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To the Editors of Symmetry:

We hereby submit our manuscript *Perceptual Similarities Among Wallpaper Group Exemplars* for publication in the special issue on **Visual Processing of Symmetry** in the journal *Symmetry*.

We present the results of a series of behavioral experiments using patterns belonging to a class of regular textures known as wallpaper groups. The 17 wallpaper groups represent the complete set of symmetries in the 2D image plane and have been shown to elicit strong responses in the brains of humans and non-human primates, that precisely reflect the symmetry content of each group. Here we asked a different question: how similar are exemplars from the same wallpaper group? Participants performed a sorting task where they were given a set of exemplars and told to freely sort them into different piles according to whatever criteria made sense to them. The results allowed us to assess the perceptual self-similarity of exemplars within a wallpaper group. Our prediction was that groups that contain many symmetries would give rise to more diverse, less self-similar sets of exemplars.

Our results show that symmetry content is only weakly linked to exemplar self-similarity. The simplest of the wallpaper groups did produce more self-similar exemplars than any other group, but we found no difference in self-similarity among the other four other groups we tested, even though they varied greatly in symmetry content. Our results also allowed us to show that consistency in exemplar pairings across participants was way above chance, and to visualize exemplars pairs that were most often, and most rarely, paired. These results open the door to further investigations into the psychological and neural mechanisms that drive perceptual similarity among wallpaper group exemplars, and indeed among exemplars from different classes of structured patterns.

We confirm that neither the manuscript nor any parts of its content are currently under consideration or published in another journal. All authors have approved the manuscript and agree with its submission to *Symmetry*. We look forward to engaging with the peer review process under your editorial guidance.

Best Regards,

Peter J. Kohler, Shivam Vedak & Rick O. Gilmore