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Reviewer report on the doctoral thesis of **Vojtěch Fiala**,
entitled „**Cross-cultural perception of sexual dimorphism in human faces**”,
submitted to Charles University, Faculty of Science in the study programme “Theoretical
and evolutionary biology”

Mr Vojtěch Fiala, born 11.09.1993 in Plzeň, conducted his doctoral thesis in the study programme “Theoretical and evolutionary biology” at Charles University, Prague. The cumulative thesis of Mr Fiala consists of 4 manuscripts and an extensive introductory text. Three of the four manuscripts have already been published and the remaining manuscript has been submitted. On two publications, Mr. Fiala appears as first (main) author, on the other two he appears as second author. In all four manuscripts Mr. Fiala contributed significantly to the work.

I will start by commenting on the four manuscripts, then on the introductory text and will conclude with a general assessment of his work.

The first study (Published Study 1: **Facial attractiveness and preference of sexual dimorphism: A comparison across five populations**) investigates whether and how sexual dimorphism relates to facial attractiveness. More specifically, the authors examined the associations between perceived (using ratings) and measured (using geometric morphometrics) facial sexual dimorphism, and perceived attractiveness. They compared their results over five distant populations (Cameroon, Colombia, Czechia, Iran and Turkey) taking into account various moderating factors. While the men found perceived femininity in women’s faces attractive in all five samples, women did not necessarily rate men’s faces that they perceived as being masculine to be particularly attractive. Only in the Czech and Colombian sample perceived masculinity was positively related to perceived male attractiveness. However, morphological sexual dimorphism (as measured with geometric morphometrics) was not associated with either perceived sexual dimorphism or

attractiveness. This study significantly adds to the existing literature, as it might help to explain the heterogeneous results of previous studies by highlighting the importance to distinguish between morphological and perceived sexual dimorphism. In addition, this study underlines the importance of including samples of multiple populations, which is currently still rather rare.

In the second study (Published Study 2, **Africans and Europeans differ in their facial perception of dominance and sex typicality: a multidimensional Bayesian approach**) Mr. Fiala and his co-authors investigated whether perceived sex-typicality and dominance can be predicted from sexually dimorphic facial features. As in Study 1, the candidate used geometric morphometrics to explore associations between perceived dominance, perceived sex-typicality, measured sexual shape dimorphism and skin colour in an African and a European sample. For men's faces of both populations, perceived masculinity was positively associated with perceived dominance. Interestingly, only in European women's faces there was an association between perceived femininity and dominance. Somewhat surprisingly, this association was also positive: women that were perceived as being particularly feminine were also assessed as being more dominant. In African women's faces, the authors found no association between perceived femininity and perceived dominance. The authors suggest that members of each population might use idiosyncratic cues to assess sex-typicality and dominance. This study is particularly noteworthy, as the findings imply that a unidimensional understanding of sex-typicality is problematic and should be applied with caution when studying perceived sex-typicality and dominance.

In the third study (Published Study 3, **Environmental convergence in facial preferences: a cross-group comparison of Asian Vietnamese, Czech Vietnamese and Czechs**) the candidate and his co-authors asked whether attractiveness judgments and preferences for facial sex-typicality and averageness are comparable between Vietnamese people, who either grew up and live in Vietnam or in Czechia, and Czechs (who grew up and live in the Czech Republic).

Specifically, they examined the relative contribution of sexual shape dimorphism and averageness to the perception of facial attractiveness. All three groups rated unmanipulated but standardized portraits of 50 Czech men and 50 Czech women for attractiveness. The authors found that Czechs and Vietnamese living in the Czech Republic assessed the attractiveness of the faces more similarly than the Vietnamese living in Vietnam. Interestingly, sexual shape dimorphism had only a limited impact on facial attractiveness (a marginally significant association was found only in Czech men). However, facial averageness seemed to be a reliable predictor of perceived facial attractiveness in all three populations. These findings are interesting because they suggest that when moving to a foreign (distant) culture, people tend to adopt some (but not all) standards of beauty.

In the final study (Submitted Study 4, **European and Asian perception of Vietnamese facial attractiveness: A case of Eurasian agreement**) the candidate and his co-authors revisit the other-race effect (ORE) by applying the logic of the ORE to perception of cues to individual biological quality, such as fertility, mating values and health. The authors hypothesised that raters should be more accurate in tracing these cues in faces from their own population. Photographs of young Vietnamese targets were rated by Czech, Asian Vietnamese and Czech Vietnamese (see above for closer description of these groups) participants. Geometric-morphometric measurements were taken that allegedly indicate biological quality (facial averageness, asymmetry, sexual shape dimorphism). The authors were surprised to find no cross-group differences in perceived attractiveness. These findings are astounding in that they seem to question the association between measured morphometry and perceived attractiveness.

In the **introductory text**, Vojtěch Fiala covers a broad area of topics, starting with a very general chapter on visual perception. He then goes on to introduce and summarise research on sex-typicality and cross-cultural research before delving into more evolutionary considerations. As one of the recurring topics of his thesis is facial sex dimorphism, he devotes a reasonable portion of the introduction to discussing sex-typicality in general and sex typical facial cues in particular. As is common for such a broad area of topics, the candidate faces the problem of a breadth-depth trade-off. He opts for more breadth, often only touching a topic without diving into it too deeply. The result is a very comprehensive but perhaps slightly superficial introduction, covering a plethora of literature.

Concluding remarks:

In less than 4 years Mr. Fiala has managed to write four manuscripts, three of which have been successfully published in high-ranking journals of the field (Scientific Reports; Evolutionary Human Sciences), and the remaining one has been submitted for publication. Publishing three papers in such a short time is rather extraordinary, not least because not every study produces publishable data. The fact that Vojtěch Fiala succeeded can be taken as evidence for his efficiency and proficiency.

I have only very few suggestions and comments that we might have the opportunity to discuss at the defence. While I found the candidate's summary of previous findings and the broad overview of the field very interesting and informative, the introduction tends to list facts without providing further information on the individual studies. At the same time, I am aware that diving more deeply into the topics would have meant a massive lengthening of the text. Secondly, the integration of his own findings in a larger theoretical framework and emphasising his own contribution to the field could have been slightly more thorough,

perhaps by adding a special section in the umbrella text.

These are my only noteworthy criticisms on this otherwise very thorough and carefully conducted PhD thesis. I feel the need to emphasise that the above-raised comments are meant to be considered as a contribution to the discussion and not as devaluation of the submitted work.

In summary, I found the thesis of excellent quality, which brought several novel and significant contributions. The author shows full capacity of being able to perform high quality, rigorous, and innovative research. He used sophisticated techniques employing geometric morphometrics of facial photos, which enables the researcher to explore and test for the effects of specific characteristics of natural faces.

I herewith state that Mr. Fiala has undoubtedly and unambiguously proven that he has the necessary skills to work successfully in academia. I recommend, without any hesitation, the thesis submitted by Vojtěch Fiala for the defence.

PD Dr. Janek Lobmaier