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ПОВІЛЬНІ СИГНАЛИ ОБЛИЧЧЯ ТА ЇХ ПСИХОДІАГНОСТИЧНЕ ЗНАЧЕННЯ
SLOW FACIAL SIGNS AND THEIR PSYCHODIAGNOSTIC VALUE

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Abstract. SLOW FACIAL SIGNS AND THEIR PSYCHODIAGNOSTIC VALUE. The current study is devoted to the identification of the scientific basis of permanent facial expression as a psychodiagnotic measure. The aim of the research is to investigate relationships between slow facial signs (SFS) and emotional personality traits with taking into account age and gender on the sample of Eastern Ukrainians (201 participants). To that end, we measured participants' personality traits levels and photographed their neutral faces in order to identify any SFS on the photographs of their faces. The test battery included the Spielberger state-trait anxiety inventory, Taylor manifest anxiety scale, Buss-Durkey hostility inventory, Vasserman social frustration questionnaire, Vasserman neuroticism scale, Personal differential inventory, "Draw-A-Person" and "Draw-A-Person-In-The-Rain" projective tests. We applied Facial Action Coding System (Ekman, Friesen, & Hager) to identify and interpret SFS on the photographs. We found that the most part of revealed SFS relates to anger (12) and sadness (11). The fewest number of revealed SFS relates to disgust / contempt (5), fear (4) and happiness (4). The elder a person becomes the more increasing number of SFS of sadness (highest rates), anger (lower rates), fear (still lower) and happiness (lowest rates) is expected in one's face. There are no significant differences in manifesting SFS between men and women. We found significant correlations between relevant SFS and traits anxiety, depression, and agressiveness (in its guilt and resentment aspects).

Keywords: facial expression, slow facial signs, emotional traits, anxiety, depressiveness, aggressiveness, happiness

Анотація. ПОВІЛЬНІ СИГНАЛИ ОБЛИЧЧЯ ТА ЇХ ПСИХОДІАГНОСТИЧНЕ ЗНАЧЕННЯ. Визначення наукової основи психодіагностики через постійні вирази обличчя є проблемою, якій присвячено це дослідження. Метою дослідження є аналіз зв'язків між повільними сигналами обличчя (ПСО) та емоційними рисами особистості з урахуванням віку та статі у вибірці східних українців (201 учасник). Щоб виявити ПСО були зняті фотографії нейтральних облич учасників. Рівень рис оцінювався за допомогою Опитувальника тривожності Спілбергера, шкали тривожності Тейлор, тесту ворожості Басса-Дарки, опитувальника соціальної фрустрації Вассермана, шкали нейротизму Вассермана, особистісного диференціалу, проективних тестів «Намалюй людину» та «Намалюй людину під дощем». Для виявлення значень ПСО з фотографій була застосована Система кодування обличчя (Ekman, Friesen, & Hager). Було виявлено, що більша частина виявлених ПСО відноситься до гніву (12) та суму (11). Найменша кількість виявлених ПСО належить до огиди / презирства (5), страху (4) та щастя (4). З віком на обличчі людей зростає кількість ПСО, що передають сум (найвищий ступінь), гнів (трохи менше), страх (менше) і щастя (найрідше). Відсутні суттєві відмінності у прояві ПСО між чоловіками та жінками. Виявлено значні кореляції відповідних ПСО з тестовими показниками тривожності, депресії та агресивності (у її аспектах почуття провини та образи).

Ключові слова: вирази обличчя, повільні сигнали обличчя, емоційні риси, тривожність, депресія, агресивність, щастя

Аннотация. МЕДЛЕННЫЕ СИГНАЛЫ ЛИЦА И ИХ ДИАГНОСТИЧЕСКОЕ ЗНАЧЕНИЕ. Определение научной основы психодиагностики при помощи постоянных выражений лица является проблемой, которой посвящено это исследование. Целью исследования является анализ связей между медленными сигналами лица (МСЛ) и эмоциональными чертами личности с учетом возраста и пола в выборке восточных украинцев (201 участник). Чтобы выявить МСЛ, были сняты фотографии нейтральных лиц участников. Уровень черт оценивался с помощью опросника тревожности Спилбергера, шкалы тревожности Тейлор, теста враждебности Басса-Барки, опросника социальной фрустрации Вассермана, шкалы

нейротизма Вассермана, личностного дифференциала, проективных тестов «Нарисуй человека» и «Нарисуй человека под дождем». Для определения значений МСЛ по фотографиям была применена Система кодирования лица (Ekman, Friesen, & Hager). Было обнаружено, что большая часть выявленых МСЛ относится к гневу (12) и грусти (11). Наименьшее количество выявленных МСЛ относится к отвращению / презрению (5), страха (4) и счастья (4). С возрастом на лицах людей растет количество МСЛ, которые передают печаль (в наибольшей степени), гнев (чуть меньше), страх (меньше) и счастье (в наименьшей степени). Отсутствуют существенные различия в проявлении МСЛ между мужчинами и женщинами. Выявлены значимые корреляции тестовых показателей тревожности, депрессии и агрессивности (в ее аспектах чувства вины и обиды) с соответствующими МСЛ.

Ключевые слова: выражения лица, медленные сигналы лица, эмоциональные черты, тревожность, депрессивность, агрессивность, счастье

Introduction. Everyday language, fiction and popular psychology often use such phrases as "a seal of an emotion on a person's face", "his / her face reflected will, lack of will, intellect, stupidity, depravity, intimidation, years of suffering..." etc. They show the possibility of revealing personality through one's face peculiarities. The present study is devoted to the identification of the scientific basis of this natural psychodiagnostics.

There have not been found quite so many mental correlates of constant facial expressions, although the number of substantiated studies relating to the issue increases permanently. At different times, P. Andrew, C. Bell, H. Braus, C. R. Darwin, E. Huber, F. Lange, P. F. Lesgaft, I. M. Sechenov and others proceeded on the assumption that frequent and continuous facial expressions would provoke permanent changes in facial features. Facial expression can provide some information about social motives and action tendencies, behavioural intentions and beliefs (Horstmann, 2002; Little, Jones, DeBruine & Dunbar, 2013); this could disclose character or personality structure within which social and cultural factors do not rank last (e.g., Davidson, 2012). For example, Stirrat & Perrett (2010) found growing trust in men with greater facial width; Wong et al. (2011) identified men with wider faces to be more financially successful; several studies showed significant

relationships between facial structure and aggression with the emphasis on a sexual dimorphism in the facial structure (Carré et al., 2008; Goetz et al., 2013).

Perceptions of facial expressions and facial features are closely related, and these perceptions may relate straight to personality traits (Said, Haxby, & Todorov, 2011). M. Bar, M. Neta & H. Linz (2006) showed that first impressions about a threatening personality could be made on the basis of the information available within the first 39 ms of the exposure of neutral faces unlike the mostly unconsistent and taking time impression about target person's intelligence. Emotionally neutral faces judged by respondents as the most trustworthy structurally resemble expressions of happiness, whereas faces judged as the most untrustworthy structurally resemble expressions of anger (Oosterhof & Todorov, 2008).

Many studies investigated interrelationships between 5-factor personality model and facial expressions. In particular, by using composite images rendered from three dimensional (3D) scans of women scoring high and low on 'B5' personality dimensions, A. Jones, R. Kramer & R. Ward (2012) proved that participants were able to identify agreeableness and neuroticism from neutral faces images. The signal of extraversion is strong and apparent in both human (Penton-Voak, Pound, Little, & Perrett, 2006; Borkenau, Brecke, Moettig, 2009) and chimpanzee static faces (Kramer, King, & Ward, 2011). In the study of Han Chinese sample (834 persons), applying the 'B5' and high-dimensional quantitative analyses of the 3D facial phenotypes, S. Hu et al. (2017) found that among the five personality factors, agreeableness and conscientiousness in males and extraversion in females were significantly associated with specific facial patterns. Appearance-based judgements of conscientiousness correctly predict grade point averages of university students that confirm presence of this trait cues on people's faces (Di Domenico, Quitasol, & Fournier, 2015). Some studies proved that the static faces contained cues to levels of depression and borderline personality disorder symptoms (Daros, Ruocco, & Rule, 2016; Scott et al., 2013).

There are some conceptions about anatomical and physiological mechanisms of facial expressions. Emotional facial movements or rapid facial signs (RFS), which reflect current emotions, and slow facial signs (SFS), which reflect constant facial expression,

correspond to physiognomic surface and medium facial levels respectively (Barabanschikov & Nosulenko, 2004) and are interpreted according to P. Ekman's neurocultural theory of emotion (Ekman, 1978). SFS arise due to physiological processes and gradual changes in mimical muscles and skin. For instance, personality traits such as threat (or hostility) may modulate facial appearance because their repeated expression affects the vascular, skeletal, and muscular properties of the face (Malatesta, Fiore, & Messina, 1987; Zajonc, 1985). The most important causes of SFS genesis are hypertonia and hypotonia of mimical muscles, loss of elasticity by skin. Therewith, RFS greatly matter for understanding the nature of SFS (in terms of Ekman & Friesen, 2003).

The face signalizes not only basic emotions (through RFS), but also tempers (Ekman & Friesen, 2003), emotional states (Ellgring, 1989) and even cognitive displays through emotional responses (Kaiser & Wehrle, 2001; Reisenzein, Meyer, & Schutzwohl, 2003). Tempers and states are supposed to display no distinct facial expressions and thereby appear through intermediary of basic emotions (Izard, 1991; Ekman & Friesen, 2003). Habitual patterns of emotions and dispositions to emotional states are defined as emotional personality traits (Cattell & Scheier, 1961; Izard, 1991).

So, on the one hand, it is logically to suggest that emotional traits can engender mental strain and present psychodynamics, – that is an implicit cause of permanent facial expression, while basic emotions are an uppermost explicit cause of facial expressions. SFS are then a shaped representation of psychic activity and reflect personality significant responses to socially determined stimuli from the perspective of an attempt at emotional self-regulation. Thus, permanent facial expression is a psychomotor indicator of psychic activity and persists as a projection of the psyche upon the body. On the other hand, J. Harrigan, K. Wilson & R. Rosenthal (2015) came to such a conclusion: 'There seem to be no consistent face, body, and gaze cues associated with trait anxiety'. L. A. Zebrowitz (2017) states: 'Typically, correlations are computed between perceivers' face-based ratings of traits (e.g., aggressiveness, competence) and indices of corresponding trait measures of the people whose faces are rated, and these correlations are compared with chance. Although some research has shown above-chance accuracy, effect sizes are often quite small'. Therefore, the issue is still quite controversial.

Our study is an endeavor to pursue the way of research into emotions that followed C. R. Darwin, S. S. Tomkins, P. Plutchik, C. E. Izard, and P. Ekman and others to describe permanent facial expression as a product of mental activity and to reveal its psychological content. SFS are notably seen as an integral image of individual identity, which includes experience, cognitions, emotional personality traits, both conscious and unconscious dimensions. According to the **hypothesis of this research**, SFS mean disposition to emotional traits that one experiences for a long time. **The aim of the research** was to investigate relationships between SFS and emotional personality traits with taking into account age and gender on the sample of Eastern Ukrainians. In particular, we attempted to determine whether SFS represented any underexplored aspects of interrelationships between facial expressions and personality traits and related to trait anxiety, depressiveness, aggressiveness, frustration, and neuroticism thereby.

Method

To measure the level of each selected personal trait (trait anxiety, trait aggressiveness, trait depressiveness, trait frustration, and neuroticism), we used a battery of questionnaires, psychosemantique and projective tests:

• Trait anxiety section of the Spielberger state-trait anxiety inventory (Russian version, modified by Y. L. Hanin);

• Taylor manifest anxiety scale (Russian version, modified by T. A. Nemchinov, supplemented with a lie scale by V. G. Norakidze);

• Buss-Durkey hostility inventory (included 8 subscales: Assault, Indirect hostility, Irritability, Negativism, Resentment, Suspicion, Verbal hostility, Guilt; Russian version, modified by A. K. Osnitsky);

• Vasserman social frustration questionnaire (modified by V. V. Boyko);

• Vasserman neuroticism scale;

• Two blanks of the Personal differential inventory (semantic differential scales adapted in V. Bekhterev Scientific Research Center). Participants self-reported appraisals of their own "I am calm" and "I am anxious" states (to find out their self-esteem aspects);

• "Draw-A-Person" (DAP) (K. Machover) and "Draw-A-Person-In-The-Rain" (DAPR) (Verinis, J. S., Lichtenberg, E. F., & Henrich, L.)" drawing projective tests were used to reveal anxious, depressive and aggressive tendencies.

To find out SFS, we organized an experiment of taking photos of the participants' neutral faces.

To identify meanings of each SFS, we applied Facial Action Coding System (FACS, Ekman, Friesen, & Hager, 2002a, 2002b) in order to avoid casual interpretations of permanent facial expressions, as appearances can have detrimental effects on the accuracy of judgments (Olivola & Todorov, 2010). The analysis of photos by using FACS allowed us to state that SFS appeared [topographically] on the place of RFS and that emotional meanings of SFS followed from the emotional functions of mimical muscles. Specific SFS were identified by comparison of the photos of participants' neutral faces and signs within FACS. Each SFS averaged from all one-type found patterns via modeling. On our sample, there were identified 35 SFS that formed groups depending on both their emotional meanings and semiotic attributes of basic emotions.

After having analysed the abovementioned literature and relying on our own observations, we state as follows: (i) there are facial patterns without diagnostic value; (ii) permanent facial features highly depend on different factors: genetic (heredity), psychological (temperament, personality traits, development trends), social (everyday life features, job, profession, cultural environment); (iii) facial expression is a system of emotional signs; (iv) permanent facial expression may reflect a subjective intrapsychic image of a person's life and not objective appraisal of reality; (v) a separate SFS can have a few meanings due to anatomy-based reasons. Mimical muscles react to a weakest emotional arousal (e.g. microexpressions): RFS are physiological reactions (muscular contractions) to emotional experience. SFS arise therefore from the work of specific muscles and present a sum of RFS. Also, age changes in skin and mimical muscles affect SFS.

A basic emotion is recognized by a combination of RFS. FACS often indicates a separate RFS for several basic emotions. Thus, there is a problem of accurate interpretation of SFS. It was solved by topographical anatomy data, account of emotional

functions of mimical muscles (for an overview, see Kupriyanov & Stovichek, 1988), and analysis of patterns of basic emotions. Thus, within FACS, there are codes that correspond only to one or two emotions (Ekman, Friesen, & Hager, 2002b, pp. 6, 174): "9": disgust, contempt, "11": sadness, "12": happiness, "14": contempt, "15": sadness, disgust, "16": disgust, "20": fear, "22, 23, 24": anger. The most intense degrees of emotions (smile, crying, sobbing, laughter, pain, suffering) described by Lange (1952) are furthermore very important for interpreting SFS as they are topographically identical with some SFS.

Participants

A total of 201 participants were randomized in this study, but questionnaires and photos of only 157 of them could be enrolled in the further research statistics due to the scores on the lie scale within the Taylor manifest anxiety scale. Thus, the final sample numbered 157 participants (59 male respondents, 98 female respondents) in age from 18 to 81 (M = 40 years, SD = 14.5) of different education, profession, and social status. The single weighty requirement concerned the appearance: in past history, participants had had no diseases affecting facial muscles and did not have any of their symptoms (e.g. pareses, tics, scars, injury consequences etc.). As facial expression is esteemed to be rather universal (e.g., Izard, 1991; Ekman & Friesen, 2003), our sample is random and represents a cross-section of society and not a profile of a separate stratum. All the participants are Caucasians from urban and rural areas of one region (Eastern Ukraine).

Research procedure

As embedding photos in the research required participants' permit, a particular item was thereto included to questionnaires (nevertheless, there are obvious restrictions on the application of the accumulated photographic database for open access due to ethical reasons). The photos were made under comfortable conditions for the participants after they had filled in questionnaires and performed drawing tests. Special requirements for participants in order to be photographed were the next: (i) emotionally neutral face expression at the instant of making a snapshot, facial muscles being relaxed; (ii) open forehead; (iii) spectacles taken off; (iv) moustache and beard do not hide mimetic wrinkles (for men), no make-up (for women). The photos obtained are color ones of 1536 × 2048 pi resolution.

Results

Decoding permanent facial expression

On the assumption of the above mentioned, all SFS compose three groups: (i) properly emotional SFS (permanent mimetic wrinkles; eye expression constituted exclusively by mimical muscles; skin folds / creases / swellings indicative of significant muscular tension; general tone of mimical muscles); (ii) age wrinkles indicative of face tissue and bone regression and wide of emotional expression; (iii) pathophysiognomic signs indicative of pathologies of any etiology (e.g. bags under one's eyes, lymphatic edemas, mimetic pareses and paralyses, ptosis etc.). Only emotional SFS interested us, the significance of other groups are to be assessed additionally. The determination and explication of emotional SFS ended in detecting the next groups:

• twelve SFS of anger (derived from RFS expressing basic emotion of anger);

• four SFS of fear (derived from RFS of fear);

• eleven SFS of sadness (derived from RFS of sadness);

• five SFS derived from RFS of disgust and contempt;

• four SFS of happiness (derived from RFS of happiness);

• three SFS with unidentified meaning.

The fewest quantity of SFS of happiness seems correct, as the basic emotion of happiness could be considered a social one and its meaning therefore inappropriate to a situation or context (Crivelli, Carrera, & Fernández-Dols, 2015). Also, we proved Levenson's findings (1992) that physiological arousal caused by negative emotions was stronger in comparison with positive emotions, as SFS derived from fear, anger, disgust, sadness, and contempt were common, whereas SFS of happiness were too rare.

Empirical substantiation of diagnostic value of SFS

To prove our hypothesis, we tested convergent validity of SFS by using Spearman's correlation analysis. We associated SFS of anger with trait aggressiveness, SFS of fear with trait anxiety, and SFS of sadness with trait depressiveness. It was plausible to state presence or absence of facial patterns for each personality trait, which was considered as a measure of SFS. We counted them like that: '0' – no SFS for a certain trait, '1 point' – 1 SFS, '2 points' – 2 SFS and continuing similarly.

Using personal inventories

Trait anxiety

According to the Spielberger inventory, 49% of participants had a moderate form of trait anxiety, 45% had its severe form, the Taylor scale: 61% and 38% respectively. 38% of participants had SFS of fear and were highly anxious. Some moderately anxious participants also had SFS of fear, yet some highly anxious did not. In whole, participants scored low in SFS of fear (M = 0.74, SD = 0.786). As anxiety is tightly linked with neuroticism (Matthews, Deary, & Whiteman, 1998; Ormel et al., 2013), we applied the Vasserman neuroticism scale and determined that 72% of participants had a moderate form of neuroticism and 4% had its severe form.

Correlation analysis revealed direct moderate relationships between SFS of fear and anxiety rates measured by both the Spielberger inventory (Spearman's rank correlation coefficient ρ = .398, p < .001) and the Taylor scale (ρ = .312, p < .001), as well as neuroticism rates measured by the Vasserman scale (ρ = .222, p = .005). That allowed us to consider SFS of fear as displays of trait anxiety or disposition to anxious reactions.

Also, there were clear manifestations of SFS of sadness among both moderate and highly anxious participants (52% and 34% respectively). It could back Izard's views on the complexity of anxiety involving fear, sadness, shame, and guilt. We found SFS of sadness being linked to trait anxiety (Spielberger inventory: ρ = .398, p < .001; Taylor scale: ρ = .356, p < .001). This is consistent with the data about depression and anxiety disorders comorbidity, namely that more than 70% of individuals with depressive disorders also have anxiety symptoms (Wu & Fang, 2014).

Trait aggressiveness

The averaged values of the Buss-Durkey inventory subscales being calculated, the prevailing ones were those of negativism, resentment, guilt (in other terms, self-aggression), indirect and verbal hostility. It could disclose hostile rather than properly aggressive behavioural trends. SFS of anger were truly abundant within the sample (M = 2.97, SD = 1.525): only 4% of participants had no SFS of anger. Such an exclusive prevalence of SFS of anger did attract attention: they were detected amongst participants having low, moderate and high averaged scores on hostility subscales. A special attention

should have been paid to low scores (23%) with more than one detected SFS of anger. As passive trends, conformity, social desirability, and restrained feelings assign to low values of hostility (as predicts the Buss-Durkey inventory), the co-presence of SFS of anger seems to reveal hidden aggressiveness. Indeed, unlike both fear and sadness, anger is often restrained, as its expression is meant socially undesirable. Controlled feelings represent mental strain and show themselves in facial expression.

There was no correlation between SFS of anger and both values of hostility subscales and hostility indexes ($p > .05$). Meanwhile, the established relationships between SFS of anger and scores on resentment ($\rho = .196$, $p = .014$) and guilt ($\rho = .184$, $p = .021$) subscales confirm the primary function of frustration, pain, disappointment etc. for aggressive reactions (Berkowitz, 1983; Izard et al., 1987; Dill & Anderson, 1995). People often experience feelings of resentment and guilt when they have no opportunity to express their anger; they do not get satisfaction when treated unfairly. Therefore, we consider SFS of anger as displays of trait hostility in its resentment and guilt components.

Trait depressiveness

Facial patterns of sadness are multifunctional: they convey sadness, grief, crying, sobbing, woe, pain, suffering, and disappointment. A prototypical situation for sadness experience is a feeling of loss (Parrott, 2011), which matches well with the interpretation of frustration, resentment, and guilt.

In our study, depressiveness is embodied by rates of the Vasserman social frustration questionnaire and both resentment and guilt rates of the Buss-Durkey hostility inventory. 23% of participants had a moderate level of frustration, only 1% had its high level. 31% of participants had moderate scores on the resentment subscale, 32% – high scores; the guilt subscale: 20% and 74% respectively. Participants scored high in SFS of sadness (M = 2.01, SD = 1.491). There was a positive correlation between SFS of sadness and (i) social frustration ($\rho = .187$, $p = .019$), (ii) guilt ($\rho = .190$, $p = .017$), and (iii) resentment ($\rho = .213$, $p = .007$). We associated those rates with trait depressiveness (pessimism, melancholia), as the last arose from the total of life events and personality experience (Romanov et al., 2003). Vasserman social frustration questionnaire shows the summative dissatisfaction level of one's education, intimacy, professional activity, social

status, finances, housing and work conditions, situation in society; consumer, medical, leisure services; possibility to spend a vacation, possibility of choosing a work place, way of life in general. Frustrated expectations, self-pity, loss of values etc. incorporate depressive feelings and are likely to evoke facial patterns of sadness.

Psychosemantic approach to studying SFS

The scales of the Personal differential inventory include three classical factors of the semantic differential: evaluation (E), potency (P), and activity (A). As we studied the domain of emotion, the "I am anxious" blank could be useful for the interpretation of all the traits under investigation.

The comparison of E-, P-, and A-factors of both "I am calm" and "I am anxious" blanks showed that the averaged values of E- and A-factors from the "I am calm" blank (M (E) = 14.5, M (A) = 5.06) were higher than those of the "I am anxious" blank (M (E) = 6.1, M (A) = 3.87). The scores indicated negative self-esteem, discontent about oneself, and activity loss while being anxious. Meanwhile, the averaged values of P-factor from the "I am calm" (M = 5.69) and "I am anxious" blanks (M = 6.06) were close and signified that a person counted oneself equally able to acting in both states and confident in one's world-view.

There was no correlation between E-, P-, and A-factors of both blanks and SFS of anger (p > .1). Still there was an inverse correlation between SFS of fear and values of P-factor from the "I am calm" blank (ρ = -.191, p = .016), which confirmed the interpretation of SFS of fear as displays of trait anxiety. Also, there was an inverse correlation between SFS of sadness and values of P-factor from the "I am calm" blank (ρ = -.213, p = .007), which could prove a depressive meaning of SFS of sadness. The findings determined that the reduction of P-factor rates would decline one's assertiveness, self-esteem and self-control over emotions. It could provoke facial patterns equivalent to those of negative emotions.

Using projective tests

After the participants had performed DAPR and DAP drawing tests, projective test-factors identified within tests blanks were divided into three groups: (i) 10 anxiety factors, (ii) 11 aggressiveness factors, (iii) 9 depressiveness factors. As there was no conventional

scale of measure, test-factors were coded into an ordinal scale; thus, the more test-factors were identified in a blank, the higher level of a trait was supposed.

There was a positive correlation between SFS of fear and anxiety factors of both DAPR (ρ = .218, p = .008) and DAP (ρ = .202, p = .011) tests. SFS of anger did not correlate with aggressiveness test-factors (p > .1). It corresponded to the results of personal inventories, so long as projective tests did not distinguish aggressive and hostile trends (e.g. resentment and guilt). SFS of sadness displayed relationships with all test-factors. SFS of sadness correlated with depressiveness factors of both DAPR (ρ = .158, p = .049) and DAP (ρ = .234, p = .003) tests and thus communicated directly with depressive feelings. Furthermore, SFS of sadness correlated with anxiety factors of both DAPR (ρ = .242, p = .002) and DAP (ρ = .181, p = .023) tests. There was also a weak inverse correlation between SFS of sadness and aggressiveness factors of DAP (ρ = -.200, p = .012) test.

Investigating SFS of happiness

Within the sample, SFS of happiness were too rare (M = 0.43, SD = 0.61). As we supposed them to relate to optimism, we decided to check out whether SFS of happiness referred to observable personality traits and submitted to analysis the results of the whole battery. Among the significant values appeared P-factor from the "I am calm" blank of the Personal differential inventory (ρ = .245, p = .002). As here, P-factor expresses calmness, peace of mind, and high assertiveness and self-esteem, this reveals that SFS of happiness relate promptly to positive emotions. A trend to a weak but positive correlation between SFS of happiness and values of E-factor from the "I am calm" blank of the Personal differential inventory (ρ = .148, p = .064) is a proof that happiness experience is a component of one's high self-appraisal. We also found a trend of significant relationship with anxiety factors of DAP projective test (ρ = -.137, p = .088), a result suggesting that one gains less positive emotional experience in an anxious state, which grips face features. All these findings confirm that SFS of happiness really have diagnostic value for identifying optimism trait.

Age and gender aspects of SFS

It is known that men demonstrate more aggressive trends than women (Campbell, 2002), while women are more anxiously inclined (Mufson, 2008). We assessed if those facts related to SFS. No significant gender differences in SFS were associated with trait anxiety, trait hostility, and trait depressiveness (p ≈ 1.0, Kolmogorov-Smirnov test). Nevertheless, the correlation analysis showed up statistically significant relationships between participants' age and SFS of happiness ($\rho = .173$, $p = .031$), of fear ($\rho = .257$, $p = .001$), of anger ($\rho = .354$, $p < .001$), and of sadness ($\rho = .494$, $p < .001$), i.e. permanent facial features least displayed both optimism and trait anxiety, but trait hostility and trait depressiveness above all. Therefore, the number of SFS would increase with age.

Conclusions

1. The comparison demonstrated that SFS related closely to RFS and corresponded to emotional functions of mimical muscles. The most part of revealed SFS relates to anger (12) and sadness (11). The fewest number of revealed SFS relates to disgust / contempt (5), fear (4) and happiness (4). We found that the elder a person becomes the more increasing number of SFS of sadness (highest rates), anger (lower rates), fear (still lower) and happiness (lowest rates) is expected in one's face. There are no significant differences in manifesting SFS between men and women.

2. Direct correlations between SFS of fear and psychometric, psychosemantic and projective tests measures confirmed the interpretation of SFS of fear as relating to trait anxiety, neuroticism and negative self-esteem. Therefore, SFS of fear predominantly reflect these personality traits.

3. We attributed depressive meanings to SFS of sadness due to positive correlations with depressive projective factors and a negative correlation with aggressive projective factors within projective tests; correlations between higher levels of social frustration, guilt, resentment, and low self-esteem and SFS of sadness also confirmed our interpretation. Moreover, SFS of sadness correlated directly with anxiety levels measured by different tests. This is consistent with the fact that depressive and anxiety symptoms have high comorbidity.

4. We were able to confirm the interpretation of SFS of anger as relating to anger or aggression only by guilt and resentment subscales of Buss-Durkey hostility inventory.

That finding interpretes SFS of anger not as a diagnostic sign of aggressiveness but rather as sign of residual aggression (e.g., feelings of guilt after anger expressed outward and led to bad consequenses, as well as resentment with no opportunity to express anger in an appropriate activity). On the one hand, modern societies do not allow people to express their anger in open instant fights that reflects mismatch between new social circumstances and an old environment where humans evolved. On the other hand, particularly in Ukraine, people often have no opportunity to get satisfaction by the unperfect court system and often remain feeling injustice and correspondingly resentment.

5. Whereas we have not planned analyse positive emotional traits such as optimism, calm or wellbeing, we did not include appropriate tests to our test battery. Nevertheless, as we revealed SFS of happiness, we validated them with applied tests: there was a direct correlation between SFS of happiness and assertiveness and high self-esteem from psychosemantic method and a negative correlation with anxiety projective factors of projective test DAP. SFS of happiness correspond to these traits.

We confirmed thereby our hypothesis in general as significant relationships between SFS and personality emotional traits and age showed that SFS had certain diagnostic value.

Limitations of the research. As perceived intentions from the face may result from emotional resemblances, facial features originating in facial musculature loose in accuracy in comparison with static signs (Hehman et al., 2015). Therefore, an interpreter is not free from cognitive biases when interpreting SFS on one's face and making a judgement about it. To avoid this, an interpreter should know the map of SFS on the face, i.e. their origin, but this does not exclude contingent interpretations. While Hehman et al. (2015) showed that dynamic facial features were less consistent in judgements of the face, we found SFS rather reliable. An extra problem is that some categories of people (e.g. VIP, aggressive and egoistic individuals) could not get into our sample, as they usually disagree about taking part in researches).

Prospects of the research. The research provides some of the experimental evidence that SFS can be used for emotional personality traits diagnostics. Nevertheless, there still remains many issues for further research: SFS with unidentified meaning,

validation on a more sizeable sample, relations between SFS and traits aggressiveness and optimism (calm, wellbeing), universal cross-cultural comparisons of SFS.

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