

Longitudinal data analysis: Assignment 3

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1 Introduction

First, the *TIME* variable is rounded to the nearest integer value. Should we keep only one measurement per time instance (eg, take the average?). Hearing thresholds will be explored, both as a continuous variable and as a trichotomized (ordinal) variable with the following three levels:

- ≤ 6 dB: Excellent hearing
- over 6 and ≤ 25 dB: Normal hearing
- ≥ 26 dB: Hearing loss

1.1 Missingness exploration

After discretizing the *TIME* variable, we consider a subject to be missing at a certain time instance if there is no measurement for that subject at that time. It should be noted that, if the subject is not missing (18.16% of TIME-subject instances), we usually (16.88 have at two measurements (one for each ear) at each time instance. In fact, the average number of measurements per subject at each time instance is 0.35, and maximum 4.

The following graph was created using the *visdat* package. It shows all subjects, ordered from youngest (in the top) to oldest (in the bottom) and whether or not their data is missing at a certain time instance (on the x-axis). The percentages on top shows the percentage missingness at each time instance.

2 Methodology

First, a direct likelihood analysis is compared with multiple imputation in the ?? continuous/discrete??? case. Next, weighted generalized estimating equations are compared with ‘multiple-imputation generalized estimating equations’. Lastly, a sensitivity analysis is performed

All analysis was done in R. All scripts are freely available at this git repository.

3 Results

3.1 Direct likelihood analysis versus multiple imputation

Q4

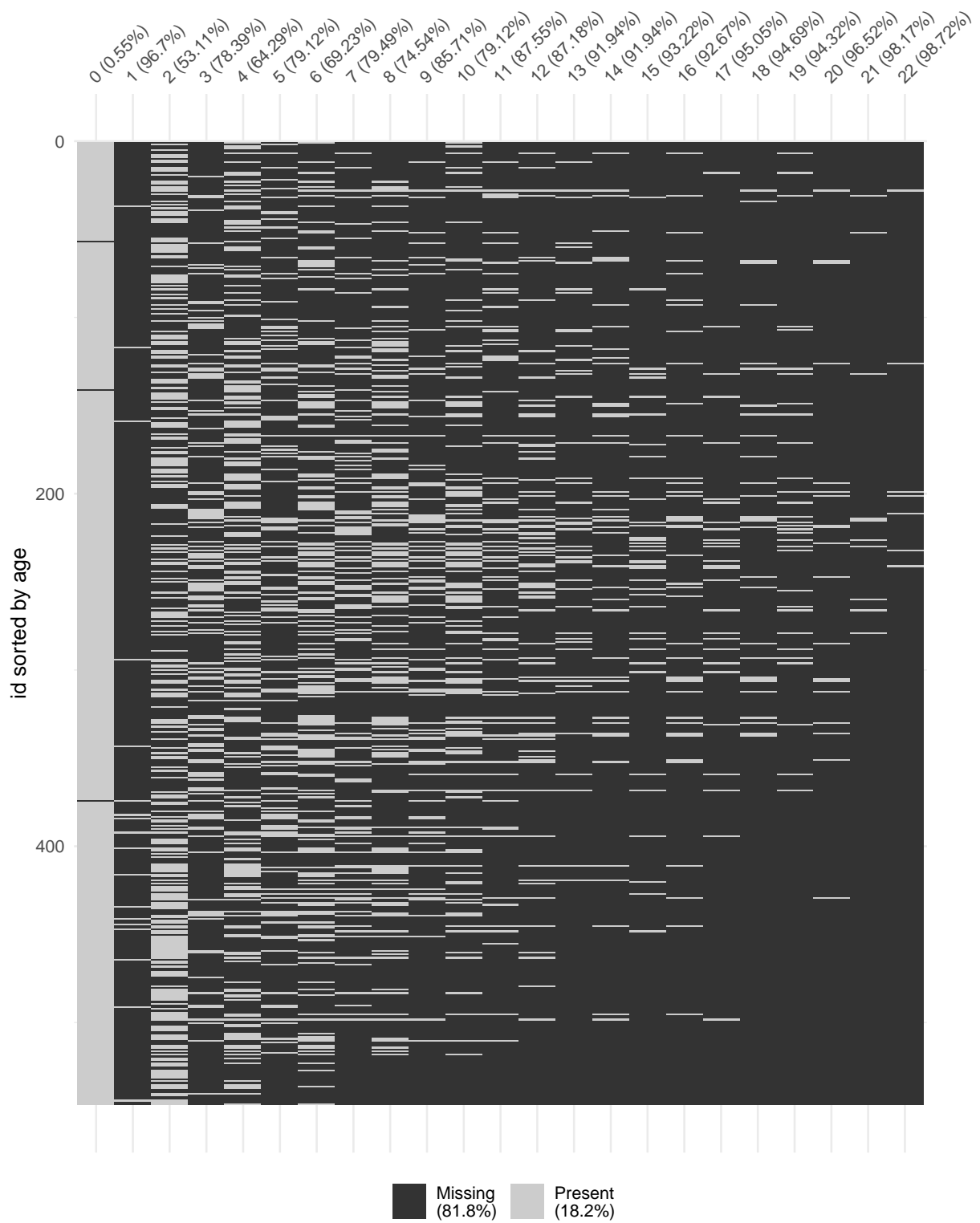


Figure 1: Visual inspection of missingness for different ages at different time instances.

3.2 Weighted generalized estimating equations versus ‘multiple-imputation generalized estimating equations’

Q5

3.3 Sensitivity analysis

Q6

4 Bibliography