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Perceiving facial expression from varying face orientations – an eye-tracking study

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We frequently encounter expressive faces from different viewing angles; invariant expression perception would be to our advantage in social interactions. Previous research is inconsistent about how face orientation affects expression categorization. It is also unknown how gaze behaviour accommodates this variable given diagnostic cues from local facial features for decoding expressions tend to vary with orientation. Here we manipulated orientation of faces (frontal, three-quarter and profile view) displaying six basic facial expressions of emotion, and measured participants' expression categorization accuracy, perceived expression intensity and associated gaze patterns. The analysis of pooled data from all expressions showed that profile faces led to lower categorization accuracy and attracted fewer but longer fixations. The detailed gaze distribution at eyes, nose and mouth regions were also manipulated by face orientation, in line with the amount of available cues from a given feature at a given orientation. Further comparison between individual expressions revealed these orientation-induced perceptual and gaze behavioural changes were expression-specific. The perceived expression intensity was affected by face orientation, even for those expressions with invariant categorization accuracy. The results suggest face orientation-invariant expression perception is categorical and is restricted to those expressions displaying expressive cues dominantly through eyes and/or mouth region.