Review

Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2022; 14(4):580-588

DOI: 10.18863/pgy.1093384

Investigation of the Tendency of People with Soft Facial Expressions to be Perceived as Innocent/Not Guilty

Yumuşak Yüz İfadelerine Sahip İnsanların Masum/Suçsuz Algılanma Eğilimlerinin İncelenmesi

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ABSTRACT

The facial recognition process in the brain has a powerful emotional feature. This is why people can rarely be indifferent to facial expressions in their dealings with other people. Every face has a term. Some people appear reliable, helpful, kind, dangerous, harsh, and disloyal in this context. People perceive faces holistically rather than as a set of distinct features. Recognizing faces happens so naturally and quickly that we rarely think twice. Recognizing a face is instant and effortless. In a moment, we realize that we are indeed looking at a face, but we also define who they are and what mood they have. We can identify an individual's identity, attitude, gender, race, age, and direction of attention in a second. Emoticons seem to jump straight into our brains from people's faces. Conveying emotions is one of the most critical roles of the human face. Facial perception has been a topic of debate since the dawn of scientific research. The ability to recognize faces helps communicate with people and learn about the environment. Studies have shown that people with delicate facial features are more likely to be found innocent or innocent. Some people may seem sad, and some may seem threatening. In this study, the reason for this was reviewed using the "literature review" method. In this direction, soft facial expression, facial attractiveness, baby-faced, innocent perception processes were examined. As a result of the study, it was seen that people have stereotypes about facial appearance, and people with soft facial expressions are perceived as more innocent. Two different ways in the face recognition process are the consciousness in the upper layers of the cortex and the unconscious amygdala, which is in the limbic system, which is deep in the brain.

Key words: Soft facial expression, facial attractiveness, baby-faced, innocent perception

ÖZ

Beyinde yüz tanıma işlemi güçlü ve duygusal bir özelliğe sahiptir. Bu yüzden insanlar başka insanlarla olan ilişkilerinde yüz ifadelerine çok nadir kayıtsız olabilirler. Her yüz bir ifadeye sahiptir. Bu bağlamda bazı insanlar güvenilir, yardımsever, kibar, tehlikeli, sert ve sadakatsiz görünürler. İnsanlar, yüzleri bir dizi ayrı özellikten ziyade bütünsel olarak algılar. Yüzleri tanımak o kadar doğal ve hızlı gerçekleşir ki, nadiren ikinci kez düşünürüz. Bir yüzü tanımak anında ve zahmetsizdir. Bir an içinde, gerçekten de bir yüze baktığımızı fark ederiz, ama aynı zamanda onların kim olduğunu ve nasıl bir ruh haline sahip olduklarını da tanımlarız. Bir saniye içinde bir bireyin kimliğini, ruh halini, cinsiyetini, ırkını, yaşını ve dikkat yönünü tanımlayabiliriz. İfadeler, insanların yüzlerinden doğrudan beynimize sıçrar gibi görünür. Duyguları iletmek, insan yüzünün en önemli rollerinden biridir. Yüz algısı, bilimsel araştırmanın doğuşundan bu yana bir tartışma konusu olmuştur. Yüzleri tanıma becerisi, insanlarla iletişim kurmaya ve çevre hakkında bilgi edinmeye yardımcı olur. Yapılan çalışmalar yumuşak yüz hatlarına sahip kişilerin, masum ya da suçsuz bulunma oranlarının daha yüksek olduğunu göstermiştir. İnsanların bazıları üzgün bazıları ise tehditkar gözükebilir. Bu çalışmada bunun nedeni "literatür tarama" yöntemi ile gözden geçirilmiştir. Bu doğrultuda yumuşak yüz ifadesi, yüz çekiciliği, bebek yüzlü, masum algılanma süreçleri incelenmiştir. Çalışma sonucunda insanların yüz görünümüne yönelik stereotipleri olduğu yumuşak yüz ifadelerine sahip insanların daha masum algılandığı görülmüş ve yüz tanıma sürecindeki iki farklı yollardan biri korteksin daha üst tabakalarında bulunan bilinç, diğeri ise beynin derinlerinde olan limbik sistem içinde olan bilinçsiz amigdalanın işlevi olduğu bulunmuştur.

Anahtar sözcükler: yumuşak yüz ifadesi, yüz çekiciliği, bebek yüzlü, masum algılanma

Introduction

The word limbic means border or edge. The term limbic system has encompassed a group of structures in the border region between the cerebral cortex and the hypothalamus (Grodd et al. 2020). The limbic system is the center of emotions, a phylogenetically ancient system that controls our expressions of anger, fear, and joy and influences sexual behavior, vegetative functions, and memory. It forms a double ring around the basal ganglia and thalamus. It phylogenetically surrounds the older parts of the cerebral

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cortex, the subcortical structures of the medial hemispheres, and midbrain connections. The limbic system is involved in many other forms beyond the border region in controlling emotion, behavior, and impulse. It also has a vital role in memory (Simani et al. 2020). Anatomically, the limbic structures include the subcallosal, cingulate, and parahippocampal gyrus, hippocampal formation, amygdaloid nucleus, mammillary bodies, and anterior thalamic nucleus. Alveus, fimbriae, fornix, mamillothalamic tract, and stria terminals form the connecting pathways of this system.

The thalamus is known to play an essential role in communication with different parts of the human limbic system, acting as a modulator of the limbic system. The thalamus modulates sensory information, communicates with large areas of the cerebral cortex, and interacts with the limbic system as part of thalamic-limbic-cortical system projections. Such sensory information is essential for many limbic responses. It is known that the direct connection of the thalamus with the amygdala, which has a central role in the limbic system, is via the amygdalotalamic or thalamo-amygdaloid pathway, which was recently observed using the high spatial resolution diffusion-weighted imaging tractography technique (Kamali et al. 2020).

The limbic system comprises interconnected cortical and subcortical structures dedicated to linking visceral states and emotion to cognition and behavior (Mesulam 2000). The use of the term 'limbic' has changed over time. It was also introduced by Thomas Willis (1664) to denote a cortical boundary surrounding the brain stem. The cortex is the part of the central nervous system located in the most significant and highest part of the brain. The corpus callosum connects the right and left hemispheres with each other. Its outermost part is called the cerebral cortex. It has tasks such as organizing complex movements, storing learned experiences in memory, and receiving sensory information (Grodd et al. 2020). The cortex and limbic system are regions that play a role in face recognition.

The facial recognition process in the brain has a powerful emotional feature. People can rarely be indifferent to facial expressions in their relationships with other people. Each face has an expression. Although it tries to be uninterested in other people, it isn't easy to achieve this. Some people appear reliable, helpful, kind, dangerous, harsh, and unfaithful in this context. Therefore, this review aims to examine the function of the unconscious amygdala, which is located in the upper layers of the cortex. The other is in the limbic system, which is deep in the brain; in two different ways, the face recognition process.

Cortex, Limbic System, and Consciousness

The cerebral cortex consists of the cerebral hemispheres. The cerebral cortex, which consists of gray matter, contains about 10 billion neurons. Sulci and gyri increase the surface area of the cortex. The thickness of the cortex varies between 1.5 and 4.5 mm. The cerebral cortex comprises nerve cells, nerve fibers, neuroglia, and blood vessels. The cerebral cortex contains the following nerve cells. Pyramidal cells, stellate cells, spindle cells, horizontal Cajal cells, and Martinotti cells. The level of human consciousness is the joint activity of diffuse domains of cortical and subcortical structures and possibly the dual coexistence of other interconnected biological and astrophysical systems. Therefore, due to the complex nature of the origin and dimensions of consciousness, it is the product of the interaction and interconnection of complex biological and non-biological networks (Simani et al. 2020).

The structures that make up consciousness include cortical components consisting of frontal, anterior cingulate, posterior cingulate, medial parietal (precuneus, retrosplenial) cortex, lateral frontal insula, orbital frontal, and lateral temporal-parietal association cortex. Major subcortical networks regulating consciousness, including the thalamus and subcortical arousal nuclei, act through multiple neurotransmitters (glutamate, acetylcholine, gamma-aminobutyric acid (GABA), norepinephrine, serotonin, dopamine, histamine, orexin) originating from the upper brain stem, basal forebrain, and hypothalamus are structures that regulate the level of consciousness (Grodd et al. 2020).

Consciousness plays a vital role in face detection. Despite this, little is known about how individuals internally represent their faces (Felisberti and Musholt 2014). The ability to detect and distinguish social entities from inanimate objects is crucial to survival. From birth, identifying social agents and congeners is critical to our survival. Among other stimuli, faces provide essential information. Among other social cues in the environment, faces are probably the most important to humans as they convey relevant social data such as identity, age, gender, and emotions.

Humans specialize in processing faces, and evidence from behavioral, brain lesion and neuroimaging studies suggests that adult face processing involves specific face processing strategies performed by brain areas (Kanwisher 2010). These findings support the hypothesis that the adult brain is equipped with a neural circuit specialized in recognizing faces (Haxby and Gobbini 2011).

Fear Conditioning and the Amygdala

Most people learn behavior. Undoubtedly, this learning takes place through some conditioning, including the amygdala. During fear conditioning, input sensory stimuli are classified as unconditioned stimuli (US) or conditioned stimuli (CS). While the US elicits unconditioned responses, CS is neutral and passes through various brain regions: the thalamus, neocortex, and hippocampus. These stimuli are then fed via two pathways to a part of the amygdala called the lateral nucleus (LA). One is a direct route from the thalamus, where sensory information is transmitted rapidly, and the other is an indirect path through the cortices, where data is transmitted slowly. Sensory stimulus properties feed into the LA (Tanaka et al. 2020).

Facial Recognition and the Amygdala

Recent research has begun to elucidate the neural mechanisms of

responses to changes in facial attractiveness. Studies have shown that compared to average attractive faces, both stunning and weird faces induce greater amygdala activation, which answers to emotionally salient stimuli in the extended system (Winston et al. 2007). Facial expressions reflect decisions about the perceived meaning of social stimuli and the expected socio-emotional outcome of responding or not responding with a common word. The decision to produce a facial expression arises from the joint activity of the amygdala and a network of interconnected structures comprising multiple cortical and subcortical motor areas. Mutual conversions between these sensory and motor signals lead to different brain states that favor or inhibit the production of facial expressions. Anatomically specific motor areas control the upper and lower facial muscles. Facial expressions occupy the upper and lower face to varying degrees. Therefore, they require different patterns of neural activity distributed across more than one facial motor area in two areas in the ventrolateral frontal cortex, the additional motor area, and the cingulate cortex. It manifests itself in the co-activation of multiple motor areas that initiate the production of facial expressions.

Various regions, including the amygdala, monitor ongoing overt behaviors (the expression itself) and the latent, autonomic responses accompanying emotional expression. Beautiful faces provide greater activation in regions that respond to various positive-value stimuli. In contrast, bizarre or unattractive appearances produce greater activation in areas that respond to negatively valued stimuli. Attractive and abnormal faces elicit highly distinctive neural activation patterns in the whole brain and specific regions within the nuclear-extended face detection system. Average pretty faces produce similar neural activation (Zebrowitz and Montepare 2008). For this reason, people with beautiful facial features cause neural activity in different areas of the brain. Probably this effect creates positive impressions on the person. The lateral nucleus receives sensory inputs through direct projections from the thalamus and sensory junction areas of the cerebral cortex. For example, visual information about face recognition is transmitted from the anterior part of the temporal cortex to the lateral nucleus. Facial recognition and limbic system, amygdala connection pathways are represented in figure 1.

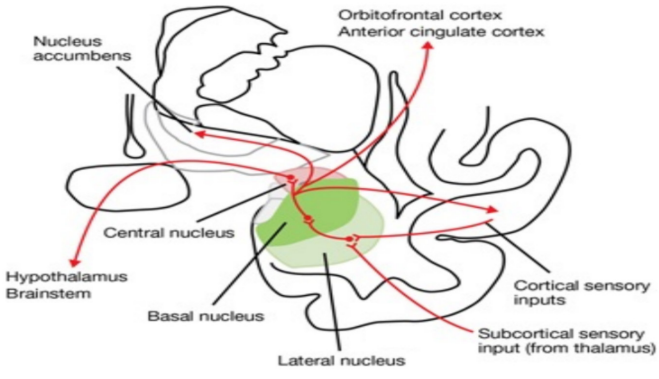

Figure 1. Limbic system and amygdala connecting pathways (Benarroch et al. 2017)

Face Processing in the Brain

People need to accurately infer the intentions and emotions of others to ensure successful social interactions. Faces are essential sources of information for understanding how others feel (de Gelder and Vroomen 2000). Based on Gibson's (1979) theory of object perception, the ecological approach to social perception argues that people's faces provide adaptive information about social interactions. For example, an infant's 'cute' face elicits protective responses to approach (Zebrowitz 1997). An angry face reinforces avoidance and defense responses (Marsh et al.). Although ecological theory assumes that our perceptions of faces will be accurate most of the time, it also proposes that adjustments to certain facial information can produce biased perceptions through overgeneralizing effects (Zebrowitz and Montepare 2006). Specifically, qualities accurately revealed by facial cues that characterize low vitality, infants, emotion, and identity tend to be perceived in people whose facial appearance resembles unsuitable infants, a particular feeling, or a particular identity. Thus, according to the ecological approach, facial appearance is important because some facial features are so helpful in guiding adaptive behavior that even a trace of these features can elicit a response. The errors produced by these overgeneralizations are assumed to be less maladaptive than those that may result from an inability to respond appropriately to people who differ in vitality, age, emotion, or familiarity. Also, generalizing across faces is just one example of the broader mechanism of cognitive stimulus generalization required for adaptive behavior. Ecological theory intersects with evolutionary psychology theories (Zebrowitz and Montepare 2006). It has much in common with a long line of research on nonverbal communication regarding responses to facial cues. It also complements contemporary models of face perception in the cognitive neuroscience literature. The dual-process model differentiates mechanisms for perception of identity versus perception of emotion and other variable facial features (Calder and Young 2005). Another is a model that predicts face recognition from the position of faces in a mental face space, where faces are encoded relative to an average face, with distances between faces representing similarities in their appearance. The ecological theory adds to these models by emphasizing that face perception drives behavior, expanding the domain of face perception to include perceived features and opportunities for social interaction and predicting these perceptions from the overgeneralization of adaptive responses (Zebrowitz and Montepare 2008).

Face processing in humans deals with a complex and distributed nervous system consisting of multiple regions (Haxby and Gobbini 2011). This system consists of a "core system" and an "extended system" working in harmony. The core system consists of three functionally distinct regions of the extrastriate cortex in both hemispheres. These are the lower occipital region, which contributes to the early stage of face perception, providing input to lateral fusiform gyri (fusiform facial area) for processing invariant features of faces and the superior temporal sulcus

for processing variable aspects. According to neuroscientists, the occipital face region is involved in an early stage of face perception; It activates very quickly after the presentation of a face (about 100 milliseconds) and recognizes the essential components of the face, eyes, nose, and mouth. These details are then transferred to other areas to process the information further. Face processing allows us to dive deep into the details, treating faces as a particular case, by helping our brains extract more complex data from the face fusiform area (FFA) than any other inanimate object of complexity.

The mental model of face processing proposed by Bruce and Young (1986) suggests that it is divided into two distinct processes, face detection, which is the capacity to detect that a given visual stimulus is a face, and face recognition, which is the capacity to recognize and sequentially identify whether a face is familiar or not. . Face processing relies on an irregular network of regions in the temporal and frontal lobes. It also includes other brain parts that don't usually deal with visual stimuli, such as the somatosensory cortex, an area primarily concerned with retrieving information about the sense of touch. Stimulation of the somatosensory cortex during the perception of facial expressions supports the "simulationist model." This model theorizes that to understand the meaning behind a facial expression, individuals try to copy the activity in their brains. Additionally, neuroimaging researchers have shown that similar brain regions are activated when someone watches an emotional expression when they try to imitate the same word. Numerous behavioral and neuroimaging studies have aimed to understand holistic perception and its role in face recognition. Most of these studies use Mooney's faces and assume holistic processing is involved (Verhallen et al. 2014, Verhallen and Mollon 2016, McCaffery et al. 2018). Since Mooney's face perception is subject to individual differences, and these individual differences in holistic processing depend on subject-specific top-down knowledge and prior experience, both individual subject-specific differences and individual stimulus-specific differences can be expected in holistic processing (Canas and Whitney 2020). Brain areas related to face recognition are represented in figure 2.

Sensory-Motor Models in Face Recognition

Motor-based models believe that the perceptual processes underlying the visual recognition of a facial expression activate "bodily-sensory and motor systems that largely overlap with those that support the production of the same facial expression" and are used to reconstruct facial expressions (Wood et al. 2016). Sensorimotor models suggest that understanding the emotional content employs a simulation process in which a viewer partially reproduces facial expressions in their sensorimotor system. An essential prediction of these models is that disrupting the simulation should make emotion recognition more difficult (Davis et al. 2017). It is suggested that the re-creation of a facial expression (sensorimotor stimulation) occurs at a sub-threshold level, possibly through facial mimicry (Krumhuber et al. 2014). The idea is that the sensorimotor stimulation of facial expressions activates the associated emotion system in the observer. The observer can experience the inner emotional state of the other person and use this information to recognize facial expressions (Wood et al. 2016). According to this mechanism, the simulated emotional state is compatible with visually observed emotional information of facial expression. Whether sensory-motor and visual processes provide congruent vibrant details in facial expression recognition is little known. Studies have shown that prolonged exposure to a facial expression (adaptation) induces impulsive adaptation effects (de la Rosa et al. 2013).

Motor-based facial expression recognition theories suggest that visual perception of facial expression is aided by the sensorimotor processes used to produce the same expression. Accordingly, sensorimotor, and visual processes should provide compatible emotional information about a facial expression (de la Rosa et al. 2018). Understanding the emotional states of others is thought to involve simulating the same situation in one's mind. Simulator models of embodied emotion argue that expression recognition cannot be performed as a disembodied cognitive process involving amodal matching of physical features with abstract concepts; instead, perception of this class of biologically meaningful stimuli relies on the activation of a distributed sensorimotor network that facilitates emotion recognition. The bodily, sensory, and perceptual elements encoded when we experience emotion are reactivated when we see the facial expression associated with that emotion (Niedenthal 2007). Key components of the emotional system combine inputs from the internal and external environments and initiate coordinated responses related to modulation of pain, emotional responses, stress, and motivated behavior. The sensory-motor regions and

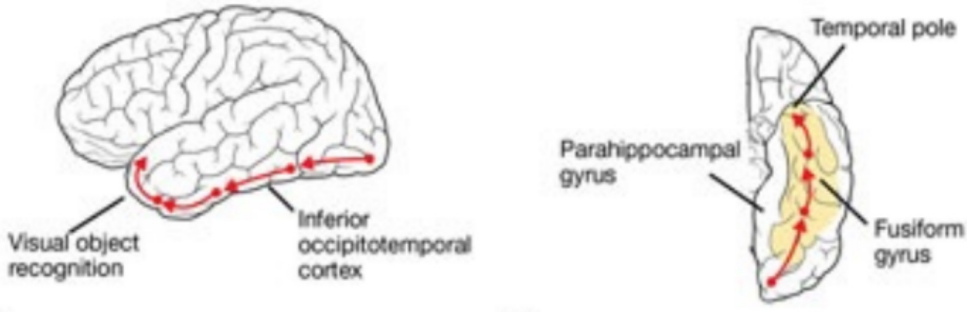

Figure 2. Face recognition fields (Benarroch et al. 2017)

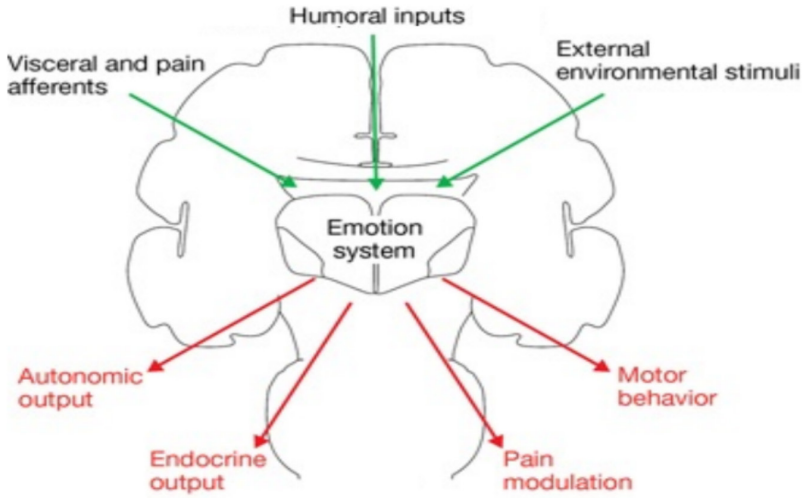

Figure 3. Inputs and Outputs of the Emotional System (Benarroch et al. 2017)

the relationship with emotion are represented in figure 3.

Perceptual Bias

People often unconsciously use stereotypes about groups they belong to or seem to belong to interpret everything done and spoke. Stereotyping is a form of categorization, something the human brain has evolved to do quickly and automatically. Throughout evolutionary time, the ability to quickly retrieve information from faces has given us an advantage in predicting character and behavior. Stereotypes are beliefs we hold about categories of people, and we categorize people in many ways. Although we try not to judge people by their outward appearance, this tendency is ubiquitous. Facial overgeneralization hypotheses illuminate precisely what we do and why even when our judgments are wrong (Zebrowitz and Montepare 2008).

There are categories like black and gay, and it creates many problems. The faces of strangers from other racial groups look less familiar than strangers from their group. Unfamiliar stimuli are generally less liked, and the beginnings of strangers from other races are perceived as less likable than those of strangers from their ethnicity (Rhodes et al. 2001; Zebrowitz et al. 2007).

Physical Characteristics and Perception

It is easy to conclude that the ability of the gay male with female eyes or delicate cheekbones, or the lesbian with a strong jawline, to detect sexual orientation depends solely on biological cues. Stereotypically, gay men are more emotionally expressive than straight men and adopt more feminine facial gestures, and some lesbians may express themselves more like straight men. Metrosexuals can trigger false alarms. In psychology the "Dorian Gray Effect", named after the character, refers to how internal factors such as personality or self-perception affect physicality. Just as our physical characteristics, in turn, affect how other people perceive us, this, in turn, affects how we feel and see ourselves. Sex hormones are one of the clear links between appearance and personality—testosterone and estrogen influence facial development and behavior. The human face is sexually dimorphic; The average male face differs from the average female face in the size and shape of the jaws, lips, eyes, nose, and cheekbones (Farkas 1981).

Even within gender, there are significant differences in these dimensions, leading individuals to appear feminine or masculine than the prototypical gendered face. While the source of this variability remains unclear, there has been considerable interest in the effect of testosterone, the most abundant androgen, in improving the facial structure. Genetically, sex is determined at conception, but gonadal hormones play a vital role in distinguishing male and female phenotypes throughout human development (Hines 2011). High testosterone manifests itself in solid jawbones, darker discolorations, and dimples in the cheekbones. Elevated testosterone has two sides. One is a sneaky, aggressive swindler, and the other is a solid and capable leader. Both stereotypes affect face perception. High estrogen manifests in smooth skin, a small chin, sparse facial hair, curved eyebrows, and full lips. But there are also less apparent stereotypes that can be incredibly powerful, including stereotypes based on facial features. While research on whether the perception of faces is associated with deviant behavior has not yielded convincing results, many studies have documented the impact of this perception on impression formation and social judgments. Perceived attractiveness and maturity of faces are the two main dimensions studied and have independent effects on impressions formed (Berry and Zebrowitz 1985).

Facial Expressions

The assessment of attractiveness is an automatic process and strongly influences how one judges a person on several other characteristics, including personality. Attractiveness is associated with the concept of facial beauty. Early studies focused on that attractive people have more socially desirable traits and happier, more successful lives than unattractive people (Dion et al. 1972).

Good looks also provide a well-documented "halo effect." The halo effect seems to be driven by the perception that "ugly is bad" rather than "beautiful is good" (Griffin and Langlois 2006). A beautiful man or woman is constantly evaluated in a positive light. Good-looking people are assumed to be smarter than their peers at home, although there is no correlation between intelligence and appearance above the average level of attractiveness.

Attractiveness is the quality of appearance that draws the most attention in research on facial impressions. People with more attractive faces, called the 'halo of attractiveness,' are evaluated more positively on many dimensions. They are perceived as more extroverted, socially competent, and robust, sexually sensitive, intelligent, and healthy (Zebrowitz and Rhodes 2004). Facial attractiveness is closely related to positive personality traits and creates a halo effect. Facial appearance leads people to judge others whose faces are attractive (Vrij 2004) honestly. Moreover, these impressions of features are accompanied by preferential treatment of beautiful people in various domains, including interpersonal relationships, professional settings, and the judicial system (Zebrowitz 1997).

Zebrowitz et al. (1996) show that doll face, attractiveness, facial symmetry, and large eyes have positive, independent effects on perceived honesty, eliciting doll face overgeneralization effect, charm halo effect. Symbolic associations of "eyes open innocence" and "distorted character". Consistent with a self-fulfilling prophecy, men who seemed more honest early in life became more accurate, especially when the outlook was stable. Women show an "artificial" effect. Those who were less natural early in life seemed more honest later on. These developmental effects were accompanied by different accuracy in perceiving honesty in males and females. Honesty was correctly read in men whose initial appearance of honesty was stable. Integrity has been misread in women with early absolute integrity. When these individual differences were ignored, actual and perceived honesty were unrelated.

The trap of facial perception is deception. Zebrowitz (1997) asked volunteers to rate people's trustworthiness based on headshot images taken during their lifetimes and compared the ratings of each face to the owner's scores on personality tests. While they found that men's reliability could be predicted early on, women's failed to do so. Women who were less honest in their youth appeared more natural, if not more trustworthy, in adulthood. This is because women can improve their appearance with cosmetics and hairstyles that make them look more honest, thanks to the halo effect. Dishonest women may be more likely to appear genuine than false men. Perceptions in everyday life seem to be easily biased and deceived. Studies have suggested that facial appearance, including attractiveness, influences fraud detection (Bull 2004).

Appearance interacts with personality in complex ways; Good-looking people consistently score higher on positive traits. According to meta-analyses by Feingold (1992), however the effect of attractiveness depends on the evaluative dimension considered. Thus, more social skills (extraversion, popularity, friendly attitude) are attributed to attractive people.

According to the ecological approach, faces that are less attractive, less average, less symmetrical, older, or less prototypical for their gender have lower social competence, social power, sexual sensitivity, intelligence, and worse social consequences and more negative social consequences. Creates an impression of health. These effects are seen across faces and sensors from various demographic groups. Also, insofar as overgeneralization contributes to self-fulfilling prophecies, it can explain accurate impressions of attractive looks versus average faces if such effects are present. Studies have revealed that different brain activation patterns may be associated with other behavioral responses to attractive and unattractive faces (Zebrowitz and Montepare 2008).

Maturity is about the difference between a baby-faced look and a mature look. Face measurements have defined features that determine whether a face is considered mature. Baby-faced people are perceived as more innocent and therefore more reliable than mature-faced people, whose eyes are large, thin, have higher eyebrows, have a broad forehead, have a round face, and have a small chin. The problem is that while real babies are less likely to harm on purpose, there's nothing to prevent baby-faced adults from doing so, and this stereotype significantly affects their chances of being punished when they do something terrible.

In one study, faces were evaluated on a scale. The results concluded that humans could easily distinguish between baby-faced and mature looks (Berry and Zebrowitz 1985). A few results suggest that baby-faced people are considered warmer, more generous, more excellent, kinder, and more honest than mature-faced people. However, they are considered weaker, less responsible, naiver, and more dependent. According to some researchers, this impression is related to being perceived as open, intelligent, and caring (Zebrowitz and Collins 1997). Facial features that distinguish real babies from adults' form images of infantile features, confirming the influence of babyfaces on impressions. Babyish features include more enormous eyes, higher eyebrows, smaller nose bridges, rounder and less angular faces, thicker lips, and lower vertical placement of components that create a higher forehead and shorter chin. Faces of all ages with one or more of these characteristics are perceived as more baby-faced, warm, honest, and weaker physically, socially, and intellectually than faces with more mature features (Zebrowitz 1997).

Effect of Face Shape on Penalties

Both the attractiveness and maturity dimensions of a face influence legal judgments. Attractiveness influences decisions and punishments, with attractive people being judged less severely than unattractive people. This effect has been observed in a controlled laboratory environment and field studies (Leventhal and Krate 1977). Field studies have looked at criminal and civil cases, with decisions made by professional judges or juries in real situations (Zebrowitz and McDonald 1991). People with a baby face are less likely to lose their case than people who are considered to have a mature look. However, it is seen

Figure 4. Digitally real facial expressions (Rennels et al. 2008)

that this effect also depends on the nature of the crime. A baby-faced defendant would be considered as less likely to commit a crime intentionally and more likely to commit a crime through negligence than a mature-faced defendant. Also, a baby-faced person found guilty of a willful crime will be punished less severely than a mature-faced person. Also, a baby-faced person will receive a lighter sentence for a crime committed through negligence than for the same crime committed intentionally. This effect also seems to depend on the maturity of the victim's face. Judgments are harsher when the victim is relatively baby-faced, and the defendant has a mature face. This effect is not seen when the victim has a moderately mature or relatively mature face. Research on attractiveness and maturity has typically looked at the impact of a particular face size; however, other studies have examined the effect of face perception (Bull and McAlpine 1998). Like baby facades, charm creates impressions about people's characteristics. Being naive, docile, weak, warm, and honest with baby-faced adults are perceived as having childish features. In addition, baby-faced people of all ages and both sexes experience social consequences with their perceived traits. For example, they are overlooked for mentally demanding tasks and leadership positions but preferred for jobs that require closeness. Also, they are more likely to be forgiven than their mature-faced peers when accused of intentional crimes (Montepare and Zebrowitz 1998).

Berry and Landry's (1997) colleagues found that baby-faced ones are warmer and less aggressive. Studies on baby-faced women do not show contradictory behaviors, and it is seen that childlike features are parallel to the stereotypes of femininity (Zebrowitz et al. 1998). Compared to mature-faced men, baby-faced men were moodier, belligerent, assertive, and hostile and showed higher academic achievement, which contradicted the impressions of baby-faced individuals. Also, in a sample of young men at risk of delinquency, more baby-faced men were more likely to be delinquent and more likely to commit crimes if delinquent (Zebrowitz et al. 1998).

According to Cicero, the face is the portrait of the soul; the eyes determine the soul's intention. The belief that the tendency to commit crimes is reflected in the front of the person goes back to the ancient Greek and Far Eastern civilizations. Attempts to provide a scientific rationalization for this idea began in the 14th century by mixing popular lore and learned knowledge. Faces and skulls have been extensively studied to reveal indicators of psychological dispositions. The study of facial features is practiced daily, consciously, or unconsciously, with the expectation of knowing what kind of behavior to expect from people with whom we interact in private and public life. Physiognomy was used until the 16th century. The interest of scientists in facial expressions in the 19th century dates to Charles Darwin; the findings show that how we perceive facial expressions can reflect not only facial expressions but also our conceptual understanding of what emotion means (Brooks and Freeman 2018). Guilt was seen as a state of nature to be reflected in the body, especially the facial stigmata. Biological data were used to generate criminal face typologies that allow the precise identification of criminals. Although these theories have long been of interest to society and have formed the basis of various practices, no scientific evidence has supported them. They became a subject of debate at the beginning of the 20th century (Oommen et al. 2003). Criminal identification "face profiling" is highly unreliable, partly because there are too many false alarms.

The influence of faces is shown in our impressions of people and our behavior towards them, such as whom we help, hire or seek appointments from (Zebrowitz 1997). Physiognomy helps determine the character of a person whose nature is otherwise unknown. Assists in recruiting, teaching, assessing candidates' abilities, and advising. It also helps a lot in understanding people where teamwork is required. Wells (1870), physiognomy; stated that it is used effectively in many areas such as exploring or making friends, choosing a life partner, establishing business partners and connections, and separating the innocent from the guilty in the courts of justice.

Conclusion

Facial expression showed that crime compliance increased the probability of a guilty verdict. Macrae and Shepherd (1989) have suggested that a person charged with a crime is more likely to be found guilty due to the guilty face effect if they have a face that "represents" that crime. Facial shape or expression influences criminal justice decisions (Zebrowitz and McDonald, 1991). Appearance is essential when our reactions to a face are arguably relevant to our choices and even when those choices need to be guided by more objective information (Zebrowitz et al. 1997).

Shows a neural substrate for the overgeneralizing effect of the infant's face; this mechanism highlights the necessity of

neuroscience of face perception that considers all the features perceived in faces, including identity and emotion and social category psychological characteristics (Zebrowitz et al. 2009).

Any face recognition process has strong emotional content. For any pair of emotions, such as fear and anger, the more a person believes these emotions are similar, the more visually similar these two emotions are on a person's face. The results show that we may differ slightly in the facial cues we use to understand the feelings of others because they depend on how we conceptually understand these emotions (Brooks and Freeman 2018). Some people seem trustworthy or kind to us. It shows that people with softer and baby-like facial features are highly perceived as innocent.

The tendency of people with soft facial expressions to be perceived as innocent/innocent is two ways that the face recognition process in the brain follows in the face recognition process. The first is located in the upper layers of the cortex and is conscious. The second is unconscious and is among the structures deeper in the brain. The unconscious works on the limbic system, and here is the amygdala, which we have understood until now to be one of the centers through which our emotions are controlled. If it is conscious, it works more slowly and tries to figure out whose face we are looking at and how we should treat the person with this face.

The conscious pathway, the cortex, works more slowly and tries to figure out whose face is being looked at and how the person with that face should be treated. However, the reason why a person suddenly creates the first impression is the limbic system, which makes an emotional state. Moreover, the amygdala, which is the essential part of the limbic system, creates this response and establishes a complex emotional relationship.

On the other hand, during fear conditioning, input sensory stimuli are classified as unconditioned stimuli (US) or conditioned stimuli (CS). While the US elicits unconditioned responses, CS is neutral and passes through various brain regions: the thalamus, neocortex, and hippocampus. These stimuli then supply a portion of the amygdala called the lateral nucleus (LA) in two ways. One is a direct route from the thalamus, where sensory information is transmitted rapidly, and the other is an indirect path through the cortices, where data is transmitted slowly. In the direct pathway, LA's sensory stimulus properties are fed.

As a result, people with soft facial expressions tend to be perceived innocent. This occurs through the conditioning of the cortex and limbic system pathways, the two paths followed by the face recognition process in the brain in the face recognition process. The unconscious limbic system, the conscious cortex, and the conditioning that mediates both states play an active role in the face recognition process.

Authors Contributions: *The author attest that he has made an important scientific contribution to the study and has assisted with the drafting or revising of the manuscript.*

Peer-review: *Externally peer-reviewed.*

Conflict of Interest: *No conflict of interest was declared by the author.*

Financial Disclosure: *The author declared that this study has received no financial support.*

References

Benarroch EE, Cutsforth-Gregory, JK, Flemming KD (2017) Mayo Clinic Medical Neurosciences: Organized by Neurologic System and Level. Oxford, Oxford University Press.

Berry DS, Landry JC (1997) Facial maturity and daily social interaction. J Pers Soc Psychol, 72:570-580.

Berry DS, Zebrowitz LAM (1985) Some components and consequences of baby-face. J Pers Soc Psychol, 48:312-323.

Brooks JA, Freeman, JB (2018). Conceptual knowledge predicts the representational structure of facial emotion perception. Nat Hum Behav, 2:581-591.

Bruce V, Young A (1986). Understanding face recognition. Br J Psychol, 77:305-327.

Bull R (2004) Training to detect deception from behavioral cues. In The Detection of Deception in Forensic Contexts (Eds PA Granhag, LA Stromwall):251-268. Cambridge, Cambridge University Press.

Bull R, McAlpine S (1998) Facial appearance and criminality. In Psychology and Law: Truthfulness Accuracy and Plausibility (Eds A Memon, A Vrij, R Bull):59-76. New York, McGraw-Hill.

Calder AJ, Young, AW (2005) Understanding the recognition of facial identity and facial expression. Nat Rev Neurosci, 6:641-651.

Canas BT, Whitney D (2020) Stimulus specific individual differences in holistic perception of mooney faces. Front Psychol, 6:585921.

Çiftci GG (2021) Limbic System. Research & Reviews in Health Sciences. Ankara, Gece Kitaplığı.

Davis JD, Winkielman P, Coulson S (2017) Sensorimotor simulation and emotion processing: Impairing facial action increases semantic retrieval demands. Cogn Affect Behav Neurosci, 17:652-664.

De Gelder B, Vroomen J (2000) The perception of emotions by ear and by eye. Cogn Emot, 14:289-311.

De la Rosa S, Fademrecht L, Bülthoff HH, Giese MA, Curio C (2018) Two ways to facial expression recognition? Motor and visual ınformation have different effects on facial expression recognition. Psychol Sci, 29:1257-1269.

De la Rosa S, Giese MA., Bülthoff HH, Curio C (2013) The contribution of different cues of facial movement to the emotional facial expression adaptation aftereffect. J Vis, 13:23.

Dion K, Berscheid E, Walster E (1972) What is beautiful is good. J Pers Soc Psychol, 24:285-290.

Farkas LG. (1981) Anthropometry of The Head and Face in Medicine. New York, Elsevier.

Feingold A (1992) Good-looking people are not what we think. Psychol Bull, 111: 304-341.

Felisberti FM, Musholt K (2014) Self-face perception: Individual differences and discrepancies associated with mental self-face representation, attractiveness and self-esteem. Psychol Neurosci, 7: 65-72.

Gibson JJ (1979) The Ecological Approach to Visual Perception. Boston, Houghton Mifflin.

Griffin AM, Langlois JH (2006) Stereotype directionality and attractiveness stereotyping: Is beauty good or is ugly bad? Soc Cogn, 24:187-206.

Grodd W, Kumar VJ, Schüz A, Lindig T, Scheffler K (2020) The anterior and medial thalamic nuclei and the human limbic system: tracing the structural connectivity using diffusion-weighted imaging. Sci Rep, 10:10957.

Haxby JV, Gobbini MI (2011) Distributed neural systems for face perception.

In Handbook of Face Perception (Eds A Calder, G Rhodes, MH Johnson, J Haxby):93-110. New York, Oxford University Press.

Hines M (2011) Gender development and the human brain. Ann Rev Neurosci, 34:69-88.

Isaacson R (2013) The Limbic System. New York, Springer Science.

Kamali A, Karbasian N, Sherbaf FG, Wilken LA, Aein A, Sair, HI et al. (2020) Uncovering the dorsal thalamo-hypothalamic tract of the human limbic system. Neurosci, 432:55-62.

Kanwisher N (2010) Functional specificity in the human brain: a window into the functional architecture of the mind. Proc Natl Acad Sci., 107:11163-11170.

Krumhuber EG, Likowski KU, Weyers P (2014). Facial mimicry of spontaneous and deliberate Duchenne and non-Duchenne smiles. J Nonverbal Behav, 38:1-11.

Leventhal G., Krate R (1977) Physical attractiveness and severity sentencing. Psychol Rep, 40:315-318.

Macrae CN, Shepherd JW (1989) Do criminal stereotypes mediate juridic judgements? Br J Soc Psychol, 28:189-191.

Marsh AA, Ambady N, Kleck RE (2005) The effects of fear and anger facial expressions on approach and avoidance related behaviors. Emotion, 5:119-124.

McCaffery JM, Robertson DJ, Young AW, Burton AM (2018) Individual differences in face identity processing. Cogn Res Princ Implic, 3:21.

Montepare JM, Zebrowitz LA (1998) Person perception comes of age: The salience and significance of age in social judgments. In Advances in Experimental Social Psychology (Eds M Zanna):93-163. San Diego, Academic Press.

Niedenthal PM (2007) Embodying emotion. Science, 316:1002-1005.

Oommen A, Oommen T (2003) Physiognomy: A critical review. J Anat Soc India, 52: 189-191.

Rennels JL, Bronstad PM, Langlois, JH (2008) Are attractive men's faces masculine or feminine? The importance of type of facial stimuli. J Exp Psychol Hum Percept Perform, 34:884.

Rhodes G, Zebrowitz LA, Clark A, Kalick SM, Hightower A, McKay R (2001) Do facial averageness and symmetry signal health?. Evol Hum Behav, 22:31-46.

Simani L, Raminfard S, Asadollahi M, Roozbeh M, Ryan F, Rostami M (2020) Neurochemicals of limbic system and thalamofrontal cortical network: Are they different between patients with idiopathic generalized epilepsy and psychogenic nonepileptic seizure?. Epilepsy Behav, 112:107480.

Snell RS (2010) Clinical Neuroanatomy. Washington, Lippincott Williams & Wilkins.

Tanaka Y, Morie T, Tamukoh H (2020) An Amygdala-inspired classical conditioning model implemented on an FPGA for home service robots. IEEE, 8:212066-212078.

Verhallen RJ, Mollon JD (2016). A New Mooney Test. Behav. Res. Methods, 48:1546-1559.

Verhallen RJ, Bosten JM, Goodbourn PT, Bargary G, Lawrance-Owen AJ, Mollon JD. (2014) An online version of the Mooney Face Test: Phenotypic and genetic associations. Neuropsychologia, 63:19-25.

Vrij A (2008). Detecting Lies and Deceit: Pitfalls and Opportunities. Chichester, Wiley.

Wells RDB. (1870) Faces We Meet and How to Read Them. London, Vickers.

Winston JS, O'Doherty J, Kilner JM, Perrett DI, Dolan RJ (2007) Brain systems for assessing facial attractiveness. Neuropsychologia, 45:195-206.

Winston R (2012) İnsan Beyni. Ankara, Say.

Wood A, Rychlowska M, Korb S, Niedenthal P (2016) Fashioning the face: Sensorimotor simulation contributes to facial expression recognition. Trends Cogn Sci, 20:227-240.

Zebrowitz LA, Montepare JM (2006). The ecological approach to person perception: Evolutionary roots and contemporary offshoots. In Evolution and Social Psychology (Eds M Schaller, JA Simpson, DT Kenrick): 81-113. New York, Psychology Press.

Zebrowitz LA (1997) Reading Faces: Window to the Soul? Boulder, Westview Press.

Zebrowitz LA, Collins MA (1997) Accurate social perception at zero acquaintance: The affordances of a gibsonian approach. Pers Soc Psychol, 1:204-223.

Zebrowitz LA, McDonald SM (1991) The impact of litigants' baby-facedness and attractiveness on adjudications in small claims courts. Law Hum Behav, 15:603-623.

Zebrowitz LA, Montepare JM (2008) Social psychological face perception: Why appearance matters. Soc Personal Psychol Compass, 2:1497-1517.

Zebrowitz LA, Rhodes G. (2004) Sensitivity to "Bad Genes" and the anomalous face overgeneralization effect: Cue validity, cue utilization, and accuracy in judging ıntelligence and health. J Nonverbal Behav, 28:167-185.

Zebrowitz LA, Bronstad PM, Lee HK (2007) The contribution of face familiarity to ingroup favoritism and stereotyping. Soc Cogn, 25:306-338.

Zebrowitz LA, Collins MA, Dutta R (1998) The relationship between appearance and personality across the life span. Pers Soc Psychol Bull, 24:736-749.

Zebrowitz LA, Voinescu L, Collins MA (1996) "Wide-eyed" and "crooked-faced": Determinants of perceived and real honesty across the life span. Pers Soc Psychol Bull, 22:1258-1269.