Conventional and unconventional aspects of facial perception

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Introduction

In modern experimental psychological, neurophysiological, clinical, differential psychological literature, it is considered that faces are a special stimulus material, and the process of processing information about the face is specific to such processes as perception of objects (for example, houses), memory of objects is a part of our social nature.

This specific nature of this category of stimulus material creates a certain difficulty for the researcher – how while maintaining environmental validity, to measure as objectively as possible various aspects of the process of processing information about a person. The prevailing approach of using standardized images of unfamiliar faces without non – specific details (such as ears, hairstyle, jewelry, etc.) is debatable.

To date, the empirical data is contradictory. For example, the configuration strategy is typical for the perception of faces as social stimuli . The configuration strategy of face perception consists in forming its image, starting from viewing it as a Gestalt, through the selection of details (mainly eyes, nose, mouth), to the analysis of the relationships between them (for example, the distance between the eyes). Experimentally, this strategy can be detected through the part-whole recognition effect ((faster and more effective recognition of facial details when it is presented in the context of an entire face comparing to an isolated one). The purpose of this work is to analyze where the line between the face as a social stimulus and the face as a physical object passes, and what the social content in the perception of faces is.

Materials and methods

Sample

The study involved 30 subjects (50% female) from different age groups (from 18 to 40 years, average age 29.16), with different levels of education (secondary, higher, with a scientific degree), normal (or adjusted to normal) vision (according to the self-report of the subjects). According to the ratio of right - and left-handedness, the subjects are represented as follows: left-handed – 2, right-handed-28 (according to the Edinburgh Handedness Inventory).

Material

We used in the experiment, photos (JPEG format, 200*300) of female and male faces of young people from 18 to 35 years old, with a neutral expression, in FAS (taken from the database of the Institute of psychology, Berlin University) were used. Humboldt (Germany)) (Fig.1), as well as similar photos of persons known in the media (Fig.2).
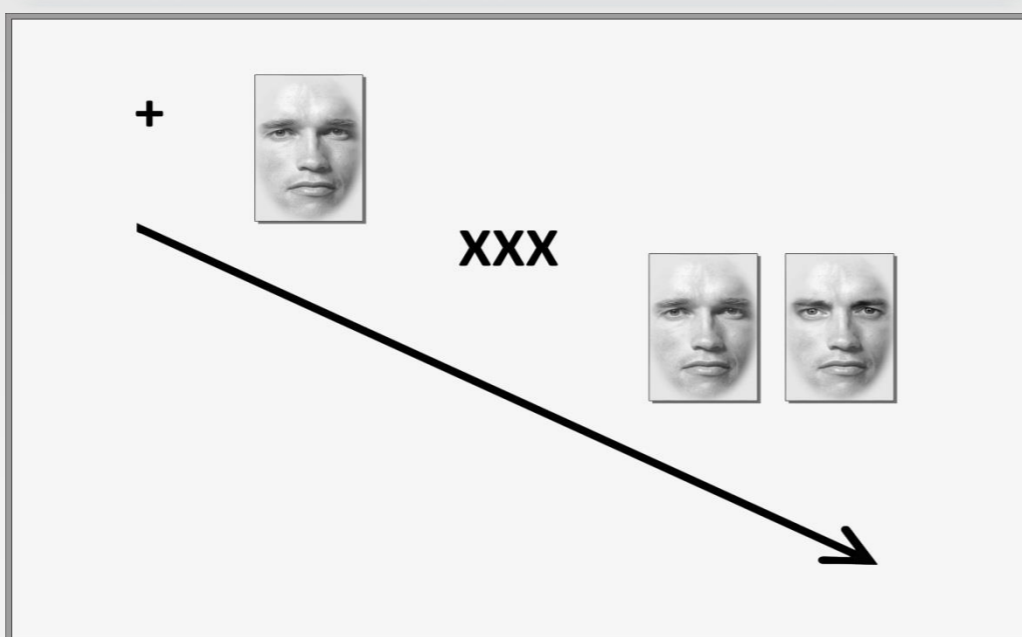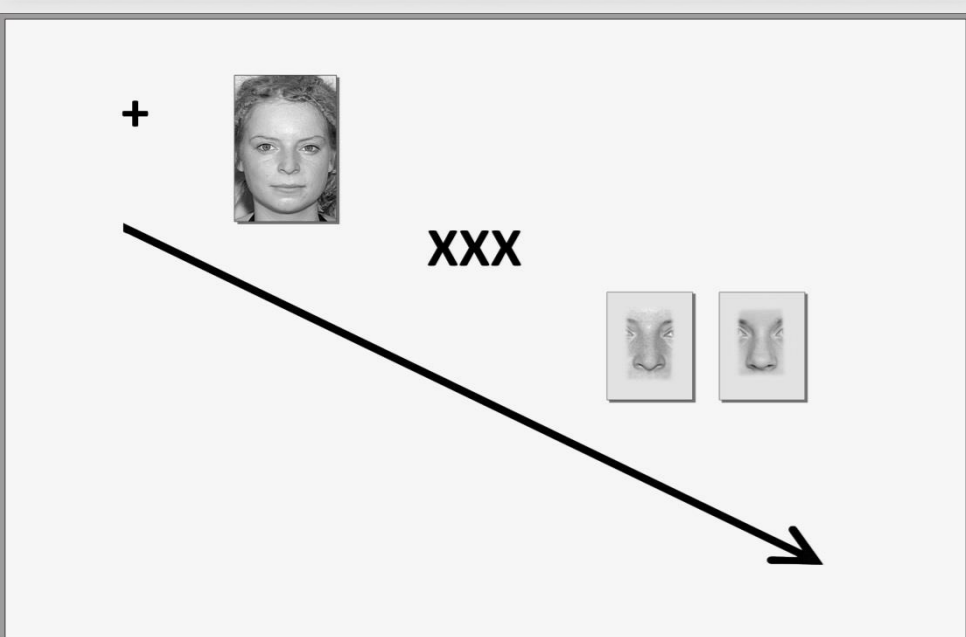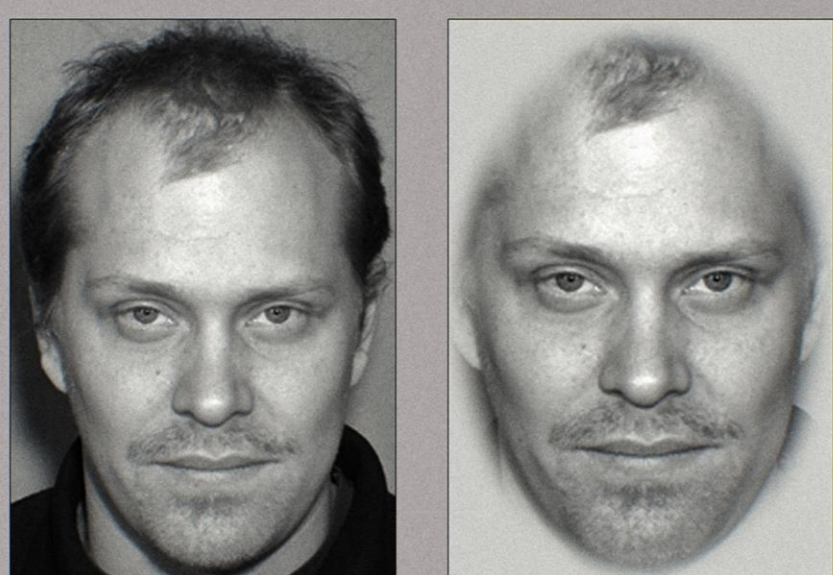
Statistical Analyses

We used univariate analysis of variance (ANOVA) to assess the significance of the impact factor of the level of "familiar" individuals, the presence/absence of non-specific details and interactions of these factors on the main experimental effect of "part-whole recognition" (the prevalence of correct answers when presenting parts of the face in the context of the whole person). Note that at this stage, the "part-whole recognition" effect was analyzed outside of the context of task completion speed. Statistical analysis was performed using the open programming language R.
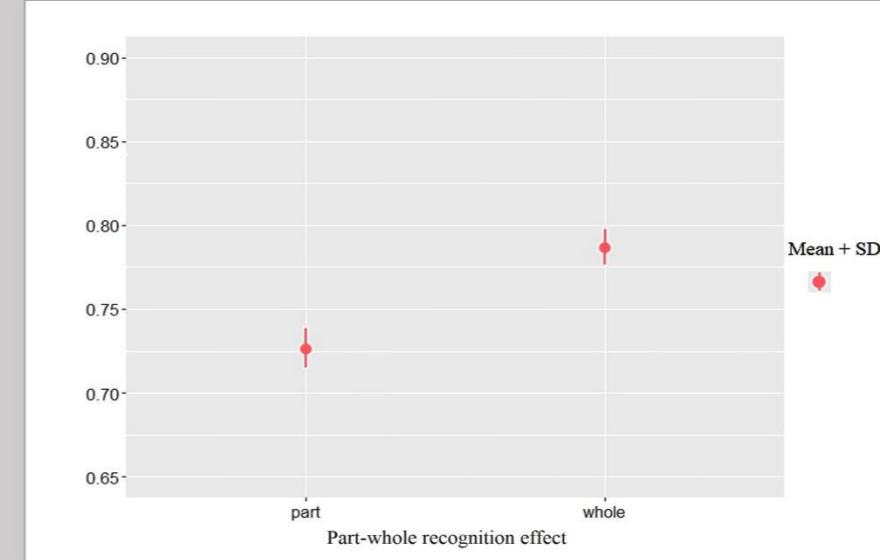
Results

Figure 3. The level of accurate task completion depending on the type of stimulus material.
Analysis of data with the inclusion of all types of stimulus material showed that the part-whole recognition effect, which is expressed as a greater number of correct responses when presenting details of faces in the context of the whole person (78%) compared to their individual presentation (72%), is expressed at a significant level (F= 63.64, p ≤ .001).Thus, at the moment, we can say that there is a configuration strategy for processing information for the stimulus material we use.
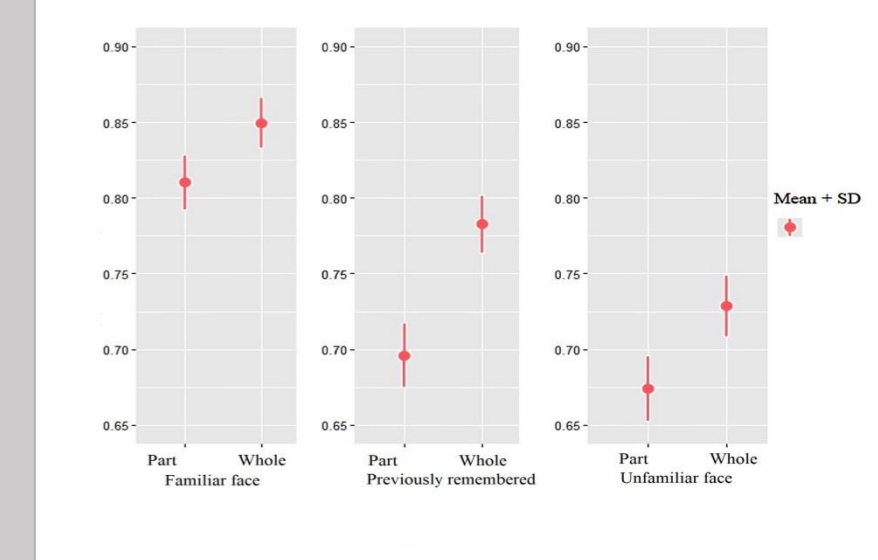

Figure 4. Part-whole recognition effect for different degrees of facial familiarity
The severity of the effect of part-whole recognition was tested in connection with such a parameter, how the face was familiar to the subjects, the results can be seen in figure 4. The correlation between familiar person and the severity of the configuration strategy for the perception of faces, represented using the part-whole recognition effect was not statistically significant (F = 69.18, p ≤ .001). The configuration strategy is expressed most when perceiving previously remembered faces (F = 37.07, p ≤ .001), when perceiving faces of famous people it decreases (F = 10.17, p ≤ .01), and least when perceiving unfamiliar faces (F = 6.54, p ≤ .01).
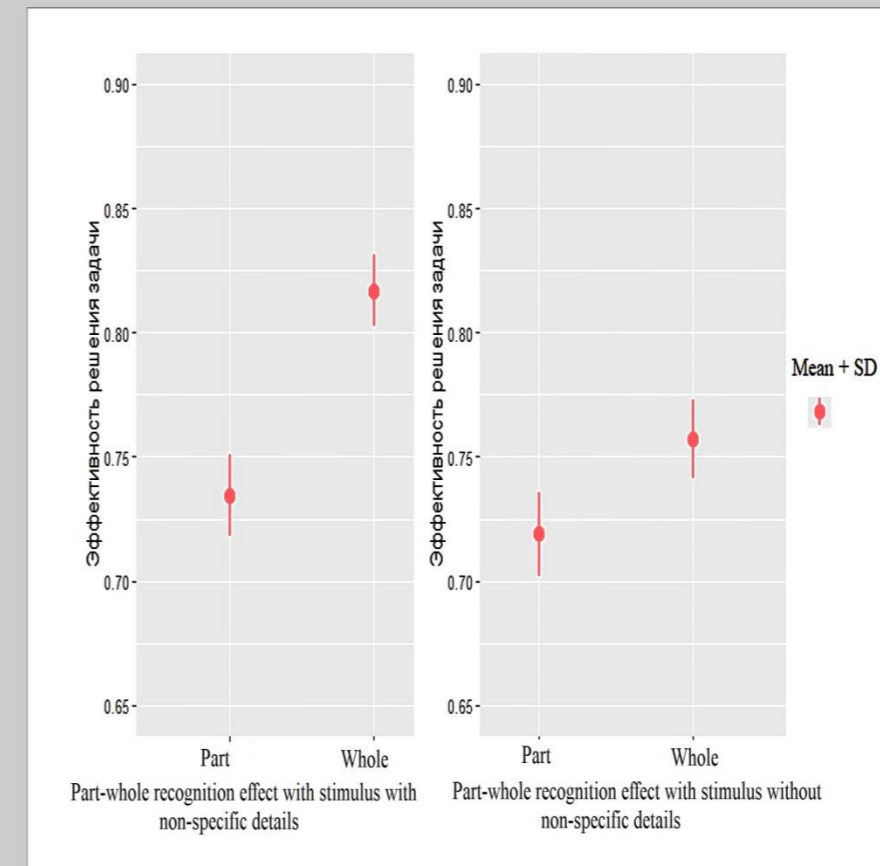

Figure 5. Part-whole recognition effect on stimulus faces with or without non-specific details
Recognition part-whole recognition depending on a parameter such as the presence or absence of non-specific details. From figure 3, Recognition part-whole recognition becomes smaller when stimuli are presented without non-specific details. This observation is statistically significant (F = 20.38, P ≤ .001).
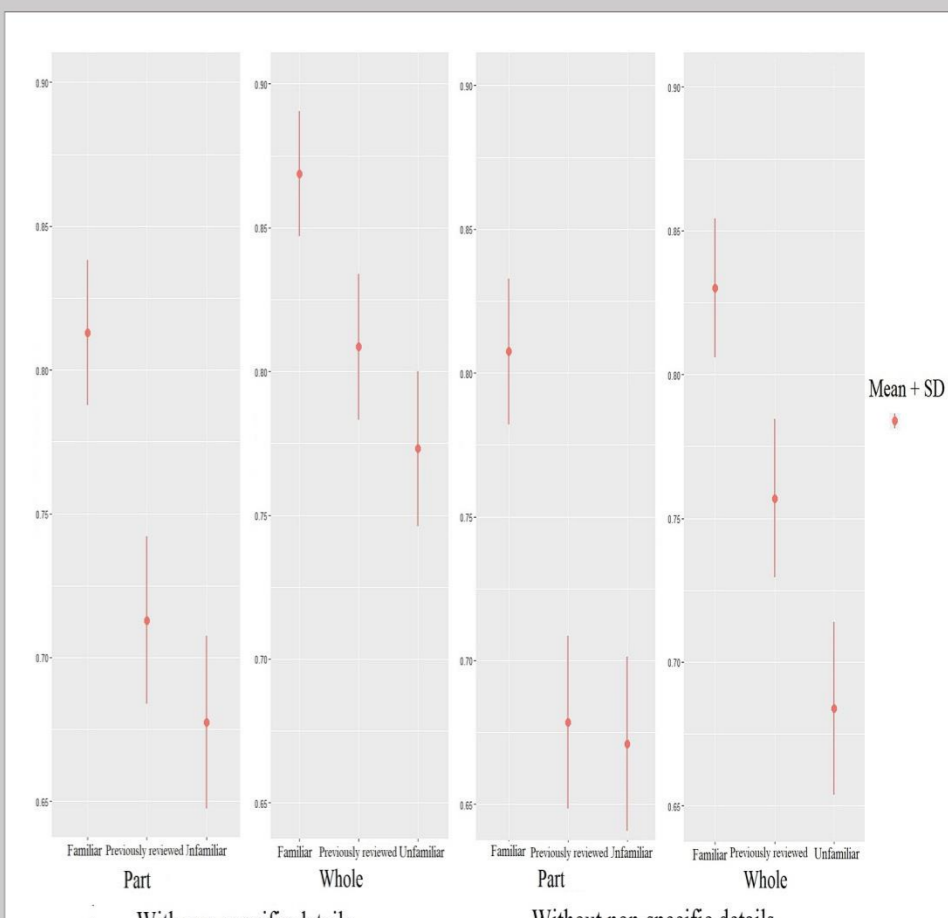

Figure 6. The effect of part-whole recognition when interacting with parameters such as the level of familiarity of the face for the subject and the presence/absence of non-specific details.
As a result, we analyzed the severity of the part-whole recognition effect depending on the combination of parameters of the degree of familiarity of the face and the presence/absence of non-specific details (Fig.4). It turned out that for faces of different levels of familiarity, provided that non - specific details were preserved, the effect was always significant (for unfamiliar faces - F=13.82, p ≤ .001, for faces of famous people - F=10.92 , p ≤ .001, for faces from the memory series=F=23.67, p ≤ .001). When presenting faces of different levels of familiarity, the effect manifests itself in different ways: it is significant only for faces from the memory series (F=14.23 , p ≤ .001) and disappears for faces of famous people and strangers.

DISCUSSION

1) Including all the stimulus material we used in the analysis, we obtained a significant part-whole recognition effect that reflects the configuration strategy typical for stimuli-faces. During analisis of the relationship between the part-whole recognition effect and the level of familiarity of the face, it turned out that this effect is more for familiar faces then unfamiliar, although it appears in the perception of all types of faces that were used in the experiment.

2) During analyzis such a parameter as the presence/absence of non-specific details, it turned out that the part-whole recognition effect is less when faces are perceived without non-specific details. As a result, we have shown that the leading parameter is the presence/absence of non-specific details. When presenting faces of famous people or unfamiliar faces without non-specific details, the effect disappears. The question of whether there is an effect for individuals from the memory series (without non-specific details) at the moment requires additional analysis, perhaps a control experiment.

3) The originality of the current research lies in the fact that we were able to show by the example of the "part-whole recognition" paradigm that the level of expression of the configuration strategy depends on which faces are used as a stimulus material. We have shown that the severity of this strategy is related to the level of familiarity of the face, and is more pronounced for familiar faces than for strangers. At the same time, the part-whole recognition effect is also associated with such factors as the presentation of an exclusively oval face, or the inclusion of non-specific details in the presentation. The configuration strategy is significantly less pronounced while viewing faces without non-specific details.

4) At this point, we can assume that perhaps the reason is different memory mechanisms for faces from the same experiment and faces seen earlier in the life. If in the first case we are talking about short – term memory, in the second-about long-term. The connection between short-term memory and face configuration perception has been repeatedly proven. Probably due to this, the effect was stable for this type of person, even with non-specific details removed.