

Exploring Dispersion as a Novel Operationalization of Gait Based Metrics for Health Outcomes

Increasingly, individual differences in gait are being employed as functional biomarkers -- potential markers of developmental change that reflect underlying biological and health processes -- of various deleterious age-related outcomes (e.g., fall risk, cognitive decline, dementia). However, with 40+ commonly employed gait metrics, there is contention over which metrics provide the most predictive utility, as well as whether different aspects of gait differentially reflect the health of specific bodily systems (e.g., CNS vs. cerebrovascular vs. musculoskeletal). Given that age-related outcomes such as changes in cognitive health often reflect numerous underlying processes, a multivariate approach to examining gait may increase sensitivity for detecting risk of key outcomes relative to any single gait indicator. To that end, we are exploring a multivariate operationalization of intraindividual variability (i.e., dispersion) that spans multiple gait indicators (e.g., velocity, stride time variability, etc). Intraindividual dispersion (within-person fluctuations across multiple measures indexed at a single point in time) has been successfully operationalized and used to predict impairment outcomes in the cognitive aging literature, and in the context of gait, may similarly improve detection of individual differences in cognitive and physical health.