

ABSTRACT

To improve bus route planning and understand walkability's role in bus network design, this study offers a method of evaluating the walkability of bus stops and provides a case study for stops along two bus routes in Orange County, California. Having better walkability for bus routes may both promote physical activity and encourage bus ridership. Previous studies on bus route planning focus mostly on the passengers' travels on the bus and minimal attention is given to the bus riders' experiences before reaching the bus, after departing the bus, and during transfers between bus lines. This study shows the relevance of considering the origin, destination, and walking paths for pedestrians when approaching bus network design problems. The walkability of the southbound bus stops along Route 47 and Route 89, operated by the Orange County Transportation Authority (OCTA), were evaluated by calculating and combining the scores of four variables within each bus stop buffer. The four variables evaluated were: population density, street connectivity, steepness, and tree canopy. Results show that Route 47 has higher overall walkability than Route 89, which is in accordance with the hypothesis that a route that runs through grid neighborhoods (Route 47) would be more walkable than a route that runs through cul-de-sac neighborhoods (Route 89). Sensitivity analyses demonstrated that walkability scores may change when a stop is repositioned to a hypothetical location further away from an arterial street and within a neighborhood. Although walkability will never be the sole factor in designing bus routes, future modeling could weigh the importance of walkability as part of origin and destination modeling and use the scoring of walkability to guide adoption of the "flexible-route" bus lines. Future research should consider other methods of determining tree canopy scores and explore other methods of identifying pedestrian "catchment" area of the bus stops.