Verbal Intelligence Is Linked to the Assessment of Specific Facial Personality Features

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***Abstract*:** *The ability to recognize various features of human face is without doubt evolutionary very important skill. There are various studies concerning this issue – they investigated many variables on the side of the observer as well as on the side of evaluated face. Our study concentrates on the intelligence of the observer and the ability to detect the presence of dominant/ submissive features and features of extraversion/introversion in male facial composites. The research has been realized on the sample of 1,298 Slovak females with the mean age of 24.43 years (minimum = 17 years; maximum = 84 years; st. dev. = 9.491 years). The results show, that females who assessed the presence of dominant/ submissive features in male facial composites correctly scored significantly (Asymp. sig. = 0.011) higher in verbal intelligence test than females who assessed the features wrong. However, this difference was not present in the assessment of the features of extraversion/introversion (Asymp. sig = 0.997). The importance of dominance vs. extraversion detection is discussed in the context of evolutionary issues together with other possible explanations and suggestions for further research.*

Keywords: *Facial features, assessment, verbal intelligence, personality features, dominance/submissiveness, extraversion/ introversion.*

1. Introduction

The ability to recognize various features of human face is without doubt evolutionary very important skill. For the survival of the individual it is essential to be able to discriminate from the very first moment of life, whether e.g., the face of the other person belongs to own mother or to a foreigner, to a man or a woman, whether it expresses friendly or hostile attitudes, whether it looks healthy or stricken, and also, whether it reflects specific features as femininity, beauty or intelligence [1]. Except the social value of such information, they bear evolutionary significant data; e.g., femininity and beauty points to the presence of health, fecundity [2], and the ownership of „good genes“ [3]; intelligence the capability to cope with new problems, etc. The connection of specific facial features with evolutionary important information otherwise hidden from the eyes of observer have been studied and proved by many researches (e.g. [4]–[6]).

Similarly, as in the case of feminine/masculine features or attractiveness, also the ability to detect personality features is important for the survival. For example, dominance present in males favors them in the fight for the resources or for the position in social group. Dominant subjects are therefore more successful in survival and thus better as potential sexual partners. Dominance can be visible in behavior; however, when there are no behavioral cues present, subjects have to rely on the detection from the face. It has been proved, that we actually are very sensitive to the cues of dominance present in the human face [7]. Dominant face shape has been suggested as an honest signal of male quality [8] and already teenage boys with more dominant faces report sexual activity at a younger age and report more copulation opportunities than those with less dominant faces [9]. Studies also show, that the formation of dominance features in the face depends on the testosterone levels [10].

Among various personality features, extraversion/ introversion belongs to the relatively well studied. Its importance lies in the fact, that extraverted behavior eases an establishment and maintenance of social relationships [11] and promotes the social status of a person [12]. Extraverts are usually more successful in the competition for a partner than introverts [13]. In men, extraversion correlates with physical strength, a trait conducive to short-term mating success [14], [15]. The ability to detect this personality feature from the face

seems to be very good – researches show, that already after 50 milliseconds of a gaze at human face, subjects are able to correctly determine whether it is the face of an introvert or an extravert [16].

The detectability of the certain personality features from the facial cues depends not just on their visibility, but also on the ability/sensitivity of the observer to register them. There are circumstances under which is the facial assessment rather downgraded. Autistic individuals [17], individuals with social anxiety disorder [18], developmental prosopagnosia [19] or Möbius sequence [20], young children and children with ADHD [21] show difficulties and less accuracy in the assessment and evaluation of human faces. On the other hand, there are "super-recognizers" – individuals that are extraordinarily good in recognizing faces. However, this ability is usually interpreted just as the high end of a broad distribution of face recognition ability (with opposite end in prosopagnosia) with no evidence that the face recognition processes of super-recognizers to be qualitatively different than normal [22]. Most of the studies considering the face assessment investigate individual preferences [23], [24] not abilities to assess, evaluate or recognize faces. If they do so, they usually orientate towards difficulties/disabilities, or they study e.g. gender or age differences, not the connection between super-recognizing abilities and other individual characteristics.

In our previous research [1], we revealed, that subjects with higher intelligence better assess the levels of intelligence of facial composites compared to the subject who scored lower. As intelligence is defined also as the ability to make the right social judgments [25], it may also facilitate feature detection from the faces. In this study, we decided to investigate whether verbal intelligence also helps to assess personality features (dominance/submissiveness and extraversion/introversion) of human face. We examined, whether there is a difference in verbal intelligence score in women who assess the features of dominance/submissiveness and the features of extraversion/ introversion correctly compared to those women, who assess these features wrong.

2. Procedure and Methods

All data were gained within the data collection using the battery of questionnaires. The participants took part in the research voluntarily. After a short exposition of the main ideas of the research and after granting oral consent they continued by completing a battery of questionnaires, tests and sets of questions and tasks. Only the main area of research was disclosed to the participants, otherwise they were blind to the aims of the specific tasks and questions.

2.1. Intelligence Measurement

For the measurement of intelligence, the "Test of the Level of Mental Abilities" [26] has been used. As in our previous research [1] we revealed, that verbal intelligence is tight closer to the assessment of facial features than the visual-spatial, we used the subtest for measuring the verbal abilities. The Test of the Level of Mental Abilities has been standardized to Slovak population. The subtest for measuring the verbal abilities consisted of twenty items. The task was to create a word from the group of letters (different for each task) using all of them. The first letter from the word was set and the word had to be a noun in singular and basic form (Slovak language has declinations in nouns). Each task had only one correct solution. The minimum score a subject could gain was zero, the maximum was twenty.

2.2. Facial Composites for Dominance/Submissiveness

Two facial composites representing male dominant and submissive faces were used from the study of Robinson, Blais, Duncan, Forget, and Fiset [27]. The facial composites were made from nearly three hundred faces, that were computerized and according to data gained from the evaluation of dominance and submissiveness. The visibility of the visual information that influences the judgement toward higher dominance or lower dominance was either increased or decreased and were represented by two facial composites (Fig. 1).

Fig. 1 Facial composites representing dominant (left) and submissive (right) male face [27, p. 5]

Female participants were asked, which one of the two presented facial composites is more dominant. If they assigned the left facial composite, their evaluation of the facial features of dominance/submissiveness was right; if they assigned the left facial composite, their answer was wrong.

2.3. Facial Composites for Extraversion/Introversion

Two facial composites representing male introverted and extraverted faces were used from the study of Penton-Voak, Pound, Little, and Perrett [28] (Fig. 2).

Fig. 2 Facial composites representing introverted (left) and extraverted (right) male face [28, p. 622]

For the creation of facial composites, the individuals completed the self–report extraversion/introversion questionnaire. Further on, the 10% of individuals (15 faces) who scored highest and the 10% who scored lowest were selected and used to make composite faces. To construct composites, 219 standard feature points were marked on facial landmarks on each face. The mean coordinates of each delineated feature point were then calculated to generate average shape information [28].

Female participants were asked, which one of the two presented facial composites is more introverted. If they assigned the left facial composite, their evaluation of the facial features of extraversion/introversion was right; if they assigned the left facial composite, their answer was wrong.

3. Subjects

As the judgement of male faces depends on the sex of the evaluator, subjects in our study were only females. Out of 1,405 Slovak female participants 102 (7,26%) were excluded due to incomplete or incorrectly filled-in questionnaires. As the main stimuli of our study were male facial composites made from Caucasian faces [27], [28], they represented a specific facial prototype. Belonging to different race can affect the facial preferences and evaluation, therefore we excluded another five participants, who were not Caucasians. Mean age of the final sample (N = 1,298) was 24.43 years (minimum = 17 years; maximum = 84 years; st. dev. = 9.491 years). Subjects gained mean score in verbal intelligence test 15.66 points, which refers (according to Slovak norms to the sten 7 [26].

4. Results

Values within the variable "verbal intelligence" were not normally distributed (Shapiro-Wilk W-test Sig. = 0.000), therefore the non-parametric Mann Whitney U-Test has been applied for the identification of differences in the intelligence between the group of women who assigned the facial composites representing the features of dominance/ submissiveness right and the group of women who assigned them wrong. The same statistical test was used for the facial composites representing extraversion/introversion.

TABLE I: Mann-Whitney U-test for the Assessment of Dominant/Submissive Facial Features

Assessment of facial features	**Mann-Whitney U-test**			
	N	***Mean Rank***	***U***	***Asymp. Sig.***
Correct	970	664.77	1,443E5	0.011
Incorrect	328	604.34		
Total	1298			

Table I shows the differences in the level of the verbal intelligence in the group of women who assessed the features of dominance/submissiveness right (N = 970) and those who assessed them wrong (N = 328). The number of female in two groups show, that more females assessed the facial composites correctly. Furthermore, results of the non-parametric Mann-Whitney U-test show, that women, who assessed the features of dominance/submissiveness correctly scored significantly (2-tailed Asymp. Sig. = 0.011) higher (Mean Rank = 667.77), than women who were wrong (Mean Rank = 604.34).

TABLE II: Mann-Whitney U-test for the Assessment of Extravert/Introvert Facial Features

Assessment of facial features	**Mann-Whitney U-test**			
	N	***Mean Rank***	***U***	***Sig.***
Correct	893	649,48	1,808E5	0.997
Incorrect	405	649,55		
Total	1298			

The table II shows, that also in the assessment of the facial features of extraversion/introversion the majority of females (N = 893) assessed the facial composites right. However, this number is not as high as within the dominance/ submissiveness assessment. Also, the results of the non-parametric Mann-Whitney U-test show, that women who assessed features of extraversion/introversion correctly did not differ at all in the levels of verbal intelligence (2-tailed Asymp. Sig. = 0.997; Mean Rank = 649.48) compared to women who were wrong (Mean Rank = 649.55).

5. Discussion

Results of our research show, that verbal intelligence plays an important role in the assessment of the facial features indicating the presence of dominance/submissiveness, but not in the assessment of extraversion/introversion. Previous researches considering this area of interest were mainly focused on the relationship between the intelligence and facial recognition [29], [30]. They brought a strong evidence that face recognition is independent of intelligence, at least in the upper half of the IQ distribution. However, they did not investigate the relationship between intelligence and facial assessment, respectively the ability to detect the certain features. Our study points to the different results depending on the type of features which were detected from the male facial composites. We can consider various circumstances, that may have led to such results.

From the evolutionary perspective, the presence of dominance in males could be much more important for females than the presence of extraversion. The dominance is tight to testosterone levels [10], indicates the physical strength and has a direct influence towards better chances to win when fighting for the resources or for sexual partner, whereas extraversion favors males rather indirectly – by better social functioning. Therefore, the ability to detect dominance could be favored by the evolution more than the ability to detect extraversion. This could be the reason, why the vast majority of women assessed the presence of dominant features right. Those, who were not able to make such correct and evolutionary conditioned evaluation, may have suffered from some impairment, that could be either directly cognitive, or could affect both, cognitive structures and also abilities to

make judgements about human faces.

It is possible, that the assessment of the features of extraversion/introversion is not as evolutionary important as the assessment of dominance/submissiveness. Therefore, we could observe less correct evaluations in our sample in the case of extraversion/introversion assessment as in the case of dominance/ submissiveness. Also, there is not probably another mechanism (help of the cognitive processes), that would be created in order to enhance the correct detection as it was in the case of dominance/submissiveness detection.

Studies also show, that the detection of extraverted facial features depends also on the evaluator´s levels of extraversion and that extraverts are better at decoding social information than introverts [32]. We did not measure the levels of extraversion of our subjects in this study, therefore we can not proof this finding on our participants as well as to state, whether the worse recognition of extroverted features could be caused by the larger number of introverts in our sample. Within this interpretation, it would be also needed to investigate, whether the level of extraversion of the observer affects only the ability to detect the extraverted facial features, or whether it is rather a general ability to assess faces (also in e.g., dominance), which is better than in introverted subjects. If so, then it should affect the assessment of dominance, too and thus this variable would not cause the difference in the assessment of extraversion compared to the assessment of dominance. Therefore, we suggest the further evaluation of the levels of extraversion/introversion, dominance/submissiveness in observers and their connection with the abilities to detect the same features in human faces. Also, there is a lack of studies on facial assessment executed on subjects with lower levels of cognitive abilities – we suggest to broaden the research in this area. Further investigation into the mechanisms of face assessment and possible evolutionary mechanisms leading to the explanation of different results in the intelligence levels of correct and wrong evaluators in the assessment of dominance/attractiveness and not in the facial features of extraversion/introversion is needed, too.

6. Acknowledgment

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-15-0294 and by the grant KEGA 004TTU-4/2015.

7. References

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