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Eye-movement pattern modulates holistic processing of faces: evidence from the composite face effect and the inverted face effect

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It is well established that faces are processed holistically, and the face inversion paradigm and the composite face paradigm are two tasks that have been widely used to demonstrate this processing. However, individuals differ in their eye movements to faces, and little is known about whether these differences in eye movements modulate holistic processing. To investigate this issue, participants were asked to identify upright (or inverted) faces and judge whether the upper (or lower) halves of two faces were the same or different. Using a hidden Markov model (HMM) to analyze their eye movements, participants were clustered into two groups on the basis of their eye movement patterns during the upright face identification task, with an upper-focused group who preferred to look at the upper half of a face (such as the eyes), and another lower-focused group who preferred to look at the nose or the mouth of a face. Those two groups showed no significant difference in the size of the face inversion effect. But in the composite face task, the upper-focused group showed a stronger composite effect for matching the upper halves of faces than the lower halves, while the lower-focused group had similar magnitudes of composite effect between judging the upper half and the lower half conditions. Moreover, the upper-focused group showed a stronger composite effect than the lower-focused group for judging the upper halves. Our findings reveal that the eye-movement pattern influences holistic processing as measured by the face composite task.