

# An Introduction to the Rasch Model

## with Examples in R

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### *Corrigenda and Didactic Comments*

#### Corrigenda

- p. 49, fourth paragraph:

“The WL estimator  $\hat{\beta}$ ” should be “The WL estimator based on  $\hat{\beta}$ ”

- p. 63, third paragraph:

“this item is easier for men than it is for women” should be “this item is easier for country A than it is for country B”

“this item is easier for women than it is for men” should be “this item is easier for country B than it is for country A”

- p. 69, equation:

$$T_i = \frac{\hat{\beta}_i^{(1)} - \hat{\beta}_i^{(2)}}{\sqrt{\text{se}(\hat{\beta}_i^{(1)}) + \text{se}(\hat{\beta}_i^{(2)})}},$$

should be

$$T_i = \frac{\hat{\beta}_i^{(1)} - \hat{\beta}_i^{(2)}}{\sqrt{\text{se}^2(\hat{\beta}_i^{(1)}) + \text{se}^2(\hat{\beta}_i^{(2)})}},$$

- p. 82, third paragraph:

“the natural logarithm of the log likelihood function” should be “the natural logarithm of the likelihood function”

## Didactic Comments

- p. 14-15:

The didactic explanations in this section should not be misunderstood with respect to the formal definition of the slope parameter.

Figure 2.2 and the first paragraphs of Section 2.2.2 illustrate that the probability of solving an item associated with a difference of 1 in the abilities of two persons located in the middle of the ICC is higher for an item with higher discrimination than for an item with lower discrimination.

However, due to the shape of the logistic function, which is further discussed in Section 2.2.3, the slope of the ICC varies across the latent continuum. Consequently, the formal interpretation of the slope parameter  $\beta_i$  in the Rasch model is not entirely straightforward.

In a logistic model, a unit change in ability results in a change of  $\beta_i$  not in the probability but in the log odds of solving an item correctly.

The same principle applies to slope parameters in logistic regression models (cf., e.g., Fahrmeir, Kneib, Lang, & Marx, 2021).

- p. 29, lower half:

This didactic example refers to the comparison of odds, not probabilities, and should not be misinterpreted as the latter. Because the phrase “more likely” is used to compare probabilities in most parts of the book, in the following sentence it may be misleading:

“If we compare her odds with those of Marco and Cora, she is six times more likely to correctly answer the first item than Marco and 1.5 times more likely than Cora.”

The sentence could be rephrased like this:

“If we compare her odds with those of Marco and Cora, her odds of correctly answering the first item are six times those of Marco and 1.5 times those of Cora.”

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## References

Fahrmeir, L., Kneib, T., Lang, S., & Marx, B. D. (2021). *Regression: Models, methods and applications*. Springer Berlin Heidelberg. doi: 10.1007/978-3-662-63882-8