

## **Claim standard for passing and mastery – Appendices**

**Appendix 1** Assessments of difficulty of the questions for determining cut-offs for passing and mastery

**Appendix 2** Individual and consensus judgements for each question

**From article:**

Measuring ability to assess claims about treatment effects: establishment of a standard for passing and mastery

<http://www.informedhealthchoices.org/wp-content/uploads/2016/08/Claim-cut-off-IHC-Working-Paper-2017-01-09.pdf>

## **Assessments of difficulty of the questions for determining cut-offs for passing and mastery**

### **Instructions for judging how difficult each question is**

Please assess the difficulty of each of the following questions for two different types of test takers: 1) ones who have a borderline understanding of the concepts that they need to understand to be able to assess claims about the effects of treatments and 2) ones who have mastered the concepts.

#### **1) People with a borderline understanding of the concepts**

When assessing the difficulty of each question for people with a borderline understanding, please consider Julie, a fifth-grade student, and her father, Daniel. Daniel does not have any formal education beyond primary school (grade six). Both Julie and Daniel can read English, but with some difficulty. English is not their first language.

Both Julie and Daniel have a borderline understanding of the concepts that they need to understand to be able to assess claims about the effects of treatments. In other words, they may or may not:

- have a basic understanding of the concepts and ability to apply them,
- need additional or alternative instruction, and
- be ready to go on to other lessons or another podcast that are used to help them understand and apply the concepts.

#### **2) People who have mastered the concepts**

When assessing the difficulty of each question for people who have mastered the concepts, please consider John, a fifth-grade student, and his mother, Harriet. Harriet does not have any formal education beyond primary school (grade six). Both John and Harriet can read English, but with some difficulty. English is not their first language.

Both John and Harriet have mastered the concepts that they need to understand to be able to assess claims about the effects of treatments. In other words, they clearly:

- have a basic understanding of the concepts and ability to apply them,
- do not need additional or alternative instruction, and
- are ready to go on to other lessons or another podcast, which will reinforce learning of the same concepts and introduce new concepts.

**For each question:**

1. First eliminate response options that a borderline individual (Julie or Daniel) would be able to eliminate. The chances of getting each question correct is then equal to one divided by the number of remaining response options; e.g. if there are two remaining response options (one of which is the correct option), the chances of a borderline individual answering the question correct is  $1/2$  or 50%.
2. Then increase or decrease the assigned probability based on an overall assessment, such as uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make a question more or less difficult.  
  
Please note your reasons for increasing or decreasing the probability of a correct answer.
3. Repeat the first two steps for an individual who has mastered the concepts (John or Harriet).

This is illustrated for the example on page 4 to 5 for an example question. The judgements are only should as an illustration. They are not necessarily the correct judgements.

**Some background information:**

We have identified 32 key concepts that people need to understand when assessing claims about treatment effects (described in the attached “Fair comparisons concepts” article, which you do not need to read). The attached Claim questionnaire covers only 13 of those concepts. This is because we are using this as an outcome measure for two trials in Uganda. The first is a trial of primary school resources for grade 5 children (age 10 to 12 years). These cover 12 of the concepts in 9 lessons. The second is a trial of a podcast series for parents of the children (that covers 9 of the concepts in 9 episodes). Eight of those concepts are covered by both the primary school resources and the podcast series. We plan to develop additional learning resources that will reinforce these concepts and introduce new concepts. The table below shows the concepts that are covered. The concepts covered by the resources and the attached Claim questionnaire are:

Children	Parents	Concepts
1	1	1.1 Treatments may be harmful
2	2	1.2 Personal experiences or anecdotes (stories) are an unreliable basis for assessing the effects of most treatments
-	3	1.3 A treatment outcome may be associated with a treatment, but not caused by the treatment
3	4	1.4 Widely used treatments or treatments that have been used for a long time are not necessarily beneficial or safe
4	-	1.5 New, brand-named, or more expensive treatments may not be better than available alternatives
5	5	1.6 Opinions of experts or authorities do not alone provide a reliable basis for deciding on the benefits and harms of treatments
6	-	1.7 Conflicting interests may result in misleading claims about the effects of treatments
7	6	2.1 Evaluating the effects of treatments requires appropriate comparisons
8	7	2.2 Apart from the treatments being compared, the comparison groups need to be similar (i.e. 'like needs to be compared with like')
9	-	2.5 If possible, people should not know which of the treatments being compared they are receiving
10	-	3.1 Small studies in which few outcome events occur are usually not informative and the results may be misleading
11	8	4.1 The results of single comparisons of treatments can be misleading
12	9	5.1 Treatments usually have beneficial and harmful effects

# The Claim Evaluation Tools

This questionnaire includes multiple-choice questions about treatment claims. Please answer all questions to the best of your ability.

*The questionnaire includes some words that may be unfamiliar to you:*

A **TREATMENT** is anything done to care for yourself, so you stay well or, if you are sick or injured, so you get better and not worse. For example, wearing glasses (to see better).

IN LUGANDA: OBUJJANJABI

A **TREATMENT CLAIM** is something someone says about whether a treatment causes something to happen or to change. A claim can be true or can be false. For example, that wearing glasses makes you see better.

IN LUGANDA: EKINTU EKYOGERWAYOGERWA KUBY'OBUJJANJABI

A **RESEARCH STUDY** is a way to answer a question by carefully collecting information. For example, a study might be done to answer the question: Does wearing glasses make people see better?

IN LUGANDA: OKUNOONYEREZA OKWEKINNASAYANSI

**RESULTS of a study** are what the study found. For example, whether people who wear glasses could see better.

IN LUGANDA: EKIVAAMU MUKUNOONYEREZA

## Instructions

Read the passage on every question then answer the question below the passage using one of the provided answers. The answers are four, marked A,B,C and D. Read through all the answers, choose what you think is the best answer for the question and write the letter for that answer in the box provided.

### Example:

A teacher says that the children in his school run faster than the children going to school in another village.

*Question:* **How can the teacher be sure about this?**

*Options:*

He should ask a teacher at the other school

He should arrange for a running contest between the two schools

He should ask the children in his school what they think

He should ask the children in the other school what they think

**Answer:**

B

### **Difficulty for a borderline test taker**

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. C, D
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? 50%
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? 60%

**Notes:** Some may also be able to eliminate option A, but there might also be reading errors.

### **Difficulty for a test taker who has mastered the concepts**

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. A, C, D
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? 100%
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? 90%

**Notes:** Some may answer incorrectly because of reading problems.

## Start

**1.** Dr. Wasswa has done a research study giving a new medicine to people who were vomiting. Some of the people stopped vomiting after they got the new medicine. Dr. Wasswa says that this means that the medicine works.

*Question:* **Is Dr. Wasswa right?**

*Options:*

- A)** No. The people who used the medicine were not compared with similar people who did not use the medicine
- B)** Yes, some of the people stopped vomiting
- C)** No, since not all of the people stopped vomiting

**Answer:**

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## QUESTION 1

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**2.** Judith wants smoother skin. The younger girls in her school have smoother skin than the older girls. Judith thinks this is because the younger girls use cream on their skin to make the skin smoother.

*Question:* **Based on this link between using cream and smooth skin, is Judith correct?**

***Options:***

- A)** It is not possible to say. It depends on how many younger and older girls there are
- B)** It is not possible to say. There might be other differences between the younger and older girls
- C)** Yes, because the younger girls use cream on their skin and they have smoother skin
- D)** No, Judith should try using the cream herself to see if it works for her

**Answer:**

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## QUESTION 2

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**3.** In a research study, doctors compared two treatments for knee pain, a new and an old treatment. People were able to choose which treatment they got. Most young people chose the new treatment. At the end of the study, people who chose the new treatment had less pain.

*Question:* **How sure can you be that the new treatment is better for treating pain than the old treatment?**

*Options:*

- A)** Less sure, because people taking the new and old treatment were not similar
- B)** Less sure, because all people taking part in the study should have got both treatments
- C)** Less sure, because older people did not like the new treatment

**Answer:**

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### QUESTION 3

#### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

#### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**4.** Doctors studied people with stomach pain before and after they took a new medicine. After taking the new medicine, many people felt less pain.

*Question:* **Can we be sure that the new medicine is good for treating stomach pain?**

*Options:*

- A)** No, taking the new medicine should have been compared either with not taking the medicine, or with taking an older medicine
- B)** Yes, people were asked how much pain they felt before and after they took the new medicine
- C)** Yes, the study was done by doctors

**Answer:**

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#### **QUESTION 4**

##### **Difficulty for a borderline test taker**

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

##### **Difficulty for a test taker who has mastered the concepts**

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**5.** Harriet is worried about getting sick. She hears about a new study on the radio that compared a new medicine to an old medicine. Fewer people who took the old medicine got sick compared to the people who took the new medicine.

*Question:* **How sure can Harriet be that the old medicine is better than the new medicine?**

*Options:*

- A)** Less sure, because Harriet needs to know the results of all other studies comparing the new medicine with the old medicine
- B)** More sure, because she heard about the study on the radio
- C)** Less sure, unless she finds another study with the same results
- D)** More sure, because this is a new study

**Answer:**

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## QUESTION 5

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**6.** A new fruit drink is said to make people feel strong. Fred wanted to know if this is true, and decided to do a research study comparing people who got the new fruit drink and people who drank just water.

People in the study knew if they got the new drink or water, and Fred told them that the new fruit drink was likely to make people stronger. At the end of the study, Fred was right and those who drank the new fruit drink said they felt stronger.

*Question:* **Why can't we be sure about the results of Fred's study?**

*Options:*

- A)** Because all people taking part in the study should have been given the new fruit drink
- B)** Because people knew if they got the new fruit drink, and knowing this may have influenced how they felt
- C)** Because Fred should have told both groups that they could expect to feel stronger

**Answer:**

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## QUESTION 6

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**7.** In a research study done by John, four people were told to do exercises every day for a month, and four people were told to eat bananas every day. At the end of the month, the people who ate bananas had more strength than those who did exercises. Based on his study, John advises his friend Mildred not to eat bananas.

*Question:* **Mildred says that we cannot be sure about the results of John's study. Why?**

*Options:*

- A)** Because the study included so few people, the differences in strength could have happened by chance, and not because of the bananas
- B)** Because John should have included fewer people in his study so that he could have followed them more closely
- C)** Because four people is not enough, all people taking part in the study should have been told to eat the bananas

**Answer:**

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## QUESTION 7

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**8.** At David's school, some students have poor parents. The students with poor parents drink less fruit juice than the children of other parents. The students with poor parents are also more often sick. Based on this link, David thinks that people who drink fruit juice, are less likely to get sick.

*Question:* **Is David correct?**

*Options:*

- A)** It is not possible to say, it depends on whether or not Peter has poor parents
- B)** Yes, students with poor parents do not drink fruit juice and are more often sick
- C)** Yes, the juice is the only possible reason why the students with the poor parents are more often sick
- D)** It is not possible to say. There could be other reasons why students with poor parents are more often sick

**Answer:**

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## QUESTION 8

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**9.** Edith has a stomach pain. Edith's mother says that fruit juice is a good treatment for stomach pain. She learnt about this treatment from Edith's grandmother. Over many years, other families she knows have also used fruit juice to treat stomach pain.

*Question:* **Based on this, how sure can we be that fruit juice is a good treatment for stomach pain?**

*Options:*

- A)** Not very sure. Even though people have used fruit juice over many years, that does not mean that it helps stomach pain
- B)** Very sure. If it has worked for Edith's mother and other people who have tried it, it will probably work for her too
- C)** Not very sure. Edith should ask more families if they use fruit juice to treat stomach pain

**Answer:**

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## QUESTION 9

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**10.** Dr. Acheng is an expert on treating headaches. A news reporter interviews Dr. Acheng about a new medicine to treat headaches. Dr. Acheng says that, in her personal experience, the new medicine is good for treating headaches.

*Question:* **How sure can we be that Dr. Acheng right?**

*Options:*

- A)** It is not possible to say. It depends on how long Dr. Acheng has been an expert on treating headaches
- B)** Not very sure. Even though Dr. Acheng is an expert, the new medicine still needs to be compared in studies with other treatments
- C)** Very sure. Dr. Acheng is an expert, so she knows if the new medicine is good or not based on her experience
- D)** Very sure. Dr. Acheng would not be interviewed by a news reporter if her advice was not good

**Answer:**

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## QUESTION 10

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**11.** Sarah has an illness. There is a medicine for it, but she is unsure if she should try it. A research study comparing the medicine with no medicine found that the medicine was helpful but also that it could be harmful. Three of Sarah's friends are giving her advice about what to do.

*Question:* **Which advice given to her by her friends is the best advice?**

*Options:*

- A)** She should only take the medicine if many people have tried the medicine before
- B)** She should only take the medicine if she thinks it will help her more than it will harm her
- C)** If Sarah has enough money to buy the medicine, it could not hurt to try it

**Answer:**

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## QUESTION 11

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**12.** Habibah has pain in her ear, and she asks her brother Hassan what to do about it. He says that once, when he had a pain like that, he rinsed his ear with hot water. The next day, his ear pain was gone. Based on his experience, he says rinsing with hot water is helpful for ear pain.

*Question:* **Do you agree with Hassan?**

*Options:*

- A)** Yes. Because this is Hassan's experience, it is likely to be true
- B)** No, Hassan's experience is not enough to be sure
- C)** Yes, Hassan rinsed his ear with hot water and the next day his ear pain was gone

**Answer:**

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## QUESTION 12

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**13.** Dr. Kato and Dr. Semakula disagree about which medicine for stomach pain is best. Dr. Kato says his opinion is right because he has worked as a doctor for a longer time than Dr. Semakula.

*Question:* **Is Dr. Kato right?**

*Options:*

- A)** Yes, because Dr. Kato has worked for a long time, he has more experience than Dr. Semakula
- B)** Yes, because Dr. Kato has worked for a long time, he must be basing what he says on studies comparing the medicines
- C)** No, just because Dr. Kato has worked as a doctor for a longer time does not mean that he is basing what he says on studies that compare medicines for stomach pain

**Answer:**

☐



### QUESTION 13

#### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

#### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**14.** Two companies make two different medicines for treating stomach pain. Each of them says that their medicine is the better one.

*Question:* **How can you know which of the two medicines is better for stomach pain?**

*Options:*

- A)** It is not possible to say. The companies may just say their medicine is best because they want to make money
- B)** I would rely on the best known company; it is more likely to have the best medicine
- C)** I cannot trust either of the companies. They are probably both wrong

**Answer:**

## QUESTION 14

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**15.** John has a skin rash on his leg. A shop sells several creams to treat skin rashes. John chooses a cream from a well-known company, even though it is more expensive than the other creams. John thinks the cream is more likely to heal his rash than the other creams because it is more expensive.

*Question:* **Is John right?**

*Options:*

- A)** No, just because the cream is expensive does not mean that it will work better than other creams
- B)** It is not possible to say. However, expensive creams are likely to be better because the companies spend more time making them
- C)** No, the cream is probably not as good as the other creams. Well-known companies are usually better at advertising
- D)** Yes, the company is well-known for a reason, so it is more likely to be better than creams sold by lesser-known companies

**Answer:**

☐

## QUESTION 15

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**16.** Regina has an illness that makes it difficult to breathe. She hears on the radio about a medicine that has helped many people, and seems to be safe.

*Question:* **How sure can Regina be that the medicine does not have any harms?**

*Options:*

- A)** It is not possible to say. However, medicines are rarely harmful
- B)** Not very sure, because all medicines may harm people as well as help them
- C)** Very sure, since the medicine has helped many people, it is unlikely that it also harms people

**Answer:**

☐

## QUESTION 16

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**17.** Annette sees an advert on TV for a new soap which the makers say protects people from getting rashes. Annette thinks that this soap must be better than other soaps for protecting her skin.

*Question:* **Is Annette right?**

*Options:*

- A)** No, the soap may be newer, but that does not mean that it is better than other soaps
- B)** Yes, the new soap is probably better than most other soaps because it is newer
- C)** Yes, the new soap is probably better than most other soaps because a well-known company makes it

**Answer:**

☐



## QUESTION 17

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**18.** When you are sick, sometimes people say that something - a treatment - is good for you. It is hard to know whether what they say is true.

**Do you agree or disagree with each of the following statements?**

*For each statement below, use ✓ to mark whether you agree or disagree.*

<b>Statements:</b>	<b>Agree</b>	<b>Disagree</b>
<b>18.1</b> Peter says that if a treatment works for one person, the treatment will help others too	<input type="checkbox"/>	<input type="checkbox"/>
<b>18.2</b> Alice says that if some people try the treatment and feel better, this means that the treatment helps	<input type="checkbox"/>	<input type="checkbox"/>
<b>18.3</b> Habibah says that, just because many people are using the treatment, this does not mean that it helps	<input type="checkbox"/>	<input type="checkbox"/>
<b>18.4</b> Julie says that companies sometimes say that the treatment they make is best just to make money	<input type="checkbox"/>	<input type="checkbox"/>

## QUESTION 18.1

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

## QUESTION 18.2

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### QUESTION 18.3

#### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

#### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

## QUESTION 18.4

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**19.** A doctor wanted to know if a new medicine for treating headaches is better than an older medicine. The doctor did a research study, comparing the two medicines.

**Which of the actions would help us be more sure about the results?**

*For each reason below, use ✓ to mark whether you think it is “a good reason” or “a bad reason”.*

Action:	More sure	Less sure
<b>19.1</b> The doctor should use chance (like tossing a coin) to decide which people should be given the new and which the old medicine	<input type="checkbox"/>	<input type="checkbox"/>
<b>19.2</b> People should not know which medicine they get (the new medicine or the old medicine) until the end of the study	<input type="checkbox"/>	<input type="checkbox"/>
<b>19.3</b> The doctor should include only a small number of people in the study	<input type="checkbox"/>	<input type="checkbox"/>

## QUESTION 19.1

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**



## QUESTION 19.2

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### QUESTION 19.3

#### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

#### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

**20.** To know if a treatment helps you, the treatment should be compared in research studies to other treatments (fair comparisons). Below you will find different things people say about such studies.

**Which are “more likely to be true” and which are “less likely to be true”?**

*For each reason below, use ✓ to mark whether you think it is “more likely to be true” or “less likely to be true”.*

Someone says:	More likely to be true	Less likely to be true
<b>20.1</b> Julie says that, if a treatment has been compared in a study to another treatment, you don’t have to look for more studies	<input type="checkbox"/>	<input type="checkbox"/>
<b>20.2</b> Margaret says that the results of a study should be used to decide if a treatment is more helpful than harmful	<input type="checkbox"/>	<input type="checkbox"/>

## QUESTION 20.1

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate.  
\_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

## QUESTION 20.2

### Difficulty for a borderline test taker

1. Which response options would a borderline individual (Julie or Daniel) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

### Difficulty for a test taker who has mastered the concepts

1. Which response options would an individual who has mastered the concepts (John or Harriet) be able to eliminate. \_\_\_\_\_
2. What are the chances of their getting this question correct (one divided by the number of remaining response options)? \_\_\_\_\_
3. What are the chances of their getting this question correct after increasing or decreasing that probability based on an overall assessment, including uncertainty about the number of response options a borderline individual would eliminate, the difficulty of the stem (scenario) for the question, the difficulty of the concept, and anything else that might make the question more or less difficult? \_\_\_\_\_

**Notes:**

Individual and consensus judgements for each question

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
1	BORDER																						
	Eliminate	C	None	C	None				C	C		C	C							24%	2.1	33%	A
	% correct	50%	33%	50%	33%	42%	42%		50%	50%	50%	50%	50%	50%		46%	50%	33%	50%				
	% adjusted	35%	50%	40%	50%	44%	45%	40%	35%	60%	40%	30%	41%	38%	40%	43%	40%	30%	60%				
	MASTERY																						
2	Eliminate	B,C	B,C	B,C	B,C				A,C	B,C		B,C	C										
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	85%	80%	90%	90%	86%	88%	85%	85%	90%	80%	40%	74%	83%	85%	80%	85%	40%	90%				
	BORDER																						
	Eliminate	D	A	D	None				C	C,D		C	D							32%	1.3	25%	B
3	% correct	33%	33%	33%	25%	31%	33%		33%	50%	33%	30%	37%	33%		34%	33%	25%	50%				
	% adjusted	23%	30%	33%	25%	28%	28%	35%	40%	50%	50%	20%	40%	45%	35%	34%	32%	20%	50%				
	MASTERY																						
	Eliminate	C,D	A,C	A,C,D	1%				A,C,D	A,C,D		C,D	C,D										
	% correct	50%	50%	100%	35%	59%	50%		100%	100%	50%	50%	75%	75%		67%	50%	35%	100%				
3	% adjusted	40%	80%	90%	25%	59%	60%	75%	80%	80%	90%	30%	70%	80%	75%	64%	80%	25%	90%				
	BORDER																						
	Eliminate	-	C	C	C				B	C		C	C							34%	2.2	33%	A
	% correct	33%	50%	50%	50%	46%	50%		50%	50%	50%	50%	50%	50%		48%	50%	33%	50%				
	% adjusted	23%	60%	40%	33%	39%	37%	40%	30%	70%	60%	30%	48%	45%	40%	43%	37%	23%	70%				
3	MASTERY																						
	Eliminate	-	B,C	B,C	B,C				B,C	B,C		C	C										
	% correct	33%	100%	100%	100%	83%	100%		100%	100%	50%	50%	75%	75%		79%	100%	33%	100%				
	% adjusted	23%	80%	80%	90%	68%	80%	75%	80%	90%	80%	40%	73%	80%	75%	70%	80%	23%	90%				

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
4	BORDER																						
	Eliminate	C	C	C	None				None	C		C	C							29%	2.1	33%	A
	% correct	50%	50%	50%	33%	46%	50%		33%	50%		50%	50%	46%	50%		46%	50%	33%	50%			
	% adjusted	40%	60%	40%	33%	43%	40%	40%	33%	45%		60%	30%	42%	39%	40%	43%	40%	30%	60%			
	MASTERY																						
5	Eliminate	B,C	B,C	B,C	A				B,C	B,C		C	C										
	% correct	100%	100%	100%	50%	88%	100%		100%	100%		50%	50%	75%	75%		81%	100%	50%	100%			
	% adjusted	90%	80%	90%	40%	75%	85%	85%	85%	80%		90%	40%	74%	83%	85%	74%	83%	40%	90%			
	BORDER																						
	Eliminate	B	B	B,D	B,C				B	B		B	D							35%	4.1	25%	A
6	% correct	33%	33%	50%	50%	42%	42%	40%	33%	33%		33%	30%	32%	33%		37%	33%	30%	50%			
	% adjusted	23%	40%	40%	25%	32%	33%	40%	33%	60%		40%	20%	38%	37%	40%	35%	37%	20%	60%			
	MASTERY																						
	Eliminate	B	B,C,D	B,C,D	B,C,D				B,C,D	B,C,D		B,D	B,D										
	% correct	33%	100%	100%	100%	83%	100%	70%	100%	100%		50%	50%	75%	75%	70%	79%	100%	33%	100%			
6	% adjusted	23%	80%	80%	75%	65%	78%	70%	70%	90%		80%	40%	70%	75%	70%	67%	78%	23%	90%			
	BORDER																						
	Eliminate	A,C	C	A	None				None	A		C	None							35%	2.5	33%	B
	% correct	50%	50%	50%	33%	46%	50%	45%	33%	50%		50%	33%	42%	42%	45%	44%	50%	33%	50%			
	% adjusted	40%	60%	40%	33%	43%	40%	45%	33%	50%		60%	30%	43%	42%	45%	43%	40%	30%	60%			
6	MASTERY																						
	Eliminate	A,C	A,C	A,C	A				A,C	A,C		A,C	C										
	% correct	100%	100%	100%	50%	88%	100%	85%	100%	100%		100%	50%	88%	100%	85%	88%	100%	50%	100%			
	% adjusted	90%	90%	80%	33%	73%	85%	85%	80%	85%		95%	40%	75%	83%	85%	74%	83%	33%	95%			

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
7	BORDER																						
	Eliminate	B,C	B	B	none				None	B		C	B							37%	3.1	33%	A
	% correct	50%	50%	50%	33%	46%	50%		33%	50%		50%	50%	46%	50%		46%	50%	33%	50%			
	% adjusted	40%	70%	40%	50%	50%	45%	45%	30%	60%		70%	30%	48%	45%	45%	49%	45%	30%	70%			
	MASTERY																						
8	Eliminate	B,C	B,C	B,C	B				B,C	B,C		B,C	B										
	% correct	100%	100%	100%	50%	88%	100%		100%	100%		100%	50%	88%	100%		88%	100%	50%	100%			
	% adjusted	90%	90%	90%	40%	78%	90%	85%	70%	90%		95%	40%	74%	80%	85%	76%	90%	40%	95%			
	BORDER																						
	Eliminate	A	A	A,C	A				A	A,C		A,C	B							38%	1.3	25%	D
9	% correct	33%	33%	50%	33%	37%	33%	45%	33%	50%		50%	33%	42%	42%		39%	33%	33%	50%			
	% adjusted	23%	60%	50%	50%	46%	50%	45%	30%	50%		60%	20%	40%	40%	45%	43%	50%	20%	60%			
	MASTERY																						
	Eliminate	A,B,C	A,B,C	A,B,C	A,C				A,B,C	A,B,C		A,C	B,C										
	% correct	100%	100%	100%	50%	88%	100%	85%	100%	100%		50%	50%	75%	75%		81%	100%	50%	100%			
9	% adjusted	90%	90%	90%	75%	86%	90%	85%	75%	90%		80%	40%	71%	78%	85%	79%	85%	40%	90%			
	BORDER																						
	Eliminate	B	C	B	None				None	B		B	B							38%	1.4	33%	A
	% correct	50%	50%	50%	33%	46%	50%	50%	33%	50%		50%	50%	46%	50%		46%	50%	33%	50%			
	% adjusted	40%	60%	50%	50%	50%	50%	50%	33%	50%		70%	30%	46%	42%	55%	48%	50%	30%	70%			
9	MASTERY																						
	Eliminate	B	B,C	B,C	B,C				B,C	B,C		B,C	B										
	% correct	50%	100%	100%	100%	88%	100%	80%	100%	100%		100%	50%	88%	100%		88%	100%	50%	100%			
	% adjusted	40%	95%	90%	75%	75%	83%	80%	75%	90%		95%	40%	75%	83%	80%	75%	83%	40%	95%			



Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
10	BORDER																						
	Eliminate	A	D,C	C	None				C	C,D	D	None								38%	1.6	25%	B
	% correct	33%	50%	33%	25%	35%	33%		50%	50%	33%	25%	40%	42%		37%	33%	25%	50%				
	% adjusted	23%	70%	33%	50%	44%	42%	40%	60%	50%	30%	20%	40%	40%	40%	42%	42%	20%	70%				
	MASTERY																						
	Eliminate	A,D	A,C,D	A,C,D	C,D					A,C,D	C,D	D				69%	50%	33%	100%				
	% correct	50%	100%	100%	50%	75%	75%			100%	50%	33%	61%	50%		69%	50%	33%	100%				
	% adjusted	40%	95%	80%	75%	73%	78%	75%		80%	90%	30%	67%	80%	75%	70%	80%	30%	95%				
11	BORDER																						
	Eliminate	C	A	C	None				C	C	C	None								40%	5.1	33%	B
	% correct	50%	50%	50%	33%	46%	50%		50%	50%	50%	33%	46%	50%		46%	50%	33%	50%				
	% adjusted	40%	40%	40%	33%	38%	40%	40%	35%	60%	60%	25%	45%	48%	40%	42%	40%	25%	60%				
	MASTERY																						
	Eliminate	A,C	A,C	A,C	C				C	A,C	A,C	C				81%	100%	50%	100%				
	% correct	100%	100%	100%	50%	88%	100%		50%	100%	100%	50%	75%	75%		81%	100%	50%	100%				
	% adjusted	80%	70%	90%	75%	79%	78%	80%	75%	80%	90%	40%	71%	78%	80%	75%	78%	40%	90%				
12	BORDER																						
	Eliminate	None	None	A,C	None				None	A	A	B								40%	1.2	33%	B
	% correct	33%	33%	100%	33%	50%	33%		33%	50%	50%	50%	46%	50%		48%	42%	33%	100%				
	% adjusted	23%	50%	70%	33%	44%	42%	50%	45%	60%	40%	30%	44%	43%	50%	44%	43%	23%	70%				
	MASTERY																						
	Eliminate	A,C	A,C	A,C	A,C				A,C	A,C	A,C	B				94%	100%	50%	100%				
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	90%	91%	90%	90%	90%	90%	90%	40%	78%	90%	90%	84%	90%	40%	95%				

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
13	BORDER																						
	Eliminate	A,B	A	A	none				none	A		A	None							40%	1.6	33%	C
	% correct	100%	50%	50%	33%	58%	50%		33%	50%		50%	33%	42%	42%			50%	50%	33%	100%		
	% adjusted	90%	50%	40%	50%	58%	50%	50%	40%	60%		40%	25%	41%	40%	50%		49%	45%	25%	90%		
	MASTERY																						
	Eliminate	A,B	A,B	A,B					A,B	A,B		A	A										
	% correct	100%	100%	100%		100%	100%		100%	100%		50%	50%	75%	75%			86%	100%	50%	100%		
	% adjusted	90%	80%	80%		83%	80%	80%	90%	90%		90%	40%	78%	90%	80%		80%	90%	40%	90%		
14	BORDER																						
	Eliminate	B,C	B	B,C	none				C	C		C	C							41%	1.7	33%	A
	% correct	50%	50%	100%	33%	58%	50%		50%	50%		50%	50%	50%	50%			54%	50%	33%	100%		
	% adjusted	40%	40%	70%	50%	50%	45%	50%	40%	70%		90%	30%	58%	55%	55%		54%	45%	30%	90%		
	MASTERY																						
	Eliminate	B,C	B,C	B,C	B				B,C	B,C		B,C	C										
	% correct	100%	100%	100%	50%	88%	100%		100%	100%		100%	50%	88%	100%			88%	100%	50%	100%		
	% adjusted	90%	70%	90%	75%	81%	83%	85%	90%	90%		95%	40%	79%	90%	85%		80%	90%	40%	95%		
15	BORDER																						
	Eliminate	D	None	B,C	None				None	C,D		C	D							42%	1.5	25%	A
	% correct	33%	25%	50%	25%	33%	29%		25%	50%		33%	33%	35%	33%			34%	33%	25%	50%		
	% adjusted	23%	50%	60%	33%	42%	42%	45%	40%	60%		40%	25%	41%	40%	50%		41%	40%	23%	60%		
	MASTERY																						
	Eliminate	C,D	B,C,D	B,C,D	B,D				B,C,D	B,C,D		C,D	C,D										
	% correct	50%	100%	100%	50%	75%	75%		100%	100%		50%	50%	75%	75%			75%	75%	50%	100%		
	% adjusted	40%	80%	90%	50%	65%	65%	75%	95%	80%		95%	40%	78%	88%	80%		71%	80%	40%	95%		

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
16	BORDER																						
	Eliminate	None	A	A	A				none	A		A	A							44%	1.1	33%	B
	% correct	33%	50%	50%	50%	46%	50%		33%	50%	50%	50%	46%	50%		46%	50%	33%	50%				
	% adjusted	23%	45%	50%	40%	40%	43%	45%	33%	65%	40%	30%	42%	37%	50%	41%	40%	23%	65%				
	MASTERY																						
	Eliminate	A,C	A,C	A,C	A,C				A,C	A,C		C	A										
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	50%	50%	75%	75%		88%	100%	50%	100%				
	% adjusted	90%	80%	90%	90%	88%	90%	85%	90%	85%	80%	40%	74%	83%	85%	81%	88%	40%	90%				
17	BORDER																						
	Eliminate	B,C	C	B,C	b				B	C		B	C							62%	1.5	33%	A
	% correct	50%	50%	100%	50%	63%	50%		50%	50%	50%	50%	50%	50%		56%	50%	50%	100%				
	% adjusted	40%	70%	70%	75%	64%	70%	65%	60%	85%	80%	40%	66%	70%	75%	65%	70%	40%	85%				
	MASTERY																						
	Eliminate	B,C	B,C	B,C	B,C				B,C	B,C		B,C	C										
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	90%	91%	90%	90%	95%	95%	95%	45%	83%	95%	90%	87%	93%	45%	95%				
18.1	BORDER																						
	Eliminate	Agree	None	Agree	None				None	Agree	Neither	None								41%	1.1	50%	Disagree
	% correct	100%	50%	100%	50%	75%	75%		50%	100%	50%	50%	63%	50%		69%	50%	50%	100%				
	% adjusted	90%	40%	75%	75%	70%	75%	60%	60%	80%	40%	30%	53%	50%	60%	61%	68%	30%	90%				
	MASTERY																						
	Eliminate	Agree	Agree	Agree	Agree				Agree	Agree	Agree	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	80%	90%	90%	88%	90%	85%	90%	95%	85%	40%	78%	88%	85%	83%	90%	40%	95%				

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
18.2	BORDER																						
	Eliminate	Agree	None	None	None				None	None	Disagree	None								22%	1.2	50%	Disagree
	% correct	100%	50%	50%	50%	63%	50%		50%	50%	50%	50%	50%	50%		56%	50%	50%	100%				
	% adjusted	70%	40%	50%	50%	53%	50%	50%	50%	35%	50%	30%	41%	43%	50%	47%	50%	30%	70%				
	MASTERY																						
	Eliminate	Agree	Agree	Agree	Agree				Disagree	Agree	Agree	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	80%	80%	90%	85%	85%	80%	90%	80%	90%	40%	75%	85%	80%	80%	85%	40%	90%				
18.3	BORDER																						
	Eliminate	Disagree	Disagree	None	None				None	None	None	None								32%	1.4	50%	Agree
	% correct	100%	100%	50%	50%	75%	75%		50%	50%	50%	50%	50%	50%		63%	50%	50%	100%				
	% adjusted	70%	80%	50%	60%	65%	65%	55%	40%	40%	60%	30%	43%	40%	50%	54%	55%	30%	80%				
	MASTERY																						
	Eliminate	Disagree	Disagree	Disagree	Disagree				Disagree	Disagree	Disagree	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	75%	88%	90%	90%	80%	80%	90%	40%	73%	80%	90%	80%	85%	40%	95%				
18.4	BORDER																						
	Eliminate	Disagree	Disagree	Disagree	Disagree				Disagree	Disagree	None	None								36%	1.7	50%	Agree
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	50%	50%	75%	75%		88%	100%	50%	100%				
	% adjusted	90%	80%	70%	80%	80%	80%	75%	60%	75%	80%	30%	61%	68%	75%	71%	78%	30%	90%				
	MASTERY																						
	Eliminate	Disagree	Disagree	Disagree	disagree				disagree	Disagree	Disagree	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	100%	94%	93%	90%	95%	90%	95%	40%	80%	93%	90%	87%	93%	40%	100%				

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
19.1	BORDER																						
	Eliminate	Less	Less	None	None				Less	Less	None	None								49%	2.2	50%	More
	% correct	100%	100%	50%	50%	75%	75%		100%	100%	50%	50%	75%	75%		75%	75%	50%	100%				
	% adjusted	90%	80%	60%	75%	76%	78%	70%	60%	75%	70%	40%	61%	65%	70%	69%	73%	40%	90%				
	MASTERY																						
	Eliminate	Less	Less	Less	More				Less	Less	Less	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	100%	94%	93%	90%	95%	90%	90%	45%	80%	90%	90%	87%	90%	45%	100%				
19.2	BORDER																						
	Eliminate	less	Less	none	none				Less	Less	None	None								56%	2.5	50%	More
	% correct	100%	100%	50%	50%	75%	75%		100%	100%	50%	50%	75%	75%		75%	75%	50%	100%				
	% adjusted	70%	80%	60%	50%	65%	65%	70%	60%	80%	50%	30%	55%	55%	70%	60%	60%	30%	80%				
	MASTERY																						
	Eliminate	less	Less	Less	less				Less	Less	Less	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	95%	90%	90%	91%	90%	90%	90%	95%	90%	40%	79%	90%	90%	85%	90%	40%	95%				
19.3	BORDER																						
	Eliminate	More	More	More	None				More	More	More	None								50%	3.1	50%	Less
	% correct	100%	100%	100%	50%	88%	100%		100%	100%	100%	50%	88%	100%		88%	100%	50%	100%				
	% adjusted	90%	90%	70%	75%	81%	83%	75%	60%	85%	80%	40%	66%	70%	75%	74%	78%	40%	90%				
	MASTERY																						
	Eliminate	More	More	More	More				More	More	More	None											
	% correct	100%	100%	100%	100%	100%	100%		100%	100%	100%	50%	88%	100%		94%	100%	50%	100%				
	% adjusted	90%	100%	90%	75%	89%	90%	95%	95%	95%	95%	45%	83%	95%	95%	86%	93%	45%	100%				

Q	Judgement	1	2	3	4	Avg	Med	Cons	5	6	7	8	Avg	Med	Cons	Avg	Med	Min	Max	Diff	Conc	Chance	Answer
20.1	BORDER																						
	Eliminate	None	More	None	None				None	Less		None	None							54%	4.1	50%	Less
	% correct	50%	100%	50%	50%	63%	50%		50%	100%		50%	50%	63%	50%		63%	50%	50%	100%			
	% adjusted	40%	80%	60%	60%	60%	60%	60%	50%	60%		50%	40%	50%	50%	60%	55%	55%	40%	80%			
	MASTERY																						
	Eliminate	None	More	More	more				More	Less	More to be true	None											
	% correct	50%	100%	100%	100%	88%	100%		100%	100%		100%	50%	88%	100%		88%	100%	50%	100%			
	% adjusted	40%	100%	90%	80%	78%	85%	75%	80%	80%		85%	45%	73%	80%	80%	75%	80%	40%	100%			
20.2	BORDER																						
	Eliminate	Less	None	None	None				Less	Less		None	Less							70%	5.1	50%	More
	% correct	100%	50%	50%	50%	63%	50%		100%	100%		50%	100%	88%	100%		75%	75%	50%	100%			
	% adjusted	90%	70%	50%	60%	68%	65%	70%	70%	70%		50%	70%	65%	70%	70%	66%	70%	50%	90%			
	MASTERY																						
	Eliminate	Less	Less	Less	Less				Less	Less	Less		Less										
	% correct	100%	100%	100%	95%	99%	100%		100%	100%		100%	100%	100%	100%		99%	100%	95%	100%			
	% adjusted	90%	70%	90%	90%	85%	90%	85%	85%	85%		90%	75%	84%	85%	85%	84%	88%	70%	90%			

Judges = 1 to 8

Avg = average

Med = median

Cons = consensus

Min = minimum

Max = maximum

Diff = difficulty (% participants in Rasch analysis who answered the question correctly)

Conc = concept number<sup>1</sup>

Chance = expected % participants who would answer correctly by chance alone

Answer = the correct answer