Editors

*Nature*

Dear Editors,

**Regarding the MS:** Visual similarity versus mental rotation for inverted and upright faces

The subject of face recognition is important since the entire social network depends on its accuracy. Human relationships would collapse if people were unable able to recognize the faces of others (including their facial reactions and emotions). A main research topic concerning the cognitive mechanism of face recognition is the Face Inversion Effect (FIE). It has been found repeatedly that the recognition of an inverted face is much lower than that of an upright face. Research in FIE has focused on explaining this phenomenon. However, to the best of our knowledge, no research has attempted to answer the following question: How does the cognitive system compare an inverted face to an upright one? This question touches directly the mechanism responsible for recognition of faces. The present study endeavors to answer this question empirically.

We tested two hypotheses: the *visual-similarity* hypothesis proposes that the comparison is made on the basis of similarity between the inverted and the upright faces, while the *mental-rotation* hypothesis suggests that the inverted face is rotated to the position of the upright face, a condition which allows an easy decision on whether the two faces are congruent or not. The results of the experiments clearly supported the *visual-similarity* hypothesis. Furthermore, it has was found that this hypothesis is based on certain mutual facial elements in the inverted and the upright faces that resist the transformations of inversion. That is to say, the similarity found between an upright face and inverted face (UI) has also been discovered for the following orientations: UU, IU, and II.

We believe that the research question and the findings of the present study are new and are of the highest theoretical importance. The report has a total of 2934 words and should fill no more than five printed pages of the journal.

Thank you for your time and consideration,

Best wishes,

Sam S. Rakover, Professor