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Cross-Context Integration in Population-Scale Social Networks and Its Association With Mortality

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Research on social networks and mortality has shown that structural characteristics of individuals' social environments are associated with health outcomes, yet most empirical work has relied on egocentric or survey-based measures that capture selected parts of people's networks. In this study, we use Dutch population registers to construct nationwide multilayer social networks that link individuals through family, household, workplace, educational, and neighborhood contexts. These data allow us to derive yearly individual-level indices—cross-context integration (excess closure across layers), density (mean embeddedness), closeness centrality, network heterogeneity, and network size—which reflect different dimensions of social structure. We link these indices to annual mortality records and estimate associations using time-varying discrete-time survival models with person-year observations. We also compare pre-COVID and COVID periods to explore whether associations vary under changing environmental risk conditions. By leveraging registry-based multilayer networks, this study provides new evidence on how multiple structural dimensions of social environments are patterned in relation to mortality risk at the population level.

