

Transportation Security Index

TSI-16

Transportation insecurity is a condition in which a person is unable to get from place to place in a safe or timely manner due to an absence of resources necessary for transportation (e.g. money for bus fare or car repairs, health for walking, friends with cars who can provide rides).

The validated 16-question Transportation Security Index (TSI-16) measures an individual's experience with transportation insecurity using 16 questions that tap into 16 unique symptoms of transportation insecurity as observed in qualitative research. It identifies 5 categories of transportation insecurity. To administer, all 16 questions should be asked and answered in the order detailed below.

Questions? Contact the research team at transportation-insecurity@umich.edu

Optional Introductory Question

Designed to prime respondents to consider the full range of transportation options. TSI results are not impacted if not administered.

How often do you use each of the following to get from place to place? If the type of transportation is not available to you, please select "Not available to me."

Statements in rows

- Walking
- Biking
- Riding a motorcycle or moped
- Your own personal vehicle (e.g., car, truck, SUV)
- Borrowing the personal vehicle of a friend, family member, neighbor, coworker, or acquaintance
- Getting a ride from a friend, family member, neighbor, coworker, or acquaintance (including carpooling)
- Taking a taxi service or rideshare (e.g., Uber, Lyft)
- Using a rental car or car sharing service (e.g., Zipcar, Car2go)
- Taking the bus
- Taking the train or subway
- Using paratransit (that is, specialized, door-to-door transport service for people with disabilities)

Statements in columns

- Daily
- A few times a week
- A few times a month
- A few times a year
- Never
- Not available to me

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1. To get to the places they need to go, people might walk, bike, take a bus, train or taxi, drive a car, or get a ride. In the past 30 days, how often were you late getting somewhere because of a problem with transportation?

Often **Sometimes** **Never**

2. In the past 30 days, how often did it take you longer to get somewhere than it would have taken you if you had different transportation?

Often **Sometimes** **Never**

3. There are times when we need to wait for transportation to pick us up. In the past 30 days, how often did you spend a long time waiting because you did not have the transportation that would allow you to come and go when you wanted?

Often **Sometimes** **Never**

4. In the past 30 days, how often did you have to arrive somewhere early and wait because of the schedule of the bus, train, or person giving you a ride?

Often **Sometimes** **Never**

5. In the past 30 days, how often did you have to reschedule an appointment because of a problem with transportation?

Often **Sometimes** **Never**

6. In the past 30 days, how often did you skip going somewhere because of a problem with transportation?

Often **Sometimes** **Never**

7. In the past 30 days, how often were you **not** able to leave the house when you wanted to because of a problem with transportation?

Often **Sometimes** **Never**

8. In the past 30 days, how often did you worry about whether or not you would be able to get somewhere because of a problem with transportation?

Often **Sometimes** **Never**

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9. In the past 30 days, how often did you feel stuck at home because of a problem with transportation?

Often **Sometimes** **Never**

10. In the past 30 days, how often do you think that someone did not invite you to something because of problems with transportation?

Often **Sometimes** **Never**

11. In the past 30 days, how often did you feel like friends, family, or neighbors were avoiding you because you needed help with transportation?

Often **Sometimes** **Never**

12. In the past 30 days, how often did you feel left out because you did not have the transportation you needed?

Often **Sometimes** **Never**

13. In the past 30 days, how often did you feel bad because you did not have the transportation you needed?

Often **Sometimes** **Never**

14. In the past 30 days, how often did you worry about inconveniencing your friends, family, or neighbors because you needed help with transportation?

Often **Sometimes** **Never**

15. In the past 30 days, how often did problems with transportation affect your relationships with others?

Often **Sometimes** **Never**

16. In the past 30 days, how often did you feel embarrassed because you did not have the transportation you needed?

Often **Sometimes** **Never**

How to score the TSI-16

Looking at responses to the main questionnaire, assign each “never” response a score of 0, each “sometimes” response a score of 1, and each “often” response a score of 2.

For those interested in using the TSI-16 as a continuous variable, sum the scores to arrive at the respondent’s continuous transportation insecurity score.

For those interested in using the TSI-16 as a categorical variable, to assign a respondent to a transportation insecurity category, use the following scheme:

- **Sum score 0-2:** No Insecurity/Secure
- **Sum score 3-5:** Marginal Insecurity
- **Sum score 6-10:** Low Insecurity
- **Sum score 11-16:** Moderate Insecurity
- **Sum score 17-32:** High Insecurity

CITATIONS AND ATTRIBUTIONS

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If you are interested in commercial use or in building upon or modifying the TSI, please contact transportation-insecurity@umich.edu.

CITATIONS

Gould-Werth, Alix, Jamie Griffin, and Alexandra K. Murphy. 2018. “Defining a New Measure of Transportation Insecurity: An Exploratory Factor Analysis.” *Survey Practice*, 11:2, pp. 1-36.

Murphy, Alexandra K, Alix Gould-Werth, and Jamie Griffin. 2021. “Validating the Sixteen Item Transportation Security Index in a Nationally Representative Sample: A Confirmatory Factor Analysis” *Survey Practice*, 14:1, pp. 1-17.

MacDonald-Lopez, Karina, Alexandra K. Murphy, Jamie Griffin, Michael Bader, Alix Gould-Werth, and Nicole Kovski. 2023. “A Driver in Health Outcomes: Developing Discrete Categories of Transportation Insecurity.” *American Journal of Epidemiology*, 192:11, pp. 1854-1863.

For more information, visit: transportation-insecurity.umich.edu