

NEWS-CFA: Confirmatory Factor Analysis Scoring for Neighborhood Environment Walkability Scale (Updated: March 15, 2011)

The NEWS is a self-report perceived environment survey originally developed by Saelens et al. (2003), in which *a priori* subscales were created by the authors (the original survey and scoring can be downloaded from <http://www.drjamesallis.sdsu.edu/measures.html>). Follow-up multi-level confirmatory factor analysis (CFA) was conducted using data from the Neighborhood Quality of Life Study (NQLS) in the U.S. (see Cerin, et al, 2006 and Cerin, et al., 2009). The scoring procedures described here are based on these confirmatory factor analyses. NOTE: the scoring procedures below are applicable if respondents completed the full NEWS. There is an abbreviated version (NEWS-A), which has a similar factor structure to the full version but has fewer items on select subscales (see website noted above for more information on the abbreviated version).

Key differences between original NEWS and NEWS-CFA scales: The residential density and land use mix-diversity subscales were not appropriate for inclusion in the multi-level CFA, so they remain the same. The multi-level CFA tested both individual-level (participant) subscales and blockgroup-level (census unit) subscales (see Cerin et al., 2006 & 2009). However, scoring procedures described below are for the individual-level subscales only.

The CFA-based scoring procedures produce 8 subscales similar to the original NEWS, but also pull out several items to be used as “single-item subscales.” Furthermore, two original subscales (“walking/biking facilities” and “traffic/pedestrian safety”) are restructured in the CFA-based scoring to be “infrastructure and safety for walking” and “traffic hazards” subscales.

References:

Saelens, B.E., Sallis, J.F., Black, J., Chen, D. (2003). Neighborhood-based differences in physical activity: An environment scale evaluation. *American Journal of Public Health, 93*, 1552-1558).

Cerin, E., Saelens, B.E., Sallis, J.F., & Frank, L.D. (2006). Neighborhood Environment Walkability Scale: Validity and development of a short form. *Medicine and Science in Sports and Exercise, 38*, 1682-1691.

Cerin, E., Conway, T.L., Saelens, B.E., Frank, L.D., and Sallis, J.F. (2009). Cross-validation of the factorial structure of the Neighborhood Environment Walkability Scale (NEWS) and its abbreviated form (NEWS-A). *International Journal of Behavioral Nutrition and Physical Activity, 6*:32.

NEWS-CFA Scoring: 8 Multi-item Subscales and 5 Single-Item Subscales

Subscale A: Residential density (higher score denoting higher walkability)

- A1. How common are detached single-family residences in your immediate neighborhood?
- A2. How common are townhouses or row houses of 1-3 stories in your immediate neighborhood?
- A3. How common are apartments or condos 1-3 stories in your immediate neighborhood?
- A4. How common are apartments or condos 4-6 stories in your immediate neighborhood?
- A5. How common are apartments or condos 7-12 stories in your immediate neighborhood?
- A6. How common are apartments or condos more than 13 stories in your immediate neighborhood?

Responses:

None (1) A few (2) Some (3) Most (4) All (5)

Score on subscale: $A = A1 + (12 * A2) + (10 * A3) + (25 * A4) + (50 * A5) + (75 * A6)$

Subscale B: Land-use mix – diversity (higher score denoting higher walkability)

- B1. Convenience/small grocery store
- B2. Supermarket
- B3. Hardware store
- B4. Fruit/vegetable market
- B5. Laundry/dry cleaners
- B6. Clothing store
- B7. Post office
- B8. Library
- B9. Elementary school
- B10. Other schools
- B11. Book store
- B12. Fast food restaurant
- B13. Coffee place
- B14. Bank/credit union
- B15. Non-fast food restaurant
- B16. Video store
- B17. Pharmacy/drug store
- B18. Salon/barber shop
- B19. Your job or school
- B20. Bus or trolley stop
- B21. Park
- B22. Recreation center
- B23. Gym or fitness facility

Responses:

1-5 min(5) 6-10 min(4) 11-20 min(3) 21-30 min(2) 31+ min(1) don't know (1)

Note: A 'don't know' response is coded as a "1" because if it is not known whether the facility is within walking distance, the actual walk is likely more than 31 minutes.

Score on subscale: Mean of item responses. $B = (B1 + \dots + B23) / 23$

Alternative scoring: For some purposes it may be useful to tally the number of stores, facilities, or types of store/facilities within a 5-, 10-, or 20-minute walk.

Subscale C: Land-use mix – access (higher score denoting higher walkability)

- C1. I can do most of my shopping at local stores.
- C2. Stores are within easy walking distance.
- C3. There are many places to go within walking distance at my home.
- C4. It is easy to walk to a transit stop (bus, train) from my home.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $C = (C1 + C2 + C3 + C4) / 4$

Subscale D: Street connectivity (higher score denoting higher walkability)

- D1. The distance between intersections in my neighborhood is usually short.
- D2. There are many four-way intersections in my neighborhood.
- D3. There are many alternative routes for getting from place to place in my neighborhood.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $D = (D1 + D2 + D3) / 3$

Subscale E: Infrastructure and safety for walking (higher score denoting higher walkability)

- E1. There are sidewalks on most of the streets in my neighborhood.
- E2. The sidewalks in my neighborhood are well maintained.
- E3. There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to
- E4. Sidewalks are separated from the road/traffic in my neighborhood by parked cars.
- E5. There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood.
- E6. It is safe to ride a bike in or near my neighborhood.
- E7. My neighborhood is well lit at night.
- E8. Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.
- E9. There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood.
- E10. The crosswalks in my neighborhood help walkers feel safe crossing busy streets

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $E = (E1 + E2 + E3 + E4 + E5 + E6 + E7 + E8 + E9 + E10) / 10$

Subscale F: Aesthetics (higher score denoting higher walkability)

- F1. There are trees along the streets in my neighborhood.
- F2. Trees give shade for the sidewalks in my neighborhood.
- F3. There are many interesting things to look at while walking in my neighborhood.
- F4. My neighborhood is generally free from litter.
- F5. There are many attractive natural sights in my neighborhood.
- F6. There are attractive buildings/homes in my neighborhood.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $F = (F1 + F2 + F3 + F4 + F5 + F6) / 6$

Subscale G: Traffic hazards (higher score denoting lower walkability)

- G1. There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood.
- G2. There is so much traffic along nearby streets that it makes it difficult or unpleasant to walk in my neighborhood.
- G3. The speed of traffic on the street I live on is usually slow. *{need to reverse-score item}*
- G4. The speed of traffic on most nearby streets is usually slow. *{need to reverse-score item}*
- G5. Most drivers exceed the posted limits while driving in my neighborhood.
- G6. When walking in my neighborhood there are a lot of exhaust fumes

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $G = (G1 + G2 + [5-G3] + [5-G4] + G5 + G6) / 6$

Subscale H: Crime (higher score denoting lower walkability)

- H1. There is a high crime rate in my neighborhood.
- H2. The crime rate in my neighborhood makes it unsafe to go on walks during the day.
- H3. The crime rate in my neighborhood makes it unsafe to go on walks at night.
- H4. My neighborhood is safe enough so that I would let a 10-yr-old boy walk around my block alone in the daytime.
{need to reverse-score item}

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Mean of item responses. $H = (H1 + H2 + H3 + [5-H4]) / 4$

Single-item subscale I: Lack of parking (higher score denoting higher walkability)

- I1. Parking is difficult in local shopping areas.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Item response. $I = I1$

Single-item subscale J: Lack of cul-de-sacs (higher score denoting higher walkability)

- J1. The streets in my neighborhood do not have many cul-de-sacs.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Item response. $J = J1$

Single-item subscale K: Hilliness (higher score denoting lower walkability)

K1. The streets in my neighborhood are hilly, making my neighborhood difficult to walk in.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Item response. $K = K1$

Single-item subscale L: Physical barriers (higher score denoting lower walkability)

L1. There are major barriers to walking in my neighborhood that make it hard to get from place to place (for example, freeways, railway lines, rivers, canyons, hillsides).

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Item response. $L = L1$

Single-item subscale N: Social interaction while walking (higher score denoting higher walkability)

N1. I see and speak to other people when I am walking in my neighborhood.

Responses:

Strongly disagree (1) Somewhat disagree (2) Somewhat agree (3) Strongly agree (4)

Score on subscale: Item response. $N = N1$

NOTE: One item in the original NEWS is not recommended for inclusion in either multi-item or single-item subscales due to poor reliability (Cerin et al., 2006 & 2009): “There are walkways in my neighborhood that connect cul-de-sacs to streets, trails, or other cul-de-sacs.”