Bryson Purdon Social Research

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Report on the review of the statistical syntax for the analysis of the Aviation Noise Attitudes Survey (ANAS)

Dr Susan Purdon, 15/09/2025

The checks conducted

In August/September of 2025 I systematically checked the statistical syntax generated by the CAA team in their regression analysis of the ANAS data. The checks covered the following:

- The merging of the two waves of data and the calculation of a scaler that creates data where both waves are of equal weighted size;
- The generation of SPSS complex sample plan files that reflect the survey design in terms of the clustering of the survey responses within households and the use of the scaler;
- The calculation of HA_v, HA_n and HA_{vw} at three months and 12 months;
- The SPSS syntax used to apply the exclusion criteria;
- The SPSS syntax created for the logistic regressions of HA_v, HA_n and HA_{vw} with $L_{Aeq,16h}$ and L_{den} as independent variables (single waves and merged waves);
- The generation of 6 and 12 noise bands for N65, the calculation of the mean value of N65 per band, and the calculation of the percentage highly annoyed per noise band based on Q8;
- The syntax and data used for the non-linear regression of the percentage highly annoyed per N65 band, using banded N65 means as the predictor;
- The Excel spreadsheets created from the logistic regressions. Based on a spot-check of the relevant spv files, I checked that the parameter and variance estimates generated from the regression had been correctly transferred from SPSS to the spreadsheets. I then checked that, per value of the independent variable, the predicted percentage and the standard error for 'highly annoyed' had been correctly calculated, and that, based on these two statistics, the 95% confidence intervals had been correctly calculated.
- The Excel spreadsheet with the results from the non-linear regression. Again, for this I checked that the parameter and variance estimates generated from the regression had been correctly transferred from SPSS to the spreadsheets. I then checked that, per value of N65, the predicted percentage and the standard error for 'highly annoyed' had been correctly calculated, and that, based on these two statistics, the 95% confidence intervals had been correctly calculated. I also checked that the knot at N65=200 was dealt with correctly in

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the spreadsheet.

Findings and suggestions

Across the checks I did not spot any errors in how the analysis has been set up or interpreted. I spotted a few elements where small improvements might be made, none of which would change the findings more than marginally. These are listed below:

1. In the calculation of 'highly annoyed' from Q5 and Q6, there are a few missing responses (labelled -99 and -92). The assumption made was that none of these were 'highly annoyed' but this seems to be contradicted by the responses given by these respondents on other attitude questions. It is probably better to set the -99s and -92s to missing;
2. There are a small number of zeros in retro_L_{den} which should probably be set to missing;
3. In the calculation of HA_{vw} the syntax does not pull out exactly 40% of those 'very' annoyed. Using amended syntax(an example was sent by email) would allow for this to be set at exactly 40%. I suggest this be done after the exclusion criteria have been applied rather than before.

A general observation, but in the creation of the complex samples plan files I note that no weight is specified for within-wave analysis. (i.e. the weight has been set to one for all respondents). I am aware that weights were supplied by the survey contractors, and subsequently re-scaled by CAA, these being weights that accounted for the sub-selection of adults within households and the differing number of respondents by noise band per airport. I assume that a decision has been taken not to use these weights for the regression analysis, but (if not already done) it may be worth checking whether the results from the regressions are sensitive to the use of these weights.

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Report on the review of the revised statistical analysis of the N65 exposure-response function

Dr Susan Purdon, 26/01/2026

The checks conducted

I have checked the revised N65 exposure-response analysis. The checks covered the following:

- The SPSS syntax used to compute the revised regression model;
- The specification of the model and the standard errors for predictions in the QA guide word file;
- The Excel spreadsheet created from the regression. I checked that the parameter and variance estimates generated from the regression had been correctly transferred from SPSS to the spreadsheets. I then checked that, per value of the independent variable, the predicted percentage and the standard error had been correctly calculated, and that, based on these two statistics, the 95% confidence intervals had been correctly calculated. I also checked that the knot at N65=96 was dealt with correctly in the spreadsheet.

Findings

Across the checks I did not identify any errors in how the analysis has been set up or interpreted, or how the confidence intervals had been calculated.