

Research article

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The Relationship Between Self-attitude and Oculomotor Patterns in Self-face Perception in Women

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Abstract

Introduction. The analysis of oculomotor activity makes it possible to better understand the perceptual strategies of self-face perception and to examine their associations with the mechanisms of self-attitude. Therefore, the study of the relationship between self-attitude and oculomotor activity in self-face perception is important. This study represents the first attempt to investigate self-face perception using eye-tracking in a mentally healthy sample of women and to compare the findings with women's self-attitudes. In young women the components of self-attitude that contain the assessment of others determine the perception of their own attractive and unattractive features. A mechanism focused on the internal processes is more characteristic of mature women.

Methods. The study used a psychodiagnostic method (Self-attitude Questionnaire by V. V. Stolin & S. R. Pantileev), structured interview, and a psychophysiological method (eye-tracking). The study sample comprised 31 women aged 20 to 48 years.

Results. In young women significant correlations were found between the following parameters: (a) index of attention to attractive facial features and such components of self-attitude as autosympathy ($r = 0.581$), self-blaming ($r = -0.589$), self-interest ($r = 0.543$), and self-understanding ($r = 0.509$); (b) percentage of time spent on viewing attractive facial features and the integral scale of self-attitude ($r = 0.513$); and (c) percentage of time spent on viewing unattractive facial features and the attitude of others ($r = 0.616$) and self-blaming ($r = 0.522$). In mature women, significant correlations were found between the following parameters: (a) index of attention to attractive facial features and self-esteem ($r = 0.610$); (b) total time spent on viewing

self-face and self-interest ($r = 0.524$); and (c) percentage of time spent on viewing attractive facial features and self-esteem ($r = -0.548$).

Discussion. This paper considers two mechanisms of self-face perception, depending on the age group of the respondents. The external mechanism of self-perception is characteristic of young women; the internal one is characteristic of mature women. The findings may be of great help to cosmetologists, plastic surgeons, and psychologists.

Keywords

face perception, eye movements, oculography, self-attitude, autosympathy, self-blaming, self-interest, self-understanding, self-esteem, attitude of others

Highlights

- Appearance is a key characteristic of self-identification that affects self-attitude. In turn, self-attitude is associated with self-face perception and manifests itself in increased attention to any facial traits or features.
- In young women self-face perception is associated with the following components of self-attitude: autosympathy, self-blaming, self-interest, self-understanding, integral scale of self-attitude, and attitude of others.
- In mature women self-face perception is associated with such components of self-attitude as self-esteem and self-interest.

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Introduction

Perceptual processing of human faces is a fast and exact cognitive process, which components are well understood by psychophysicologists. Numerous empirical studies have suggested various theoretical concepts of visual processing of faces. The functional model is the most famous. This model suggests that when perceiving faces individuals receive several types of information, including graphic, structural, and semantic ones, and also information related to the expressive component of facial expressions (Bruce & Young, 1986; Russell, Duchaine, & Nakayama, 2009). The ability to recognize faces depends on many psychological and psychophysiological characteristics and can be impaired in prosopagnosia (Garrido, Duchaine, & Nakayama, 2008).

Despite the large amount of research on the process of recognizing faces of others, few

studies provide insights into self-face perception. Most of the studies examine the relationship between various psychiatric diagnoses and organic disorders and the characteristics of perceptual processing of self-face images. Unlike other faces, the mental image of a subject's own face was formed through his/her repeated observations (Tong & Nakayama, 1999). Self-face perceptual processing can be impaired in many neuropsychological disorders. For example, compared to healthy individuals those with damage to the hippocampus and parahippocampal gyrus are more likely to recognize their own face as unfamiliar. In contrast, patients with lesions of the superior frontal gyrus and superior temporal sulcus are more likely to recognize faces of others as their own ones (Sui, Chechlacz, Rotshtein, & Humphreys, 2015). Mental disorders also affect self-face processing. For example, nearly 10 % of patients with schizophrenia cannot recognize themselves in photographs, although they do relatively well at recognizing familiar and unfamiliar faces (Irani et al., 2006; Heinisch, Wiens, Gründl, Juckel, & Brüne, 2013).

Visible facial skin lesions result in severe loss of the sense of self, for example, after facial disfigurement (Callahan, 2005). Despite this, self-face mental representations are rather plastic than static, influenced by multisensory stimuli. This plasticity is an adaptive specific characteristic for maintaining a holistic sense of self, despite the physical changes occurring over time (Felisberti & Musholt, 2014; Walton & Hills, 2012).

Self-face perceptual processing is associated with neural processes different to those associated with processing other faces, even when comparing one's own face with familiar faces (Alzueta, Melcón, Poch, & Capilla, 2019). Self-face perception differs from the perception of other faces and external body parts in that we can only see our faces indirectly (for example, in a photograph or reflected in a mirror). Self-identification requires self-orientation from a decentralized position and indicates a high value of self-related stimuli (Heinisch, Dinse, Tegenthoff, Juckel, & Brüne, 2011).

Self-consciousness is one of the most complex manifestations of human cognition and is a requirement for the feeling of Self and Others (Gallup, 1970; Keenan et al., 1999). Self-consciousness exists in various areas, including the physical sphere (body image) and the mental one (a complex of specific personal traits and qualities) (James, 1890).

Self-face recognition is of critical importance for the sense of identity and maintaining a holistic sense of self. The images that we see are the same images that others can see. A certain level of self-awareness is characteristic of children aged 1.5 to 2 when they recognize their own face in the mirror (Suddendorf, Simcock, & Nielsen, 2007). This ability is a prerequisite for reflexive self-consciousness (Gallup, 1970; Lewis, 2003) because it facilitates the construction and recognition of a perceptual facial image (Young & Brédart, 2004; Gallup, 1998). Thus, self-face recognition is often defined as a characteristic of reflexive self-consciousness, which should be distinguished from other more basic forms of self-consciousness (Zahavi & Roepstorff, 2011).

The attention mechanisms involved in processing self-related information represent an important aspect of the self that requires empirical research (Sui & Gu, 2017).

Current studies on the issues of self-face perception have certain specific characteristics. First, they focus on the body image perception, which is rather the body build than the face (Thaler et al., 2018). Second, they involve individuals with mental disorders, including body dysmorphic disorder (Ritter et al., 2020), eating disorders (Esposito, Cieri, di Giannantonio, & Tartaro, 2018), depression (Aftanas et al., 2019), and schizophrenia (Caputo et al., 2012). Third, they often focus on faces with visible abnormalities in result of injuries and tumors of the maxillofacial region (Callahan, 2005) or cleft palate (Meyer-Marcotty, Gerdes, Stellzig-Eisenhauer, & Alpers, 2011).

In Russian psychology studies on the perception of appearance were carried out within the framework of the social-perceptual approach. Physical appearance was studied as a component of the communication process. According to A. A. Bodalev, human face is the most important communication tool (Bodalev, 1982). Physical appearance is perceived by the reflected Others.

According to Russian researchers, personal characteristics, including perfectionism (Varlashkina & Dementii, 2010), self-attitude to a physical self-image (Cherkashina, 2012), and the attachment pattern (Tsurkin & Razuvaeva, 2013) determine satisfaction with self-appearance. For example, the degree of physical self-acceptance is higher in women with a high level of general perfectionism and a low level of socially prescribed perfectionism (Varlashkina & Dementii, 2010).

The research methods used play a significant role. The study of oculomotor activity in self-face recognizing makes it possible to obtain objective data on self-perception, and also to better understand the perceptual strategies that underlie the fundamental component of both physical and reflexive self-consciousness.

Methods

A sample of 31 women aged 20 to 48 years took part in the study (mean age 35.5 ± 7.3 years), 16 being included in the group of 'young women' (mean age 29.5 ± 4.3 years) and 15 being included in the group of 'mature women' (mean age 41.9 ± 3.3 years).

Study progress

Color portrait photographs of the respondents taken in a photographic studio before the experiment started were used as stimulus material. No makeup or post-processing were used to create these photos. Further, we showed each respondent her photograph on a computer monitor; the gaze was registered using an eye tracker. The structured interview and filling out the questionnaire were carried out after viewing the photograph.

The study used the following *methods*:

A *survey method* represented a structured interview, during which we obtained biographical data of the respondents and self-reports of attractive and unattractive features of their own appearance (examples of questions, "Which face region do you find especially attractive?", "What don't you like about your appearance (face region)?", "What do you think is your most attractive face angle (in relation to yourself) – right or left"?). The structured interview was conducted by an interviewer, who recorded responses. Further, we transferred these data into an electronic format in an Excel spreadsheet. Thus, for each woman we obtained a unique complex of features (for example, eyes, lips, nose were attractive features; shape of the face, wrinkles were unattractive ones) that they consider as their attractive or unattractive features. indicators as an area of interest in further data processing.

The Self-attitude Questionnaire (Gurevich & Borisova, 1997; Stolin & Pantileev, 1988) was used as a *psychodiagnostic method*. The questionnaire contains 57 statements that constitute the following scales: the integral scale of self-attitude, self-esteem, autosympathy, expected attitude from others, and self-interest. The questionnaire also contains seven scales measuring the severity of the attitude towards certain self-related internal actions, including self-confidence, attitude of others, self-acceptance, self-guidance, self-blaming, self-interest, and self-understanding.

Oculography using the Neurobureau software and hardware complex, including the GP3HD eye tracker at the sampling rate of 150 Hz (Shelepin, Shelepin, & Skuratova, 2019) was used as a *psychophysiological method*.

The oculography was performed by an eye tracking specialist. For the study, a place was organized taking into account the requirements for eye-tracking research (no illumination of the eye-tracker; a place where respondents sit still during the experiment). The respondent was in front of the computer where the image was later presented. The specialist gave the following instructions, "First, you will need to monitor the red dot for the eye tracker calibration. Further, your photo will be presented. Please look at your photo and say whether you like everything. You are not limited in time. When viewing is finished, please press the space bar". Thus, respondents could view their own images for an unlimited amount of time and complete the experiment by pressing the space bar.

For the statistical analysis of oculomotor activity, we identified areas of interest based on the data obtained from respondents in the process of the structured interview (a unique complex of attractive and unattractive facial features for each woman). Thus, the further analysis involved both attractive and unattractive facial features. For these areas, we analyzed the following indicators of oculomotor activity: (1) the total time of self-face viewing; (2) the percentage of time spent on viewing attractive features; (3) the percentage of time spent on viewing unattractive features; (4) the time until the first fixation on attractive features; (5) the time until the first fixation on unattractive features; (6) the number of returns to viewing attractive features; (7) the number of returns to viewing unattractive features; and (8) the index of attention to attractive features.

Statistical processing of the data was carried out using the statistical software R (version 3.5.1) using Spearman's correlation coefficient.

Results

The results of the structured interview indicated the following characteristics of self-perception of attractive and unattractive facial features. Young women most often considered eyes (34 %), lips (22 %), and nose (11 %) as attractive facial features and chin (23 %), nose (19 %), skin condition, dermatitis (15 %) as unattractive ones. Mature women most often considered lips (32 %), eyes (26 %), and nose (11 %) as attractive facial features and wrinkles, nasolabial folds (18 %), facial contours (14 %), and eyelids (14 %) as unattractive ones.

Therefore, we observed differences in the mechanisms of self-face perception in young and mature women, depending on the dominant characteristics of self-attitude.

Such characteristics of self-attitude as 'attitude of others' ($r = 0.616$; $p = 0.010$) and 'self-blaming' ($r = 0.522$; $p = 0.038$) determine the perception of unattractive facial features in young women. The importance of opinions and attitudes of others and the tendency to self-blaming and denial of self-related emotions contribute to a longer fixation on self-face unattractive features.

We also observed this pattern in the relationship between the index of oculomotor activity ('index of attention to attractive facial features') and characteristics of self-attitude. Thus, 'self-blaming' ($r = -0.589$; $p = 0.016$) has a negative correlation coefficient. This means that low levels of attention paid to attractive features are associated with high levels of openness to the perception of self-related negative emotions and a tendency to self-blame. 'Autosympathy' ($r = 0.581$; $p = 0.018$), 'self-interest' ($r = 0.543$; $p = 0.029$), and 'self-understanding' ($r = 0.509$; $p = 0.043$)

has positive correlations with the ‘index of attention to attractive features of appearance’. This means that young women who are in harmony with themselves and show interest in their own thoughts and feelings are ready to communicate with themselves on equal terms and are sure that they are interesting for others; they are more fixated on their attractive features, rather than unattractive ones, which, in turn, reinforces their self-esteem and self-attitude ($r = 0.513$; $p = 0.014$).

Table 1 shows Spearman correlation coefficients between indices of oculomotor activity and self-attitude in young women.

Table 1			
<i>Indices of oculomotor activity during self-face viewing and self-attitude in young women (n = 16)</i>			
<u>Oculomotor activity indices</u>	<u>Self-attitude</u>	<u>Spearman correlation coefficient</u>	<u>Significance level</u>
Index of attention to attractive facial features	Autosympathy	0.581	0.018
	Self-blaming	-0.589	0.016
	Self-interest	0.543	0.029
	Self-understanding	0.509	0.043
Percentage of time spent on viewing attractive facial features	Integral self-attitude scale	0.513	0.041
	Attitude of others	0.616	0.010
Percentage of time spent on viewing unattractive facial features	Self-blaming	0.522	0.038

In mature women the perception of attractive facial features is associated with such a component of self-attitude as 'self-esteem' ($r = -0.548$; $p = 0.034$); it concerns internal consistency, self-understanding, and self-confidence. We can assume that in mature women low self-confidence is associated with high rates of fixation on unattractive facial features.

This assumption is also confirmed by positive correlations between the 'index of attention to attractive features' and 'self-esteem' ($r = 0.610$; $p = 0.015$).

We also found a positive relationship between the total time of viewing self-face images and self-interest in mature women ($r = 0.524$; $p = 0.045$). This may be explained by the fact that with age self-face images undergo changes and may not coincide with women's mental self-face images. Thus, women with high rates of self-interest are more interested in changes in their appearance, which determines a longer viewing of their own faces.

Table 2 shows Spearman correlation coefficients between indices of oculomotor activity and self-attitude in mature women.

Table 2			
<i>Indices of oculomotor activity during self-face viewing and self-attitude in mature women (n = 15)</i>			
<u>Oculomotor activity indices</u>	<u>Self-attitude</u>	<u>Spearman correlation coefficient</u>	<u>Significance level</u>
Index of attention to attractive facial features	Self-esteem	0.610	0.015
Total time of self-face viewing	Self-interest	0.524	0.045
Percentage of time spent on viewing unattractive facial features	Self-esteem	-0.548	0.034

Therefore, we can conclude that the components of self-attitude and the perceptual strategy of viewing self-face differ depending on the age of women, which suggests the existence of different mechanisms of self-perception.

Discussion

Attitude towards self-face represents an important component of self-appraisal. Researchers argue that human face plays a decisive role in interpersonal interaction, because it is the most visible part of the body for the others (Inoue et al., 2015).

The findings of our study indicate that there is a relationship between eye movements during self-face perceiving and the components of self-attitude. We also observed differences in these components depending on the women's age, which suggests the existence of different mechanisms for perceiving attractive and unattractive facial features. Thus, young women's perception of facial imperfections is characterized by greater externalization, that is, orientation towards others; internalized mechanisms that are focused on internal self-related processes are more characteristic of mature women. Young women have numerous associations in their perception of attractive features. Mature women's perception of attractive facial features is associated only with 'self-esteem'. This observation may indicate that at a young age a more dynamic self-attitude contains more variables that depend both on the assessments of others and on internal attitudes, which may also be reflected in the dynamic attention to positive traits. In turn, mature women's perception of attractive facial features is mediated by a single component of self-attitude, which makes the recognition of all the pluses and minuses in their appearance more stable.

Delving deeper into the differences in self-perception, we may assume that young women are more involved in the processes of socialization, which entails risks in objectification.

According to L. Festinger's theory of objectification (Festinger, 1954), the process of female socialization involves a critical assessment of self-value, based on social standards (primarily, standards of appearance). In an objectifying culture socialization is mediated by interpersonal relationships and the media, which entails the process of self-objectification, when women start to evaluate themselves according to their appearance. B. L. Fredrickson defines self-objectification as the process by which a woman starts to "treat herself as an object to be looked at and evaluated" (Fredrickson & Roberts, 1997, p. 177). Self-objectification leads to negative consequences, including mental health disorders such as depression, dysmorphomania, and eating disorders (Moradi & Huang, 2008). Despite the fact that similar processes are to some extent characteristic of male socialization, women experience greater social pressure related to their appearance (Fox & Vendemia, 2016). Some researchers found that compared to mature women young women demonstrate higher self-objectification (Tiggemann & Lynch, 2001), which does not contradict our results.

Russian psychologists consider the issues of physical appearance within the framework of the 'I-for-Another' construct. According to Labunskaya & Pogontseva (2016), categorizing a person as beautiful or, conversely, ugly leads to a special form of discrimination – lookism.

The results obtained in this study may be useful to cosmetologists and plastic surgeons to understand the psychological reasons for patients' applying and to form a general understanding of problems (correcting unattractive features or, conversely, outlining attractive ones) and, as a result, to increase the level of client satisfaction.

Also, the results can be used in the practice of psychological counseling to change the strategy of perception of the body image and to shift the focus from unattractive features to attractive ones when working through internal mechanisms of self-attitude.

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V. S. Zueva carried out the eye-tracking study.

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