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## Urban isolation and daytime neighborhood social composition from twitter data

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In a recent paper in PNAS, Wang et al. (1) investigate the key question of urban isolation in light of daily mobility. Urban isolation may actually be mitigated by individuals spending much of their everyday lives in neighborhoods where social composition and urban opportunities widely diverge from their home neighborhoods. From a large dataset composed of 128 million geotagged micromessages called tweets, sent by 392,000 Twitter users living in the 50 most populous American cities, the authors overcome the pervasive **spatial assumption** that social interactions are limited to home neighborhoods. However, they made one **temporal assumption** that merits further discussion. They classified neighborhoods into poor and nonpoor based on the proportion of residents living on incomes below the federal poverty line, and they similarly characterized neighborhood racial status into three groups: majority of white, black, or Hispanic residents. They used residential neighborhood composition to characterize both the neighborhoods in which people reside and those into which people travel on a daily basis. Through this approach, the authors assumed that social structures of neighborhoods are necessarily frozen over a 24-h period. Omission of daily changes in neighborhood social composition is frequent in the literature about neighborhood effects; however, in the case of this research, it is especially unfortunate because the study precisely aims to explore daytime contact and copresence between (poor and nonpoor) inhabitants. With Twitter messages [which are not only geographically informative but also temporally informative (hours and minutes)], it would still have been possible to move beyond nighttime residential-based estimates. Even if no information was available to define the individual social status of Twitter users, the authors could have qualified the neighborhoods visited daily from daytime concentrations of Twitter users living in poor/nonpoor neighborhoods. By doing so, the authors' conclusions about the urban isolation in American cities would have been even more convincing.

In the emerging literature concerning people's daily mobility and their exposure to nonresidential contexts, there is a frequent discrepancy between the high accuracy in measuring people's daily trajectories in cities and the low accuracy in measuring daily rhythms of neighborhood social composition. However, daily rhythms constitute an important timescale not only for people but also for places. The social determination of work and free time impacts the temporal signatures of places. Moreover, when planning public transportation, employment areas, or public events, public authorities frame and coordinate daily population flows. Some scholars, inspired by the time-geography approach, have highlighted the theoretical importance of considering time and space in tandem (2, 3) and have accounted for daily variations in neighborhood social mix to explore opportunities for social contact between members of different social groups (4-7). The recent "daycourse of place" framework (8) could be used to consider the rhythms of places more explicitly and to strengthen our understanding of urban isolation around-the-clock. Variation or stability in neighborhood social composition over a 24-h period is actually more than a phenomenon that may bias findings: It is a dynamical expression of urban isolation and neighborhood effects.

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