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Selective tuning of face perception

Abstract Text: PURPOSE: Face-selective neurons in monkeys are highly selective for emotion and gender (Tovee, Neuron 1998). Also, the perception of human faces shows adaptation for configuration, gender, and ethnicity (Webster and MacLin, Psychon Bull Rev. 1999; Kaping et al., VSS 2001). Are the mechanisms mediating face perception jointly selective (e.g. tuned for both ethnicity and gender) or selective for a single property? (e.g. tuned for ethnicity and unselective for gender). METHODS: In separate sessions, 4 observers were adapted to [a] female-Caucasian faces, [b] male-Asian faces, or [c] female-Caucasian alternating over time with male-Asian faces in a contingent adaptation paradigm. (Face size = 7.1 deg; initial adaptation period = 3 min; re-adaptation period = 8 sec). Before and after adaptation, observers judged the gender of Caucasian faces morphed between male and female (Webster and MacLin, Psychon Bull Rev. 1999) to determine the point along the morph that was apparently neutral in gender. We compared how this neutral point was shifted by the three adaptation conditions. RESULTS: Adaptation to [a] female-Caucasian faces alone shifted the neutral point towards the female-morph for both Caucasian and Asian faces, i.e. it made test faces look more male regardless of ethnicity. Also, female-Caucasian adaptation made test faces look more Asian, regardless of gender. Neurons selective for gender are relatively unselective for ethnicity, and vice versa. This allows properties such as ethnicity or gender to be represented across faces that vary along other dimensions. Under [c] contingent adaptation conditions some, though not all observers showed adaptation effects consistent with the presence of jointly selective neurons. Thus, gender-neutral test faces looked more male if Caucasian but more female if Asian. CONCLUSIONS: The human visual system probably includes both singly- and jointly-tuned neurons for face perception.

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