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Longitudinal measurement of noise and annoyance of airplanes by citizens near Schiphol The Netherlands

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EXTENDED ABSTRACT

In The Netherlands two groups of 14 citizens living in the vicinity of Schiphol airport installed a small relatively cheap noise sensor in their backyard or on their balcony. The participants were recruited online by means of RIVM newsletters and social media. The willingness to participate was large. Consequently, participants were selected from 7 different spatial clusters near Schiphol airport.

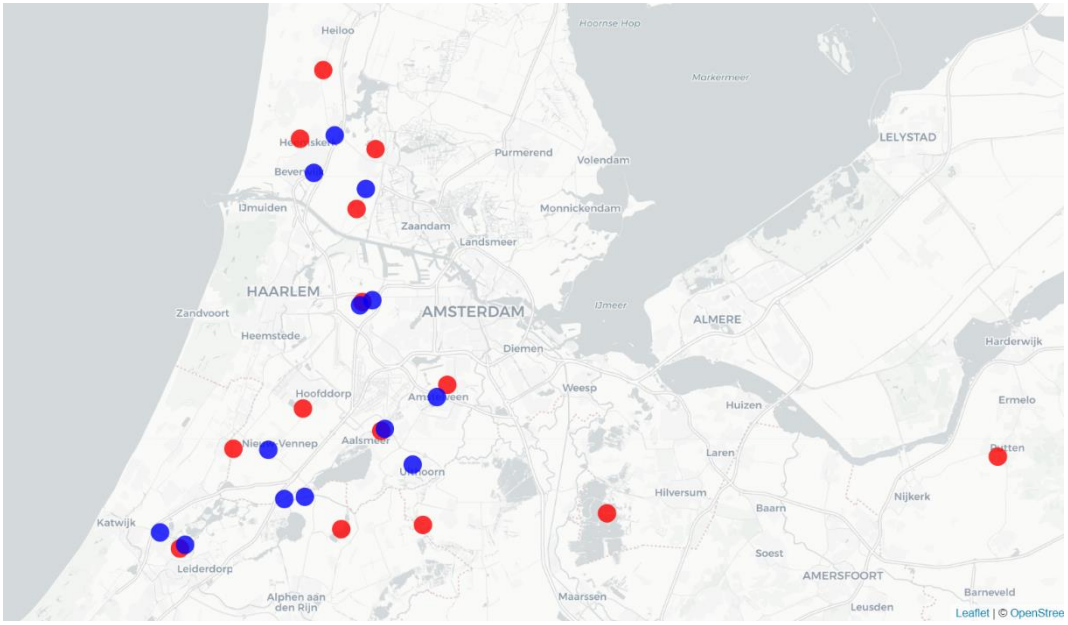
The first group wanted to study the effect of numbers of airplanes and a lack of rest on annoyance, while the other group wanted to describe the way that noise sensitive citizens experience airplanes. The exact study design was decided upon in collaboration with the participants.

Measuring noise

The data collection started with noise measurements in February 2022. The noise meter we use in this project is the Sensor.Community sound meter. The noise meters have been sent to the home addresses of the participants. The box contained a description of how to hang the noise meter, advice on the location, a description of how the noise meter could be connected to the Internet via WIFI and made visible on the data portals of SamenMeten and Sensor.Community. Two videos have been made to support this. All participants were able to get the noise meter working and make it visible on the two data portals this way.

Figure 1 shows the geographic positions at which noise has been measured by the participants in the project. The blue points are the participants in the 'respite' group, the red points are the participants in the ‘noise sensitivity' group.

Figure 1: Geographical position of the noise meters in the project



Measuring annoyance with an app

In the small questionnaire, implemented in an app, questions were asked about perceived annoyance (ISO question), about the number of aircraft passing by, about the occurrence of consecutive periods of flights (flight blocks) and their duration, about the rest between flight blocks, about the noise level of aircraft passages, and the causes of the disruption. The latter concerned: noisy types of aircraft, ground noise, noise or vibrations due to low overflying, noise due to making a turn, variable noise due to weather conditions, flying outside the agreed times (between 07:00 and 23:00), ascending or descending air traffic, sleep disturbance or fear of/by aircrafts.

The data collection with the app was carried out in the period from July 7, 2022 to October 1, 2022. Almost all participants registered their perceptions 4 times a day for three weeks They did so by looking back at the night (23.00-7.00), the morning (7.00-10.00), the day (10.00-18.00) and the evening (18.00-22.00). Some participants collected data for more than three weeks. The aim was to collect 28 (participants) x 4 (parts of a day) x 21 (days) = 2352 questionnaires. After cleaning up the data, 2582 usable questionnaires remained. This is 78% of all data collected with the app.

Combining data and analysis

In addition, in these three months flight radar tracks and weather data was collected. Noise measurements were coupled with flight radar tracks in order to identify airplane noise.

In the longitudinal statistical analysis objective and subjective information has been combined in order to explain the annoyance. The first results of the analysis shows the relevance of the (perceived) number of planes for annoyance.