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Learning Complex Texture Discrimination

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Abstract

Different isotrigon texture types are only discriminable from random binary patterns and each other by their third and higher-order spatial correlations. Their mean contrast and spatial frequency content is identical to random noise. Our ability to make these discriminations has be proposed to be innate. We previously investigated learning of 17 isotrigon types in seven naïve subjects, where each type was tested in 14 sessions over 6 weeks. Significant learning was observed. Here we examined if 7 learning sessions conducted every 30 minutes on one day achieved similar learning. We also tested participants at a recall session, 2.5 months later. We used 11 naïve subjects with normal vision. We examined discrimination from random patterns of a subset of 5 of the original texture types, with 16 4AFC repeats/texture/session (5*11*8*16=7040 discriminations). Learning was similar to that achieved in the 6-week sessions. Two of the textures showed significant learning with mean discrimination improvement in probability of correct discrimination of 0.125 ± 0.058 to 0.244 ± 0.089 (p = 0.03 and 0.01). The textures that showed significant learning were the Cross-Even and Wolf-Odd type. However, both of these textures showed a reduction in learning at the final recall session. It appears that the number of discriminations, rather than the duration of

learning period is the key factor in learning differences in texture appearance based upon higher order spatial correlations. Initial performance was not chance so there appears to be some innate ability in naïve subjects.

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