing is a sign of "high stress and it is believed to be a gesture for lying" (p. 27). This view is supported by Ekman (2009, as cited in Dong et.al., 2022), who notes that frontal muscles contribute to the detection of falsehoods. Furthermore, Keating et al. (1977, as cited in Mazur & Mueller, 1996) suggest that lowered eyebrows indicate a person's desire to dominate the situation, which is often seen in inspectors. In contrast, raised eyebrows are typically associated with submissiveness. Hromadka (1993) adds that raised eyebrows "could be a sign of surprise or that the person is being truthful" (p. 16), whereas Ekman (2001, as cited in Hurley & Frank, 2011) links them to "the emotion of fear" (p. 121). Freshman (2013) claims that "raising the inner eyebrows alone may reliably reveal distress" (p. 192), while "knitted eyebrows" (Longford, 2013, p. 217) are a sign of anger. Additionally, Abd et al. (2021) mention horizontal wrinkles in the middle of the forehead, while the inner corners of the eyebrows move upward as potential indicators of deception.

5.3. Eyes

Apart from receiving information with eyes, humans convey nonverbal messages with them. "Statistics have shown that ninety percent of all facial information comes from expression of the eyes" (Hromadka, 1993, p. 18). Navarro and Karlins (2008) explain that the muscles surrounding the eyes have undergone evolutionary adaptations as a safeguard against danger, and this ability to this day aids in the examination of the speaker's feelings during social interactions. For instance, while the average blink rate is "between eight and 21 times per minute while resting" (Andreu-Sánchez et al., 2021, p. 422), it accelerates rapidly when a person is lying (ten Brinke & Porter, 2008, as cited in ten Brinke & Porter, 2012). As stated by ten Brinke and Porter (ibid.), "on average, deceptive pleaders blink nearly twice as quickly as genuinely distressed individuals" (p. 475). Walters (2000) claims that the "blink rate under stress conditions apparently coincides with how fast the brain is processing information" (p. 93). In other words, blinking is coordinated with the person's thoughts as they prepare what they are going to say out loud (ibid.). Similarly, Paunović and Orlandić (2013, as cited in Bjelajac & Banović, 2024) discuss the correlation between a person's thoughts and the directions of their gaze. A person can direct their gaze in six directions, with each direction reflecting their current thought process (ibid.). Also, Borza et. al. (2018) mention a theory according to which people glance to the left while recalling past events, and when attempting to fabricate a false event, they gaze to the right.

To appear more credible, the person who is lying also significantly prolongs the eye contact with the interlocutor (Mann et al., 2012). According to Ekman and O'Sullivan's (1991) research, people with psychopathic tendencies, criminals, and pathological liars are found to maintain eye contact for a longer duration than the average person. On the other hand, avoiding eye contact occurs when cognitive load becomes too high (Doherty-Sneddon, Bruce, Bonner, Longbotham, & Doyle, 2002; Doherty-Sneddon & Phelps, 2005; Glenberg, Schroeder, & Robertson, 1998, as cited in Vrij et al., 2010). Vrij et al. (2010) explain that when people need to focus on their speech, they tend to minimize environmental distractions "either by closing their eyes or focussing on an information-poor aspect of the environment, such as a ceiling, wall, floor etc." (p. 6).

Researchers have noted that pupil dilation correlates with emotional arousal (Bradley, Miccolli, Escrig, & Lang, 2008; Partala & Surakka, 2003; Stern, Ray, & Quigley, 2001, as cited in Cook et al., 2012), and Cook et al. (ibid.) confirmed this, observing that innocent people exhibited larger pupils when hearing crime-related statements. This also supports Horowitz et al.'s

(1997, as cited in Cook et al., 2012) theory that "threatening stimuli evoke stronger autonomic responses than neutral stimuli even when responses are truthful" (p. 16). This suggests that while pupil dilation responds strongly to threatening information, it cannot reliably distinguish between deceptive and truthful responses, highlighting the limitations of using physiological cues alone for detecting deception.

5.4. Lips

Lips send nonverbal signals that "could be associated with deception" (Hromadka, 1993, p. 18). They claim that dry mouth, frequent moisturization of the lips, and biting of the lower lip are indicative of a person's nervousness and tension. Furthermore, emotion of fear can be indicated by an open mouth and lips that are either tensed and pulled back or "strained to the maximum and pulled back" (Kádár, 2017, p. 80). Also, DePaulo et al. (2003, as cited in DePaulo & Morris, 2004) note that liars are more prone to pressing their lips together than those telling the truth. Givens (2014) claims that pressing lips together is the limbic brain's way of conveying the message to "seal off our mouth opening in a form of nonverbal lock-down" (p. 16). While this does not necessarily indicate deception, it may indicate that the person is angry and under stress (Kádár, 2017). On the other hand, slightly parted lips indicate disagreement (Givens, 2002, as cited in Bousmalis, 2009), such as when the inspector presents the specific information to a suspect. This frequently occurs when the suspect knows the truth, but the provided information does not align with it.

5.5. Tongue

Despite not directly indicating deceit, numerous tongue signals suggest that a person is experiencing stress. Stress, however, can stem from hiding certain information or attempting at deception. According to Matsumoto and Hwang (2013), when a person feels threatened, fear triggers a response that prepares them to escape the situation. The fear will "shut down temporarily unneeded digestive processes, resulting in saliva reduction" (p. 18) and a dry mouth. As a result, the person may lick their lips with their tongue to hydrate them. Additionally, a person can subconsciously seek to calm themselves by moving the tongue along the surface of the mouth, touching the cheeks and lips from the inside (Navarro & Karlins, 2008). Another behaviour, known as "tongue-jutting" (ibid., p. 194), can be observed in individuals who feel they are getting out of

a certain situation, such as when they are caught doing something not allowed. This gesture is characterized by the "tongue between the teeth without touching the lips" (ibid.).

5.6. Smiling

According to Ekman (2001, as cited in Hurley & Frank, 2011), "smile is the most frequent expression used to mask negative emotions or portray positive emotions that one does not feel" (p. 121). Ekman (ibid.) also notes that liars often attempt to suppress their smiles because laughter is frequently portrayed in media and manuals as a sign of deceit. Hurley and Frank (ibid.) studied individuals who were instructed to suppress facial expressions, such as smiling and eyebrow movements, to conceal their true emotions. They found that no one was entirely successful in hiding their smiles. The researchers concluded that, in a control group, where participants were not required to control their facial expressions, liars "spent less time smiling than the truth tellers" (p. 127).

Rückle (1999, as cited in Rodat, 2019) identifies eight types of smiles, with the crooked smile, ironic smile, and the smile expressing fear being the most relevant for this context. A crooked smile, where one side of the mouth is pulled up and the other down, typically suggests "inner conflict" (p. 216). An ironic smile, marked by slightly downturned corners of the mouth, may indicate underlying disagreement or "hidden, unspoken thoughts" (p. 216). The smile that expresses fear often appears "involuntarily" (p. 216). It is characterized by the lips being "drawn laterally" (p. 216), the mouth "slightly open" (p. 216), and the corners of the mouth "drawn to the ears" (p. 216).

5.7. Face Colour and Perspiration

Hromadka (1993) claims that the first thing an experienced officer will notice is the change of skin colour which "tends to become paler or redder during periods of deception" (p. 15). Occasionally, drops of sweat may also appear during deception. Aubry and Caputo (1980, as cited in Hromadka, 1993) explain that nervousness and tension increase the activity of body functions and cause "the increase in the normal flow of perspiration" (p. 16). Perspiration is the most noticeable "between the eyes and on the upper lip" (p. 16). However, it first appears on the forehead "in little beads of moisture just below the hairline" (p. 16).

6. Torso and Shoulders

Torso is the core region of the body that contains most of the human organs. When the brain senses potential danger, it sends a message to the body to protect the torso (Navarro & Karlins, 2008). Therefore, the torso plays a significant role in nonverbal communication, as the limbic brain perceives the necessity to safeguard the organs from potential threats, our in the case of interrogation, from potential exposure while lying.

According to Navarro and Karlins (2008), the torso carries a significant proportion of our weight, which necessitates energy and balance in comparison to the rest of the body. They (ibid.) claim that this is why the torso serves as one of the most honest indicators of inner emotions, as the brain subconsciously regulates it in accordance with true feelings. For example, showing a photo that evokes a certain feeling in the suspect will cause his torso to lean forward or backward, depending on whether the feeling is positive or negative (Eerland et al., 2012). The torso tilts backwards in response to a negative stimulus (ibid.), moving away from the source. In this context, a photograph depicting a potential perpetrator or accomplice may cause the suspect to lean back if he hesitates to identify the individual and attempts to mislead the police officer by claiming not to recognize the person in the photograph.

One of the ways to protect the torso from harm is by crossing the arms over it (Baić et al., 2020). When a person hears or sees something that causes them discomfort, the limbic system sends a subconscious message to cross the arms over the chest and thus shield the body (Navarro & Karlins, 2008). This posture is "correlated with several negative mental attitudes including opposition, protection, defensiveness, and disinterest" (Egan, 1975, as cited in Barkai, 1990). Hromadka (1993) associates a posture of crossed arms and tucked elbows with deception, noting that an honest person typically sits "upright with their elbows away from the body" (p. 21). When we fold our arms over our chest, we subconsciously begin to develop defensive emotions that will regulate our micro gestures.

Walters (2000) asserts that while shoulders do not directly indicate deception, "they can contribute to the efforts at decoding someone's emotional and mental processes" (p. 95). When the speaker's shoulders are aligned with those of the interlocutor, it suggests that communication is open and that both people are "emotionally and mentally involved or participating fully in the conversation" (p. 95). Conversely, shoulder rotation often signals a negative reaction to a stimulus (ibid.). If this rotation occurs while the person is speaking, it usually indicates a "rejection of his own statement and the person probably is not fully committed to his answer or doesn't really believe the answer himself" (p. 95). Furthermore, shoulder shrugging can be a sign of potential

deception. Ekman and Friesen (1969a, 1972, 1974, as cited in Ekman et al., 1976) found that shrugging tends to increase when people are being deceptive. This aligns with Salzen's (1979, as cited in Givens, 2014) observation that mammals exhibit a "primitive protective response" (p. 21) involving "flexion withdrawal, which 'takes the head and neck away from the stimulus'" (p. 21). Givens (ibid.) further explains that submissive emotions are expressed by "coordinated muscle contractions" (p. 22) that shrink the body, creating a non-threatening appearance for physical and emotional self-defence. In interrogation settings, the increase shrugging indicates that deceptive individuals may unconsciously adopt protective postures to manage their perceived vulnerability.

7. Hands and Fingers

Compared to the other parts of the body, hands have a greater neural connection to the brain, providing an accurate insight into an individual's emotional state (Pease & Pease, 2004). The act of conveying a nonverbal message through hand movements is commonly referred to as gesturing. Gestures unconsciously reinforce verbal messages in a nonverbal manner (Vrij et al., 1996). German philosopher Schopenhauer (1903) wrote:

> natural gesticulation, such as commonly accompanies any lively talk, is a language of its own, more widespread, even, than the language of words – so far, I mean, as it is independent of words and alike in all nations. (…) In the universal use made of it, gesticulation has some analogy with logic and grammar, in that it has to do with the form, rather than with the matter, of conversation; but on the other hand it is distinguishable from them by the fact that it has more of a moral than of an intellectual bearing; in other words, it reflects the movements of the will. (p. 84-85)

In some cases, the direction of a person's gestures can indicate whether they are telling the truth: "Deceptive persons will tend to gesture toward themselves while truthful persons will gesture away from themselves or their bodies" (Hromadka, 1993, p. 14). Caso et al. (2006) argue that researchers mainly focus on two distinct types of gestures when analysing the correlation between hand movements and deception. Firstly, they refer to illustrators, describing them as gestures that complement the verbal message (ibid.). According to DePaulo et al. (2003, as cited in Caso et al., 2006), illustrators "tend to decrease when people lie" (p. 2). One of the reasons this decrease occurs is because the person who is lying attempts to regulate their actions, believing that avoiding suspicious movements will leave the impression of honesty (Vrij & Mann, 2005, Zuckerman et al. 1981, as cited in Caso et al. 2006). The second type of analysed gestures are self-adaptors, which are "assumed to have the purpose of satisfying self or bodily needs" (Ekman &

Friesen, 1969, as cited in Caso et al. 2006, p. 2). As stated by Neff et al. (2011), self-adaptors include actions such as "scratching a body part, tapping nervously, unnatural bracing of the hands, rubbing the face or head in soreness or fatigue, and adjusting the hair" (p. 401). The correlation between these gestures and deceit depends on "how aroused the liar is and how hard s/he tries to appear convincing" (Caso et al., p. 15).

7.1. Gestures that Indicate Deceit

Pease and Pease (2004) identify eight gestures that indicate deceit. The first gesture involves covering the mouth with several fingers or a closed fist, as the brain subconsciously tries to prevent the lie from being said. Some individuals attempt to conceal this gesture by pretending to cough. Another gesture, where "one finger is placed vertically over the lips" (p. 49) signifies that the individual is refraining from expressing their true thoughts (ibid.). The second deceptive gesture consists of "several quick rubs below the nose" (p. 150) or "one quick, almost imperceptible nose touch". When a person lies, "chemicals known as catecholamines are released, causing tissue inside the nose to swell" (p. 150). Specialized cameras have determined that lying causes an elevation in blood pressure, resulting in the irritation of the nose, a phenomenon commonly referred to as the "Pinocchio Effect" (p. 150). The third gesture is similar to the previous one, but, in this case, it is a matter of rapid nose scratching due to the itching sensation. The distinction is that gentle touching of the nose can be employed by both the speaker and the interlocutor, whereas nose scratching is typically "an isolated repetitive gesture and is incongruent or out of context with the person's overall conversation" (p. 150). The fourth gesture they mentioned is "The Eye Rub" (p. 151). A person will rub their eyes when their brain wants to "block out the deceit, doubt or distasteful thing it sees, or to avoid having to look at the face of the person who is being lied to" (p. 151). Men tend to rub their eyes "vigorously" (p. 152), while women subtly touch the area under the eyes with their fingers (ibid.). The fifth gesture is "The Ear Grab" (p. 152). "By putting the hand around or over the ear or tugging at the earlobe" (p. 152), the person is trying to shut off the words they are hearing. It can also indicate that they have received enough information or wish to speak (ibid.). Moreover, the sixth deceptive gesture is "The Neck Scratch" (p. 153). A person signals uncertainty and contradiction by touching the part of the neck below the earlobe with the index finger of the dominant hand (ibid.). The seventh gesture is "The Collar Pull" (p. 153). When a person who is lying suspects that the interlocutor does not believe them, the blood pressure increases, resulting in small drops of sweat on the neck and a strong desire to scratch that spot (ibid.). This also happens when a person is angry or frustrated and needs to move the collar

to ventilate. Finally, the eighth gesture Pease and Pease mention is "Fingers-in-the-Mouth" (p. 154). When a person is under stress, they subconsciously seek reassurance by putting the finger in their mouth. This action subconsciously brings the person back to childhood, when they sought relief in sucking mother's breast (ibid.).

Ekman and Friesen (1969) refer to the types of gestures mentioned in the previous paragraph as "manipulators" (p. 43). According to them (ibid.), manipulators are movements in which "one part of the body or face manipulates in some fashion – stroking, pressing, scratching, licking, biting, sucking, etc. – another part of the body or face" (p. 43) without any special goal, but rather for subconscious "reassurance or comforting" (p. 43). Collet (2003, as cited in Kádár, 2017) asserts that "touching the face can express anxiety, but the observation should be supported by the environment, the other signals or by the content of the verbal communication" (p. 84). Kádár (2017) also mentions "the rubbing of the lower part of the nose with the index finger" (p. 83), as a gesture related to covering the mouth during lying, which can serve as a deceptive cue. Covering the mouth helps the individual avoid saying something that might place them in a risky situation, or, when done repeatedly, it can provide a sense of reassurance (ibid.)

The position of the palms also provides insights into the individual's emotional state. Kádár (2017) notes that "open gestures generate confidence" (p. 83), whereas "closed gestures indicate anxiety, rejection, dislike, and a possible passivity" (p. 83). Thus, when a person shows their hands, it is important to observe whether the palms are open and facing outward. A person that is saying the truth will unconsciously extend their palms outward, thereby nonverbally conveying honesty to the interlocutor (Abdulaal, 2023). When the palms are open, it is more difficult for a person to lie because gestures and emotions are closely related (Pease & Pease, 2004). This can be supported by Givens' (2016) explanation that emotions, which unconsciously control palm movements, are linked from the limbic system in the forebrain – particularly the amygdala – to the spinal cord. This connection allows the emotional brain to automatically trigger "flexor-withdrawal movements designed to protect from real or imagined harm" (p. 239).

7.2. Sweaty Palms

The limbic system, particularly the amygdala, triggers sweating in response to emotional stress (Boucsein, 1992; Mangina & Beuzeron-Mangina, 1996, as cited in Asahina et al., 2015). This phenomenon, known as emotional sweating, is elicited "by stress, anxiety, pain, and fear (Wohlrab et al., 2023, p. 455). These emotions are commonly experienced by individuals who are

being deceptive. Wallin (1981, as cited in Ambach, W., & Gamer, M., 2018) explains that the eccrine sweat glands on the palms "are mainly regulated by the sympathetic nervous system" (p. 8), which is also active during the limbic system's freeze and flight, or fight response (Navarro and Karlins, 2008). While some sources suggest that sweaty palms indicate deception, Navarro and Karlins (ibid.) argue against this notion. According to them, sweaty palms solely signify an individual's nervousness and stress. Additionally, Callejas et al. (2009) point out that "nearly 3% of the population" (p. 110) suffers from hyperhidrosis (p. 110), a disorder characterized by "excessive sweating in response to heat or emotional stimuli that are stronger than physiologic stimuli" (p. 111). When observing sweaty palms, interrogators should consider this condition, as it is beyond the individual's control (ibid.).

8. Feet and Legs

For millions of years, humans have used their feet and legs for mobilization. Prior to the development of speech and language, humans responded to threats by kicking objects or running away from them (Navarro & Karlins, 2008). According to Navarro and Karlins (ibid.), this instinct remains present today when a person feels threatened or confronted with a matter they disagree with.

Feet and legs are considered "a primary source of both leakage and deception clues" (Friesen & Ekman, 1969, p. 99). Ekman and Friesen (1969, as cited in Akçay, 2012) note that body parts farthest from the brain tend to provide clearer indications of deception. Since the legs and feet are the most distant from the brain, they are the most accurate indicators of an individual's true emotions (ibid). People tend to focus more on controlling their facial expressions during conversation and pay less attention to their feet: "Being away from our heads, we forget to control our feet (…) So, the feet are the most realistic limb of our body. Whatever facial expression; unconscious movement of our feet exposes the real mood of ours"(Schober, 1996, as cited in Akçay, 2012, p. 52). Feet can reveal a wide range of emotions such as "nervousness, fear, anxiety, caution, boredom, restlessness, happiness, joy, hurt, shyness, coyness, humility, awkwardness, confidence, subservience, depression, lethargy, playfulness, sensuality, and anger" (Navarro & Karlins, 2008, p. 56).

As stated by Friesen and Ekman (1969), "deception clues can be seen in tense leg positions, frequent shift of leg posture, and in restless or repetitive leg and foot acts" (p. 99). Researchers such as Vrij and Semin (1996) and Vrij (2000, as cited in DePaulo & Morris, 2004) found that foot movements decrease during deception. Similarly, DePaulo et al. (2003, as cited in Caso et al.,

2006) claim that liars generally make fewer leg movements than truth-tellers, likely due to the cognitive load of lying and a conscious effort to appear less deceitful. However, Navarro and Karlins (2008) argue that noticing a change in the movement is more important than the quantity of movement. For instance, if a person is consistently jiggling their feet during a conversation and then abruptly starts kicking them after being asked an uncomfortable question, this may indicate a negative stimulus in their brain that is prompting this nonverbal response (ibid). Jiggling may signify nervousness and anxiety, whereas kicking is a subconscious method of coping with the negative emotion (ibid.). Similarly, Hromadka (1993) notes that "constant swinging of a crossed leg or foot is associated with nervousness and stress" (p. 22). Thus, fidgeting with the feet might indicate potential dishonesty (ibid.), as it often reveals underlying anxiety or discomfort.

Guilty suspects often extend their feet "towards the interrogator to create a physical distance between them" (Gordon & Fleisher, 2002 as cited in Strömwall, Granhag & Hartwig 2004, p. 237). Also, the abrupt pulling of legs under the chair can raise suspicion among interrogators (Zulawski and Wicklander, 1993, as cited in Strömwall, Granhag & Hartwig, 2004). Furthermore, Shepherd (1993, as cited in Baić et al., 2020) asserts that crossed legs are a defensive posture that signals substantial resistance of the suspect. This resistance is intended to obstruct the interrogator's efforts to engage in meaningful dialogue and uncover the facts related to the criminal offense under investigation (ibid.). Additionally, Gordon and Flaisher (2011, as cited in Baić et al., 2020) suggest that crossing one's legs in front can signify a fear of interacting with the interrogator. In conclusion, foot and leg movements, such as crossing and shifting positions, can offer valuable insights into a suspect's emotional state, indicating levels of anxiety, discomfort, or resistance during an interrogation.

9. Paralanguage

Hall et al. (2019) define paralanguage as a "vocal behaviour that occurs with or substitutes for words, including fundamental frequency; amplitude; rate; pitch contour; and sighs, cries, and other non-word sounds" (p. 277). Correct analysis of paralinguistic variations can aid in detecting deceit (Hromadka, 1993), as these variations in voice quality and vocalizations often provide insight into the individual's "emotional state and veracity" (Johar, 2016, p. 4). For example, when a suspect feels threatened during interrogation, the brain sends an arousal signal to the body, resulting in an emotion of anger. This often leads to speech that is rapid, loud, and high-pitched (Hromadka, 1993). Scherer (2000, as cited in Johar, 2016) suggests that a raised voice signifies anger, while "lower pitch and faster speech rate are associated with more credibility and hence,

more benevolence" (Apple & Kraus, 1979; Baldwin & Moses, 1996, as cited in Johar, 2016). Deception is closely linked to the fundamental frequency of the voice, with a higher frequency often indicating false statements and making the individual seem less trustworthy (ibid.). This correlation is further supported by the observation that stressful situations tend to elevate the voice's pitch (ibid.). However, Vrij (2004) points out that "differences in pitch between liars and truth-tellers are usually very small and therefore only detectable with sophisticated equipment" (p. 293).

Anger and fear are associated with accelerated speech, whereas "slow, low pitched speech with weak high frequency energy" indicates sadness (Johar, 2016). Accelerated speech may also indicate practice prior to delivering a speech, while an unusual decrease in speech rate suggests the person is taken aback by an unexpected question and needs to think carefully before responding (Walters, 2000).

Furthermore, deception may cause frequent speech errors and stuttering (Hromadka, 1993). Strömwall, Granhag and Hartwig (2004) claim that complex lies are often accompanied by an increase in speech errors, whereas simple lies are easier to control, resulting in fewer errors and less hesitation in speech delivery. These errors can stem from nervousness or overthinking the answer (ibid.). Walters (2000) adds that sudden stuttering can occur when a person speaks too quickly without fully considering their words. Additionally, mumbling may serve as a strategy to buy time until the speaker has determined precisely what to express and what not to (ibid.). DePaulo and Morris (2004) assert that "liars are more likely to repeat words and phrases" (p. 25), noting this as a key behaviour distinguishing them from truth-tellers in their study.

10. Conclusion

Communication is the exchange of information between a speaker and an interlocutor, encompassing both verbal and nonverbal elements. A speaker attempting to deceive an interlocutor verbally is often betrayed through nonverbal behaviour, which is difficult to fully control. This is particularly evident during police interrogations, where officers must carefully observe the congruence between verbal and nonverbal cues. The limbic brain plays a key role in this process, sending signals to the body when it senses danger – such as risk of being exposed while lying.

Investigators need to be vigilant in interpreting these signs, as stress from fear of false accusations can also trigger similar responses. Techniques like the widely employed Reid technique allow police officers to manipulate suspects and observe their nonverbal reactions to uncover their true emotions. However, they must consider all other factors that may cause the

suspect experience stress and fear, which are not necessarily indicative of deception, such as fear of being accused of lying or just being accused of conducting a criminal act.

Facial expressions, including micro expressions, eye movement changes, lip pressing, increased sweating, and smiling, serve as potential indicators of deception, although they are susceptible to manipulation. Torso movements, such as moving backward in response to negative stimuli or crossing arms as a protective gesture, also reflect negative subconscious reactions. Similarly, shrugging serves as a protective response against perceived threats by taking a non-threatening form. Additionally, hand movements – due to their strong connection to the brain – reveal a suspect's emotional state, with gestures touching the nose, eyes, covering the mouth, and scratching the neck associated with deception. While facial expressions are considered the most unreliable indicators, leg movements are among the most telling signs of deception. This is because legs are furthest from the brain, and thus less consciously controlled during the act of lying. For example, constant swinging and kicking in response to uncomfortable questions often signify anxiety or discomfort. In addition to physical movements, vocal cues such as sudden changes in pitch, speed, and tone can also signal deception. Mumbling, stuttering, and frequent pauses often suggest that the person is carefully considering their words to avoid detection.

The aim of this paper was to analyse nonverbal cues of potential suspects by observing different body parts, as well as their paralanguage when indicative of deception within the context of police interrogations. Given that each individual responds differently to certain stimuli, and that these signals vary based on personality and the severity of the lie, it is crucial to consider the overall picture rather than isolated movements to prevent false accusations.

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