Coordination dynamics in speech and lexical semantics

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Abstract: Variations in individual human behavior are intrinsically long-range correlated (i.e. 1/f noise). These correlations may reflect interdependence (i.e. coordination) among components at various scales of structure and dynamics (e.g., neurons, cortical columns, brain areas, brain-body interactions). Two experiments tested whether long-range correlations emerge when two people interact. In experiment 1, perceptual-motor coordination was invoked by instructing participant pairs to coordinate uttering the word "mom" in alternation with key taps. In experiment 2, semantic coordination was invoked by alternating free word associations (e.g. one says "cat", the other says "dog", first says "collar", second says "shirt", and so on). Fluctuations in series of mom-tap intervals were long-range correlated. Long-range correlations were also found in semantics fluctuations of free word associations, the latter being weaker and derived from lexical co-occurrence statistics. Results indicate that common principles of coordination apply across individual and dyadic scales of perceptual-motor and cognitive performances.