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Direct influences vs contextuality in human choices

(joint work with Ehtibar Dzhafarov)

A system of random variables exhibits true contextuality when different contexts force measurements of the same property (in psychology, e.g., responses to the same question) to be more dissimilar than required by the differences of their distributions. The difference in distributions is itself a form of context-dependence, but it is attributed to direct information-carrying influences exerted by contexts upon the random variables. We discuss and clarify the difference between direct influences and contextual differences. In particular, we address the issue of “hidden direct influences,” those not reflected in distributional differences. We argue that hidden differences are immaterial as they cannot carry information, and that if they could somehow be observed, it would change the system of random variables and lead to different conclusions. While in quantum mechanics there are situations when measurements of the same property under different conditions have the same probability distribution, in psychology some form of direct influences is always present. Analysis of many previous attempts to demonstrate contextuality in human judgments has shown that they were unsuccessful because direct influences in them were all that was needed to account for context-dependence. However, in our “Snow Queen” experiment (Decision 5, 193-204, 2018) we unequivocally demonstrated true contextuality in human decision making. The formal structure of the experiment was that of a cyclic system of rank 4 (also used to depict the Einstein-Podolsky-Rosen paradigm in the Bohm-Bell version, and the double-slit experiment). The experiment laid down a template by which contextuality could be explored in a variety of empirical situations. We present a series of experiments conducted with I. Basieva and A. Khrennikov (arXiv:1807.05684) that follow this template using the formal structure of cyclic systems of ranks 3 and 4, and that confirm the presence of true contextuality in human decision making.