

Nominal and ordinal responses

Ordinal: Groups with an ordering.

Nominal: Groups without an ordering.

Examples:

- Car air condition preferences: *little importance, important, very important*
- Laptop color preferences: *gray, green, pink, yellow*
- Course satisfaction: *poor, good, very good, excellent*
- Housing satisfaction: *low, medium, high*
- Breath: *normal, boarder line, abnormal*
- Political sympathies: *SV, Ap, Sp, V, KrF, H, Frp*
- Grades *A, B, C, D, E, F*

Nominal logistic regression

Response: $y \sim m(n, \pi_1, \pi_2, \dots, \pi_J)$

Link function: $\eta_j = \text{logit}(\pi_j) = \log\left(\frac{\pi_j}{\pi_J}\right)$

For $j = 1, \dots, J$. Chose a reference category (here $j = J$)

Linear component: $\eta_j = X\beta_j$

Illustration proportional odds model

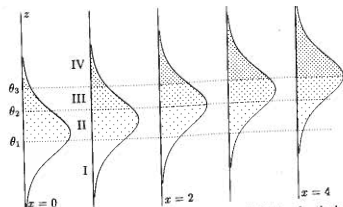


Fig. 5.1a. Diagram showing how the response probabilities for the logistic model (5.1) vary with x when $\beta > 0$. Response categories are represented as four contiguous intervals of the z -axis. Higher-numbered categories have greater shade density.

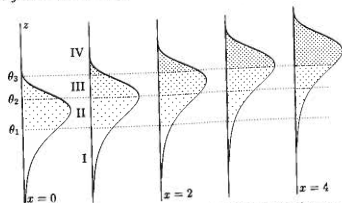


Fig. 5.1b. Diagram showing how the probabilities for the four response categories (5.2) vary with x when $\beta < 0$.