



## TIME-LOCATION (TIME-SPACE) SAMPLING

Time-location sampling (TLS, also known as time-space sampling and venue-based sampling) is a **probability-based method** used to sample a hard-to-reach population based on their frequented locations, particularly when constructing a sampling frame is difficult. The sampling frame is developed by exhaustively crafting a list of **all possible locations and time frames where the target population congregates**.

Each location on the list is then numbered and each site is randomly assigned a day-time slot for the researchers to observe. TLS relies on **three tiers of randomization**: (1) locations where population congregates, (2) the days and times sampled, and (3) the individuals visiting the chosen spaces at the chosen day and time.

Individuals found at each venue are randomized into the study with every *n*th person identified selected to participate. Some studies track personally identifying information to ensure that a participant is only included once while others rely on participant self-identification. Sampling from a high number of venues and targeting a large number of population members can protect against sampling bias and increase the probability of interviewing subgroups within the population.

Research teams can also use weights to account for the variation of population frequency of participants visiting the locations to enhance generalizability to the entire target population.



## ASSUMPTIONS

- Researchers have access to a majority of the venues frequented by target population.
- Attendance of target population individuals is equally probable at all venues of a particular type.
- Present individuals at a venue have an equal probability of being selected into the study

## ASSUMPTION CONSIDERATIONS

- Verifying that a high proportion of target- visited venues are included in the study increases the heterogeneity of the sample.
- To ensure equal probability of venues, if a venue contains roughly the same segment of the population as another venue already included it could be unnecessary. Researchers should extend extra effort to include venues that contain unique subgroups of the target population into the sampling frame.
- Sampling from a high number of venues and targeting a large number of population members protects against sampling bias.

### PREVIOUS USES

**Individuals Using Drugs**  
Parsons et al. (2008);  
MacKellar et al. (1996)

**Men Who Have Sex With Men**  
Kendall et al. (2008); Muhib et al. (2001)

**Truck Drivers Utilizing Individuals Engaged in Commercial Sex**  
Ferreira et al. (2008)

**Migrants**  
Semaan & Dinunno (2014)

### PROS

- Since TLS does not use peer recruitment strategies, it is not susceptible to volunteerism and masking biases.
- Does not rely on administrative or NGO registries for identifying hidden population which could be prohibitive due to exploitation or social stigma.

### CONS

- Researchers can miss important locations.
- Results can be biased toward visitors who frequent study sites violating the equal selection probability assumption.
- TLS is a time-intensive method. Constantly changing attendance patterns can necessitate a review of the sampling frame.

## A NOTE ABOUT VENUE LOCATIONS

- Helpful for researchers to take a significant formative and preparatory phase where challenges of access to the population and obstacles to recruitment are exhaustively assessed.
- Ethnographic mapping and use of community/location-based gatekeepers has been helpful to identify and gain access to diverse venues.
- The amount of time spent at a location varies between research teams. Suggestions vary between 2-4 hours to balance staff burden and recruitment quality of participants.
- Given the transient nature of many hidden populations, researchers should consider an iterative process where venue characteristics are reviewed and updated throughout the entire process.
- Since there is a possibility that participants sharing similar characteristics will congregate in similar areas, researchers need to account for clustering within venues.
- Examples of venues include NGOs, markets, industry locations (e.g. farms), parks, etc.

## PAST VENUE LOCATION EXAMPLES

- Muhib et al. (2001) identified 13 venues within the sampling frame (dance clubs) and had 300 units of observation randomly selected at different times among 6 separate sites.
- Ferreira et al. (2008) identified 5 venues (bathrooms, diner, & document processing site) and randomly assigned interviewers to different venue and days for 4 hour periods.



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