DeCarlo, L. T. (2021). A signal detection model for multiple-choice exams. *Applied Psychological Measurement*, *45*, 423-440.

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– the Y_{ij} in the probabilities should be 1,2,3,4 and not always 1. From the original manuscript:

"where F is a CDF, f is a probability density function (PDF), and d is the derivative. The above is the model for a choice of Alternative '1'; the same approach is used for the remaining alternatives of 2, 3, and 4 in this example, giving,

$$p(Y_{ij} = 1|\boldsymbol{b_{jm}}) = \int_{-\infty}^{\infty} F\,(b_{j1} - b_{j2} + \varepsilon_{ij1}) \times F(b_{j1} - b_{j3} + \varepsilon_{ij1}) \times F(b_{j1} - b_{j4} + \varepsilon_{ij1})\, f(\varepsilon_{ij1})\, d\varepsilon_{ij1}$$

$$p(Y_{ij} = 2|\boldsymbol{b_{jm}}) = \int_{-\infty}^{\infty} F\,(b_{j2} - b_{j1} + \varepsilon_{ij2}) \times F(b_{j2} - b_{j3} + \varepsilon_{ij2}) \times F(b_{j2} - b_{j4} + \varepsilon_{ij2})\, f(\varepsilon_{ij2})\, d\varepsilon_{ij2}$$

$$p(Y_{ij} = 3|\boldsymbol{b_{jm}}) = \int_{-\infty}^{\infty} F\,(b_{j3} - b_{j1} + \varepsilon_{ij3}) \times F(b_{j3} - b_{j2} + \varepsilon_{ij3}) \times F(b_{j3} - b_{j4} + \varepsilon_{ij3})\, f(\varepsilon_{ij3})\, d\varepsilon_{ij3}$$

$$p(Y_{ij} = 4|\boldsymbol{b_{jm}}) = \int_{-\infty}^{\infty} F\,(b_{j4} - b_{j1} + \varepsilon_{ij4}) \times F(b_{j4} - b_{j2} + \varepsilon_{ij4}) \times F(b_{j4} - b_{j3} + \varepsilon_{ij4})\, f(\varepsilon_{ij4})\, d\varepsilon_{ij4}.$$

The above can be written more compactly and generally for M alternatives as

$$p(Y_{ij} = m|\boldsymbol{b}_{jm}) = \int_{-\infty}^{\infty} \left(\prod_{\substack{k=1 \\ k \neq m}}^{M} F\left(b_{jm} - b_{jk} + \varepsilon_{ijm}\right) \right) f\left(\varepsilon_{ijm}\right) d\varepsilon_{ijm}. \tag{5}$$

Equation 5 is a general form of the basic SDT choice model; it is the same (with the addition of an alternative-specific signal variable) as the *m-alternative forced choice model with bias* discussed in mathematical psychology (e.g., DeCarlo, 2012) and the maximum utility model discussed in econometrics (e.g., Train, 2009)."