Dear Editor,

We are pleased to submit to *Scientific Reports* our manuscript entitled “**The Illusion Game: A Novel Experimental Paradigm Provides Evidence for a General Factor of Visual Illusion Sensitivity and Personality Correlates**”. We believe it will attract a wide readership, including scientists of various fields, as well as attention from the public (visual illusions are a popular topic, and the reported links with personality are an appealing finding).

Illusions are among the first phenomena studied by early psychologists, and have since then sustained an important scientific interest beyond the fields of perception and vision, with applications in consciousness science, Bayesian brain theories, and psychiatry. One major issue limiting the growth of illusion science was the **difficulty to adapt illusions stimuli to experimental contexts**, which ideally require a controlled and gradual modulation of effects and objective measurable outcomes.

In this well-powered and pre-registered study (total participants *n*= 250), we validate a **novel and innovative paradigm** that allowed us to study the objective effect of visual illusions (in 10 different classical visual illusions) and explore the structure and correlates of the participant-level scores of illusion sensitivity.

This work represents the culmination of several years of effort that started with the development of the *Pyllusion* framework (Makowski et al., 2021). Here, we finally make full use of it to investigate both key questions of illusion science (e.g., the presence of a common factor of illusion sensitivity), and explore inspiring directions (such as links with personality).

Notably, we discovered strong evidence in favour of the existence of a general factor of illusion sensitivity (labelled ***Factor i***), and present stimulating results on the relationship between illusion sensitivity and personality characteristics (in particular, a **negative relationship between illusion sensitivity and “pathological” personality traits**, such as psychoticism, antagonism, and disinhibition).

This is an exciting **princeps study** describing a new way of using illusions in experimental psychology. This paradigm shift that will open many doors for discussion and future developments, and represents a real breakthrough in the field of illusion research and beyond.

In line with our aim to set the highest standards of methodological rigour and reproducibility, all the materials (the raw data, the pre-processing script, and the analysis scrip containing additional analyses and the code to generate the figures) has been made **fully available in open-access** at https://github.com/RealityBending/IllusionGameValidation.

This manuscript is original, not previously published, and not under concurrent consideration elsewhere. The data were collected in a manner consistent with ethical standards for the treatment of human subjects (NTU IRB-2022-187), and informed consent was obtained after the nature and possible consequences of the studies were explained. There is no conflict of interest to disclose. All authors have approved the manuscript and agree with its submission.

On behalf of all the authors,

Dominique Makowski

dom.makowski@gmail.com

**Potential reviewers:**

* **Dr. Rebecca J. Hirst**, expert in illusions ([becca@opensciencetools.org](mailto:becca@opensciencetools.org))
* **Dr Marco Bertamini**, expert in illusions (M.Bertamini@liverpool.ac.uk)
* **Dr Charles-Edouard Notredame,** expert in link between illusions and psychopathology ([notredame.ce@gmail.com](mailto:notredame.ce@gmail.com))
* **Prof Renaud Jardri**,expert in link between illusions and psychopathology([renaud.jardri@univ-lille.fr](mailto:renaud.jardri@univ-lille.fr))
* **Prof Biyu Jade He**, expert in perception([Biyu.He@nyulangone.org](mailto:Biyu.He@nyulangone.org))