

# Can the Social Sciences Contribute to the Theory of Phase Transitions?

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Discontinuous phase transitions are particularly interesting from a social point of view because of their relationship to social hysteresis and critical mass. In this paper, we show that the replacement of a time-varying (annealed, situation-based) disorder by a static (quenched, personality-based) one can lead to a change from a continuous to a discontinuous phase transition. This is a result beyond the state of the art because so far numerous studies on various complex systems (physical, biological, and social) have indicated that the quenched disorder can round or destroy the existence of a discontinuous phase transition. To show the possibility of the opposite behavior, we study a multistate q-voter model, with two types of disorder related to random competing interactions (conformity and anticonformity). We confirm, both analytically and through Monte Carlo simulations, that indeed, discontinuous phase transitions can be induced by a static disorder. The talk will be based on the publication: Nowak, B., Sznajd-Weron, K. (2022) *Switching from a continuous to a discontinuous phase transition under quenched disorder*, Physical Review E 106 (1), 014125 (doi: 10.1103/PhysRevE.106.014125).