Motifs in mental representations of low-level perceptual features

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Abstract

Prior work has demonstrated structured individual differences in mental representations of colors. Do similar differences exist in other low-level domains? We investigated representations of line orientation using triadic comparisons of Gabor patches varying in orientation angle (0-360°). When we embedded similarity judgments into personalized 2D spaces, own embeddings predicted judgments better than others' embeddings ($p<.001$), but no better than orientation ($p=0.69$), suggesting participants represented similarity by orientation, with some variation. When Gabor patches also varied in contrast (high vs. low), own embeddings predicted judgments better than others' ($p<.001$) and orientation ($p<.001$), but not better than contrast ($p=.08$). When instructed to judge similarity by orientation, participants clustered based on similarity judgments made by orientation angle ($n = 13$) or by contrast ($n = 21$). This evidence suggests individual differences in mental representations of line orientation; participants may differ in their ability to make judgments based on one stimulus dimension versus another.