Answers

1. Outcome measures in a Randomized Clinical Trial (RCT)

The Wilson and Cleary model distinguishes biological and physiological variables, symptom status, functional status, general health perceptions and overall quality of life.

- Balance, blood pressure, heart rate at rest, forced expiratory volume, and peak expiratory flow are physiological variables.
- The number of falls belongs to symptoms status and is an indication of symptom severity.
- Fear of falling and physical activity are characteristics of the individual, although in this trial they are used as outcome measures of the trial.
- Functional status is self-evident.

2. What is the construct?

2.A Classification of items of the questionnaire. The questionnaire appears to assess different constructs:

1. Pain is a symptom

2 and 3. Interference with daily activities is functional status

4 and 5. Anxiety and depression refer to psychological status

6. Influence of work refers to characteristics of the environment

7. Control the neck pain refers to characteristics of the individual

2.B Looking at the questionnaire does not give us a hint on whether the developers reasoned that all these items may be manifestations of neck pain, i.e. departed from a reflective model, or whether they reasoned that these might be important items and together they determine the severity of the neck pain, i.e. departed from a formative model. Because the authors do not mention their conceptual model or way of reasoning in the paper, they probably failed to think about this issue.

3. Item Response Theory

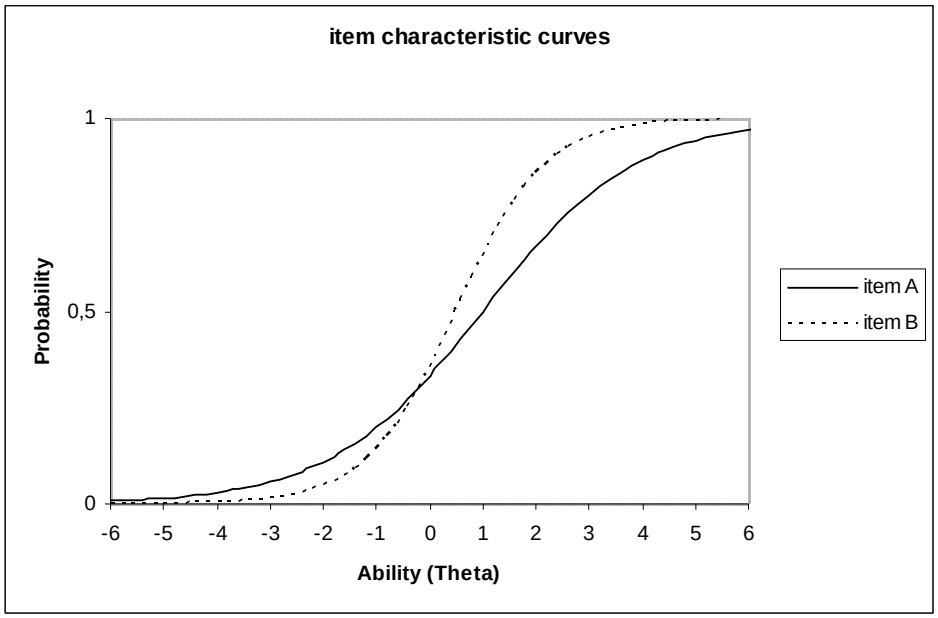
3.A Item A is the most difficult one, because its difficulty parameter b is higher.

3.B Item B discriminates best, because its discrimination parameter a is higher.

3.C We use the formula of the Birnbaum model: $P_i(\theta) = \frac{e^{a_i(\theta - b_i)}}{1 + e^{a_i(\theta - b_i)}}$

value of θ	Item A: a = 0.7; b = 1.0			Item B: a = 1.2; b = 0.5		
	$a(\theta - b)$	$e^{a(\theta - b)}$	$P_A(\theta)$	$a(\theta - b)$	$e^{a(\theta - b)}$	$P_B(\theta)$
-3	- 2.8	0.061	0.057	- 4.2	0.015	0.015
-2	- 2.1	0.122	0.109	- 3.0	0.050	0.047
-1	- 1.4	0.247	0.198	- 1.8	0.165	0.142
0	- 0.7	0.497	0.332	- 0.6	0.549	0.354
1	0.0	1.000	0.500	0.6	1.822	0.646
2	0.7	2.014	0.668	1.8	6.050	0.858
3	1.4	4.055	0.802	3.0	20.086	0.953

3.D Figure with the item characteristic curve of item A and B



The information obtained in assignment 3.C is used to draw the curves for items A and B. The value of θ is on the X-as, and the values of $P_A(\theta)$ and of $P_B(\theta)$, respectively, is on the Y-as.

3.E Yes the items will cross because for θ values up to -1, the $P_i(\theta)$ for item A is larger and for θ values of 0 and higher the $P_i(\theta)$ for item B is larger.

3.F We would delete item A, because we prefer items with a high discrimination parameter. The difficulty parameter only tells us the position of the item on the θ scale.