Using Response Times to Investigate the Face Recognition Mechanism in Developmental Prosopagnosia

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The nature of face recognition memory deficits in developmental prosopagnosia (DP) remains to be fully characterized. Previously, a dual process analysis of confidence ratings during face recognition showed that, compared to controls, DPs have deficient recollection (all-or-none recognition with context) but intact familiarity (feeling of knowing) (Stumps et al., 2020). Since confidence ratings are subjective, response times (RTs) may provide a complementary, objective measure of DPs' memory deficits. To test this possibility, 30 DPs and 30 controls performed an old/new face recognition task where they studied 60 faces, each shown for 1.5 seconds, twice. At test, 60 new (lure) faces were interspersed with 60 old (target) faces, and participants made old/new judgments with confidence ratings (confident/somewhat sure/guessing), and RTs were recorded. For all participants, RTs differed across confidence ratings, displaying the standard pattern of fastest RTs to high confidence and slowest RTs to low confidence responses. Using RT Receiver Operating Characteristic's (ROC) Area Under the Curve (AUC) analysis, we found that DPs and controls significantly differed in RT-ROCs for targets (AUC DPs=0.547, AUC controls=0.629, $p<.01$) but not for lures ($p=.99$). Further, the target AUC significantly predicted Cambridge Face Memory Test accuracy (CFMT, $R=0.53$) as well as DP diagnosis (AIC=68.0). Importantly, RT-ROC predicted unique variance beyond the recollection parameter derived from the dual process analysis of confidence ratings. Combined, they predicted 76% of the variance in DP diagnosis and 53% of the variance in CFMT. This suggests that RT-ROC is a useful, objective method of assessing face recognition abilities that provides different information than confidence judgments.

Awards Won:
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