Categorical Perception as Adaptive Processing of Complex Visuo-spatial Configurations in High-level Basket-ball Players

Eric Laurent (laurent@staps.univ-mrs.fr)
University of the Mediterranean
Faculty of Sport Sciences, av Luminy CP 910
13009 Marseilles, France

Thierry Ripoll (ripoll@newsup.univ-mrs.fr)
University of Provence,
Faculty of Psychology, 29 av Schuman
13621 Aix-en-Provence, France

Hubert Ripoll (ripoll@staps.univ-mrs.fr)
University of the Mediterranean
Faculty of Sport Sciences, av Luminy CP 910
13009 Marseilles, France

Categorical Perception: An Adaptive Process

Research on expertise in sport has provided in the last twenty years explanations about the cognitive processing involved in decision making. The underlying processes of expert performance are known to be related to information stored in memory. Previous studies highlighted the richness of the content of expert conceptual knowledge and the organization of information in memory. This organization related to the chunking hypothesis is thought to reduce the informational load by limiting the number of units that we have to deal with. One hypothesis is that the unitization of elements depends namely on conceptual background of players. Recently, we (Courrieu, Baratgin, Ripoll, Ripoll, & Laurent) tested the assumption that this type of influence could occur in similarity tasks. In several studies, experts were better than novices at discriminating "structured configurations" (*i.e.*, semantically coherent configurations). However some differences (*e.g.*, small physical variations) were poorly detected by experts. Empirical evidence was also given that the influence of knowledge is likely to occur at a perceptually-grounded level. In order to explain this pattern of results we would to test the assumption that knowledge guide perception by modifying perceptual spaces of similarity. Research in the field of categorical perception (*e.g.*, Harnad, 1987) has supported this idea. More recently, Goldstone, Lippa, and Shiffrin (2001) found that the object representations themselves could be altered by category learning. In the same vein we have considered decision making as based on the determination of perception by categorical knowledge.

Building Categorical Material

In order to produce material we used a cluster encoding method validated by Courrieu (2001). Basket-ball coaches built schematic configurations with the following constraint: from one source configuration, drafting two target configurations with an equally physical distortion for both (relatively to the source), but in one case target should belong to the same category as the source and in the other case target should belong to another category.

Categorical Effects

Comparison of novice and expert basket-ball players performances in a same-different judgment task yields evidence for a dissociation of results. Differences between configurations belonging to different categories were particularly well identified by experts while these participants were weaker than novices for detecting differences between configurations belonging to the same category. These data support the idea of a perceptual adaptation constrained by conceptual knowledge and the one of human ability to acquire categorical perception in sport context.

References

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