

10364-TIME USED IN TRAFFIC BY SOCIODEMOGRAPHIC GROUPS IN *EXPOLIS*-HELSINKI

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Air pollution exposures depend on both air pollution concentrations in the microenvironments of concern and time-microenvironment-activity patterns of the exposed. In the European *EXPOLIS* study 48-hour time-microenvironment-activity data (15-minute time-resolution) of 435 randomly drawn subjects (age 25-55) were collected during one year in 1996-97 in Helsinki. This paper introduces the sociodemographic (gender, age, occupational status and employment status) differences in the time used in traffic.

Table 1. Percentage of time used in traffic by sociodemographic groups in Helsinki.

		Total traffic	t-test sig.	Share of vehicle used while in traffic			
		%		walk/bike	train/metro	car	bus/tram
GENDER	men	9.8	**	28.6	2.9	57.2	11.3
	women	7.4		46.3	5.2	30.2	18.3
AGE	25-34 years	8.4	*	39.9	3.7	41.4	15.0
	35-44 years	7.5		38.0	4.2	39.7	18.1
	45-55 years	9.1		36.3	4.3	46.6	12.8
OCCUP.STATUS	white-collar	7.9	**	37.6	5.0	41.9	15.4
	non w-collar	9.3		38.6	2.6	44.6	14.3
EMPLOYMENT	employed	8.4		35.1	4.4	45.4	15.1
	not empl.	7.9		59.9	1.6	24.3	14.2

Men, the oldest group (45-55 years) and non white-collar workers spent significantly more time in traffic than women, the younger and white-collar employees. PM_{2.5} concentrations in different means of transportation were assessed by 3 to 11 hour measurements in 39 vehicles. The measurements showed the PM_{2.5} concentrations to be double in cars and buses/trams (22-25 µg/m³) compared to walking/biking and in trains/metro (10-12 µg/m³) in Helsinki. Men and employed subjects are more exposed to PM_{2.5} in traffic, while they use more time in road traffic (car and buses/trams combined) than women and not employed subjects. In addition to total time used in traffic also selection of the means of transportation between sociodemographic groups leads to different exposures to air pollutants in traffic.

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10766-The French permanent survey on indoor air quality: reliability and accuracy of time activity diaries.

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BACKGROUND: The French permanent survey on indoor air quality was set up in 1999 to collect representative data on quality of indoor environment and to assess risk related to exposure from various pollutants. In March 2001 a pilot study was conducted to improve measurement protocols, descriptive questionnaires and time activity diaries. This work aims to describe time activity diaries used in this survey in term of reliability and accuracy. **STUDY DESIGN:** Ninety dwellings were selected in three regional areas. In each area, two investigators conducted the investigations on a one-week base following standardized protocols. At the time of the first visit, time activity diaries were left to occupants to be completed throughout the week. Two documents were used: a one week diary filled out indicating the time spent by occupants in each room (15 minute unit), and a one day diary (10 minute unit) filled up by occupants of more than 10 years, for one week day and one day during the week-end. The one day diary provided more details on activity (location, activity, number of person, products used). **RESULTS:** Two hundred and seventy two people lived in the 90 investigated residences. In the overall 254 (93.4%) week diaries were recovered by the investigators. Eighteen were missing because of occupant's refusal. Among the 272 households occupants, 126 (46.3%) returned the weekly diaries fully completed and 198 (72.8%) filled out to 90%. The percentage of time units completed throughout the week was 81%. The results were different from one area to another, varying from 95.6% to 55.8%. Among the 222 occupants ten years old and more, 200 (90%) filled up the one day diary. For this document, percentage of time units completed was higher during a week day (78.7%) than a week-end day (74.9%). The mean time spent in housing was about 14 hours per day (Standard deviation: 6.8, Inter quartile interval: 7.5), and was different from one area to another, varying from 11% for an area located in the south to 15% for the areas located in the north. **DISCUSSION:** Collection of data on time budget requires the use of documents often difficult to fill. In our study, the filling quality of time activity diaries was different from one area to another. These differences were probably due to the investigators who did not manage in the same way a refusal or a little filled out document. Based on these results we will focus on investigators training, to avoid misinterpretation and to standardize the interview. In a second time, we will set up a follow-up of time activity diaries quality to enhance their reliability and accuracy.

10920-Methodology for Simulating Sequential Micro-Level Activity Patterns for Modeling Human Exposure to Contaminants

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Sequential micro-level activity patterns are valuable in estimating dermal and non-dietary ingestion exposures. While methods to collect activities are available, not many data sets exist due to the resource intensive methodologies. In reality, the field may never have a large enough pool of data to adequately estimate population or longitudinal exposures. This paper outlines a methodology to increase the value of current data by simulating probabilistically relevant sequences of micro-level activity patterns. Although the concepts for simulating sequences are not new, the application to simulate micro-level activity sequences is novel. This approach is possible with the foundation of second-by-second sequential activity patterns produced at Stanford University. The underlying assumption is that behavior is a stochastic chain of activity states. With this assumption there exist probabilities that an individual will move from one activity state to another. In the case of the Stanford database these categorical states are locations and objects contacted. As an example, 100 sequences were simulated based on the normal activities of a 1-year-old female. The original sequence, representing objects the child contacts with her right hand, is for a duration of 1.85 hours and consists of 906 contacts with 27 of the possible 36 object categories. Sequences were produced for the same elapsed time (1.85 hrs) and resulted in a range of 757 to 959 total contacts. The distribution of durations for simulated contacts was as expected with a high frequency of short durations and a decrease in frequency as duration increased. The frequencies and total duration of contact with individual objects are similar to those in the original file. For example, the original sequence contains 102 contacts with Hard Toy (total duration, 1002 seconds) and 2 contacts with Dirt (total duration, 6 seconds). The median number of contacts for Hard Toy in the simulated sequences is 95.5 (range, 77-127), and for Dirt is 2 (range, 1-6). The median total duration for Hard Toy in the simulated sequences is 1011 seconds (range, 689-1376 seconds), and for Dirt is 4 seconds (range, 1-29 seconds). See Figures 1 and 2. Ultimately this methodology is constrained by the range of available scenarios and macro-activities in original sequences. However, these methods may aid in extending the value of current sequential micro-level activity patterns. Potential also exists to develop more complicated schemes to simulate longitudinal micro-level activity patterns for individuals or activity patterns for a population, and for combining these simulation techniques with existing macro-level activity patterns.

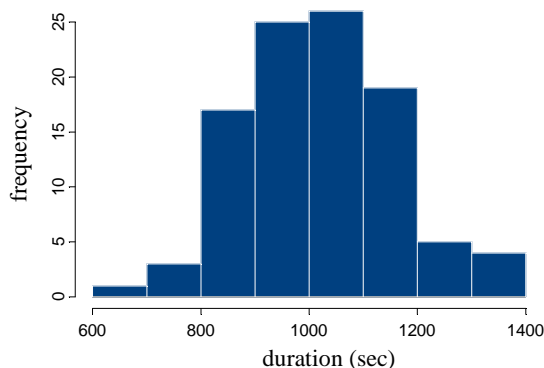


Figure 1. Distribution of Durations for Hard Toy Contact

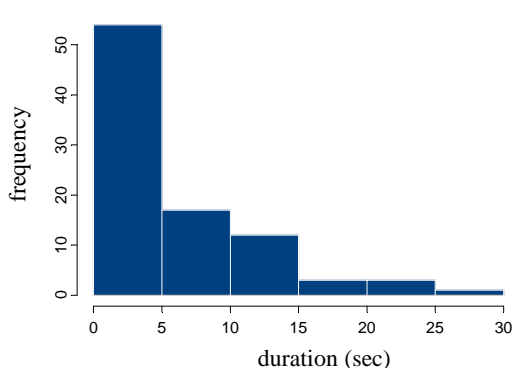


Figure 2. Distribution of Durations for Dirt Contact