

Language Use in Assessments: Making Multiple Choice Questions More Intelligible

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Presentation Goals

To explore equitable and inclusive assessment practices for linguistically diverse students using MCQs

- The linguistic construction of MCQs and what challenges this can pose for students to demonstrate their knowledge
- A short description of our research – an intervention with linguistic diverse students to assess their likelihood of demonstrating their knowledge when MCQs were “unpacked”
- Feedback from student experiences with MCQs
- Discuss implications for EAP specialists & assessment writing

Multiple choice questions (MCQs)

Multiple choice questions (MCQs) used for formative and summative assessment of students' cognitive knowledge in undergraduate higher education course tests tend to contain highly complex linguistic features, which may result in

- a) A difficulty for instructors to provide feedback in a timely manner.
- b) Many instructors choosing not to include multiple choice questions in their examinations.
- c) Potential confusion among students during the reading comprehension stage of answering test questions.



MCQ Stems are typically “packed”

How many different BIG IDEAS can you identify?

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“Unpacking” Linguistically Complex MCQs

In order to unpack MCQs, we employ three linguistic interventions:

- 1) Expand long, complex noun groups into shorter sentences
- 2) Substitute less common academic vocabulary for more frequently used synonyms
- 3) Explicitly explain or remove references which require specific cultural knowledge



Linguistic Intervention #1:

Reducing Noun Group Complexity

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1. Multiple choice questions
 - used for formative and summative assessment
 - of students' cognitive knowledge
 - in undergraduate higher education course tests
2. Highly complex linguistic features



Linguistic Intervention #2:

Substituting Infrequent Vocabulary

Readers need to understand **98%** of the vocabulary used in a text in order to understand the main ideas and details (Hu & Nation, 2000).

Multiple choice questions (MCQs) used for **formative** and **summative** assessment of students' **cognitive** knowledge in undergraduate higher education course tests tend to contain highly complex linguistic features, which may result in...



How do we unpack language?

Use shorter sentences, focusing on fewer ideas.

Multiple choice questions

- used for formative and summative assessment
 - Instructors use MCQs to assess students throughout the course and at the end of a course.
- of students' cognitive knowledge
 - MCQs test whether students have understood course material.
- in undergraduate higher education course tests
 - MCQs are used frequently in undergraduate courses.
- contain highly complex linguistic features
 - The language used in MCQs is often complex.

Unpacking Linguistically Complex MCQs

Complex MCQ: Multiple choice questions (MCQs) used for formative and summative assessment of students' cognitive knowledge in undergraduate higher education course tests tend to contain highly complex linguistic features, which may result in...

Unpacked MCQ: Multiple choice questions (MCQs) are used as assessments in undergraduate higher education courses. They help instructors monitor how well students understand information throughout a course and at the end of a course. However, many MCQs are written in a complex way. This complex language may result in...



Linguistic Intervention #3:

Making Cultural References Explicit

Complex MCQ: Charon argues that the slap of a beaver's tail is:

Unpacked MCQ: Beavers are animals that have large, round tails and sometimes slap (hit) them on water. Charon argues that when a beaver slaps its tail, it is:

Our Context

Layered Adjustments of First Year International EAL Students





Research Questions:

- a) Does the linguistic structure of MCQs limit EAL students' ability to demonstrate their knowledge of course content in post-secondary sociology and psychology courses?
- b) What is the effect of simplifying the language of MCQs for pathway and direct entry students?
- c) How do pathway and direct entry students perceive differences between original and simplified MCQs?

Results

Does the linguistic structure of MCQs limit EAL students' ability to demonstrate their knowledge of course content in post-secondary sociology and psychology courses?

Yes – Students have a **6% increased chance** of answering an unpacked question correctly compared to a complex question.

Results

What is the effect of simplifying MCQs for pathway and direct entry students?

While our results suggest that unpacking increases all students' ability to demonstrate their knowledge by answering more MCQs correctly, our results indicate that international **EAL students are more likely to benefit from reduced complexity of MCQs.**

Results

How do pathway and direct entry students perceive differences between original and simplified MCQs?

Students perceived:

1. Unpacked versions provided more information, context and more details to interpret the meaning of the MCQ stem.
2. However, unpacked MCQs take longer to read, presenting a challenge to EAL students.
3. Study strategies and techniques for identifying the right MCQ response as most important (placing the burden of understanding on the student), overlooking possible issues in the linguistic structure.



Implications

Unpacking MCQs – but be selective about which content to unpack, avoiding unnecessarily long question stems.

- Reducing noun group complexity
- Substituting infrequent vocabulary
- Making cultural references explicit

Consider more inclusive practices

- Increased time
- Practice with MCQs



Time for some **practice**
unpacking complex language!

Analyzing Packed vs. Unpacked Language

PART 1



Packed vs. Unpacked Language

Consider the following comparison between a packed and an unpacked MCQ stem:

Packed MCQ stem: A process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the organisms' activities is called...

Unpacked MCQ stem: Plants and other organisms can turn light energy from the sun into chemical energy. This chemical energy can be used later to give the plants and organisms energy to grow. What is this process called?



Packed vs. Unpacked Language

Consider the following comparison between a packed and an unpacked MCQ stem:

Packed MCQ stem: A process used by plants and other organisms to *convert* light energy into chemical energy that can later be *released* to *fuel* the organisms' activities is called...

Unpacked MCQ stem: Plants and other organisms can *turn* light energy *from the sun* into chemical energy. This chemical energy can be *used* later to *give* the plants and organisms energy *to grow*. What is this process called?

Identifying Unpacked Questions

PART 2

Which MCQ stem is unpacked the most?

Original MCQ stem: From a sociological perspective, one of the most significant factors that determines the number of children a woman bears is:

- a) Certain factors can influence the number of children a woman bears.
From a sociological perspective, what is the most significant factor?
- b) From a sociological perspective, one of the most significant factors that helps influence the number of children a woman has is:
- c) Certain factors in society can cause women to have more or fewer children. From a sociological perspective, which of the following factors has the strongest effect on the number of children women have?

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Which MCQ stem is unpacked the most?

Original MCQ stem: A business leader who welcomes a variety of opinions from subordinates and invites experts' critiques of their company's developing plans is most likely to avoid:

- a) Some business leaders who encourage their employees to give their own individual opinions about how the company can develop, while also inviting experts to give critical feedback about the company's development are most likely to avoid:
- b) Some business leaders encourage their employees to give their own individual opinions about how the company can develop. These leaders also ask experts to give critical feedback about the company's development. These types of business leaders are most likely to avoid:
- c) Some business leaders encourage their subordinates to give their own individual opinions about how the company can develop. These leaders also invite experts to critique the company's plans for development. These types of business leaders are most likely to avoid:

Which MCQ stem is unpacked the most?

Original MCQ stem: A business leader who welcomes a variety of opinions from subordinates and invites experts' critiques of their company's developing plans is most likely to avoid:

- a) Some business leaders who encourage their employees to give their own individual opinions about how the company can develop, while also inviting experts to give critical feedback about the company's development are most likely to avoid:
- b) Some business leaders encourage their employees to give their own individual opinions about how the company can develop. These leaders also ask experts to give critical feedback about the company's development. These types of business leaders are most likely to avoid:
- c) Some business leaders encourage their subordinates to give their own individual opinions about how the company can develop. These leaders also invite experts to critique the company's plans for development. These types of business leaders are most likely to avoid:

Unpacking MCQs (or other academic language)

PART 3



Packed vs. Unpacked Language

Let's try one together!

Packed MCQ stem: The enzyme that synthesizes short sequences of RNA during DNA replication and that is necessary for DNA synthesis to initiate is...

How would we start to unpack this language?



Packed vs. Unpacked Language

Think of this as a paraphrasing exercise. What are the main ideas that you would like to capture in the new text?

Packed MCQ stem: The enzyme that synthesizes short sequences of RNA during DNA replication and that is necessary for DNA synthesis to initiate is...

1. One enzyme synthesizes short sequences of RNA.
2. This happens during DNA replication.
3. This is necessary for DNA synthesis to initiate.

We would then also want to think about the **vocabulary** that we use!



Packed vs. Unpacked Language

What vocabulary might cause difficulty with comprehension?

1. One enzyme synthesizes short sequences of RNA.
2. This happens during DNA replication.
3. This is necessary for DNA synthesis to initiate.



Packed vs. Unpacked Language

Consider the following comparison between another packed and an unpacked MCQ stem:

Packed MCQ stem: The enzyme that *synthesizes short sequences of RNA during DNA replication* and that *is necessary for DNA synthesis to initiate* is...

Unpacked MCQ stem: During DNA replication, a short *segment of RNA must form*. This RNA segment is the *beginning of DNA synthesis*. What enzyme *creates* these RNA segments?

Unpacking MCQs

In small groups, think about how you would unpack the following MCQ stems:

Packed MCQ Stem Option A: The red blood cell membrane's obstruction of substances except for the passage of water, oxygen, carbon dioxide, and glucose into the blood cell is called...

Packed MCQ Stem Option B: The form of emotion management characterized by the commodification of people's deep acting inducing a sense of alienation is...

The Future with AI

Here are a few websites that can help unpack language:

Using a readability calculator – this will give you a sense of the general difficulty of the language as well as identify specific words that may be more challenging for students. (It won't change your language though.)

If you would like help replacing difficult vocabulary and unpacking those long, complex noun groups, we have been working with Jonny Kalambay, founder of Roshi, which is an online platform that uses AI to generate sample texts for instructors.

- <https://www.roshi.ai/editor>

Unpacking MCQs

Option A

Packed MCQ Stem: The red blood cell membrane's obstruction of substances except for the passage of water, oxygen, carbon dioxide, and glucose into the blood cell is called...

Unpacked MCQ Stem: Cell membranes can act as a barrier. The cell membrane of the red blood cell only allows water, oxygen, carbon dioxide, and glucose to pass through. Because other substances are blocked from entering, this type of membrane is called...

Unpacking MCQs

Option B

Packed MCQ Stem: The form of emotion management characterized by the commodification of people's deep acting inducing a sense of alienation is...

Unpacked MCQ Stem: There are different forms of emotion management. In one form, people's deep acting is commodified. This deep acting causes people to feel alienated. What is the name of this form of emotion management?



Our Training Program:

Linguistic Justice:

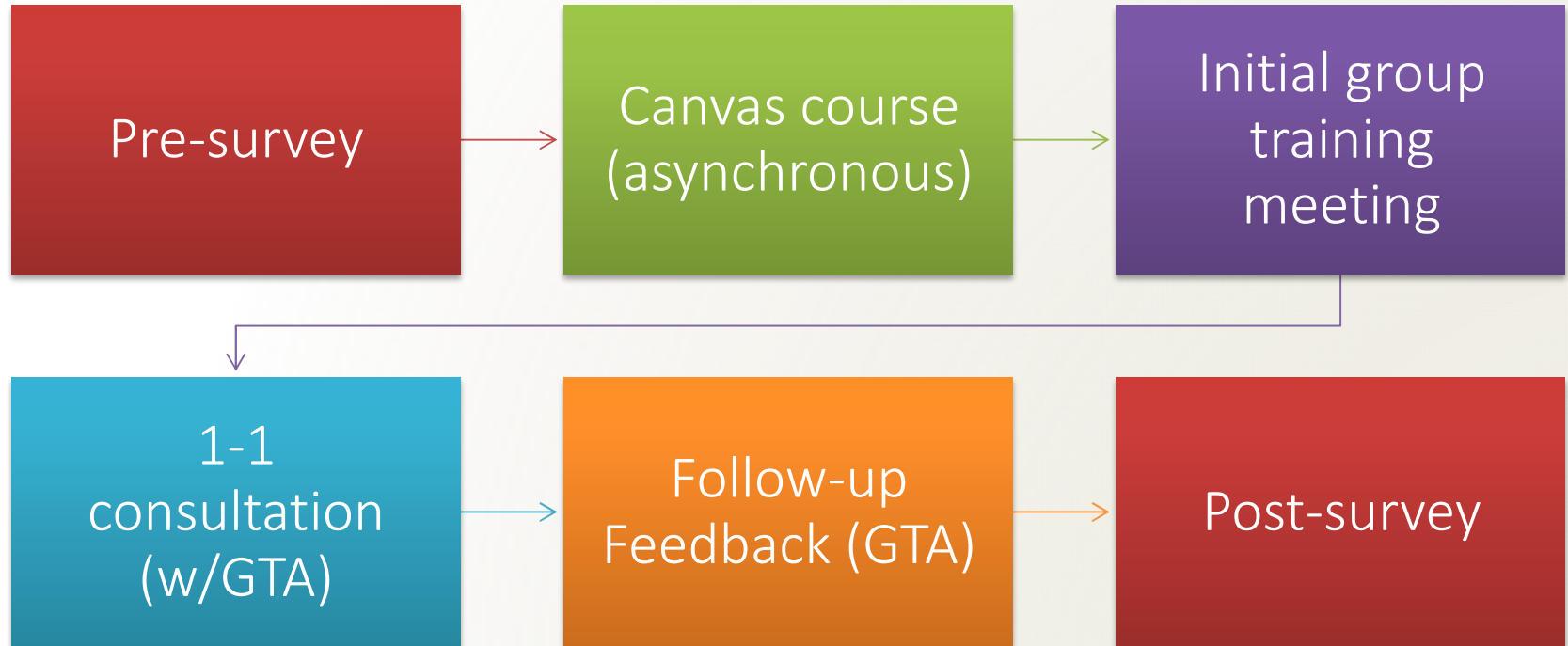
Reducing Linguistic Complexity
for Inclusive Assessment

Linguistic Justice on Campus:

Enhancing Faculty and GTA Capacity to Implement Inclusive Assessment Practices in Multiple Choice Exams with a Linguistically Diverse Student Body

- Capacity building across campus
- Resource development: inclusive assessment
- Connection to UBC's Inclusion Action Plan

Flow of Implementation



What a typical consultation involved:

Part 1: One-to-one consultation (1 hr.)

- Professor came prepared with 5 specific MCQs chosen to review. Usually from prior tests from courses taught annually.
- Reviewed the questions using strategies to identify potentially complex language and worked together to think of modifications.

Part 2: Follow-up feedback (by email)

- Professor emailed 5 MCQ questions and GTA responded with more detailed feedback for unpacking the questions.

Reflection on Consultations

Benefits

- Collaboration between the GTA and instructor was helpful to understand context of the course and what technical vocabulary was expected vs. advanced.
- GTAs were able to respond to concerns and questions regarding the techniques.

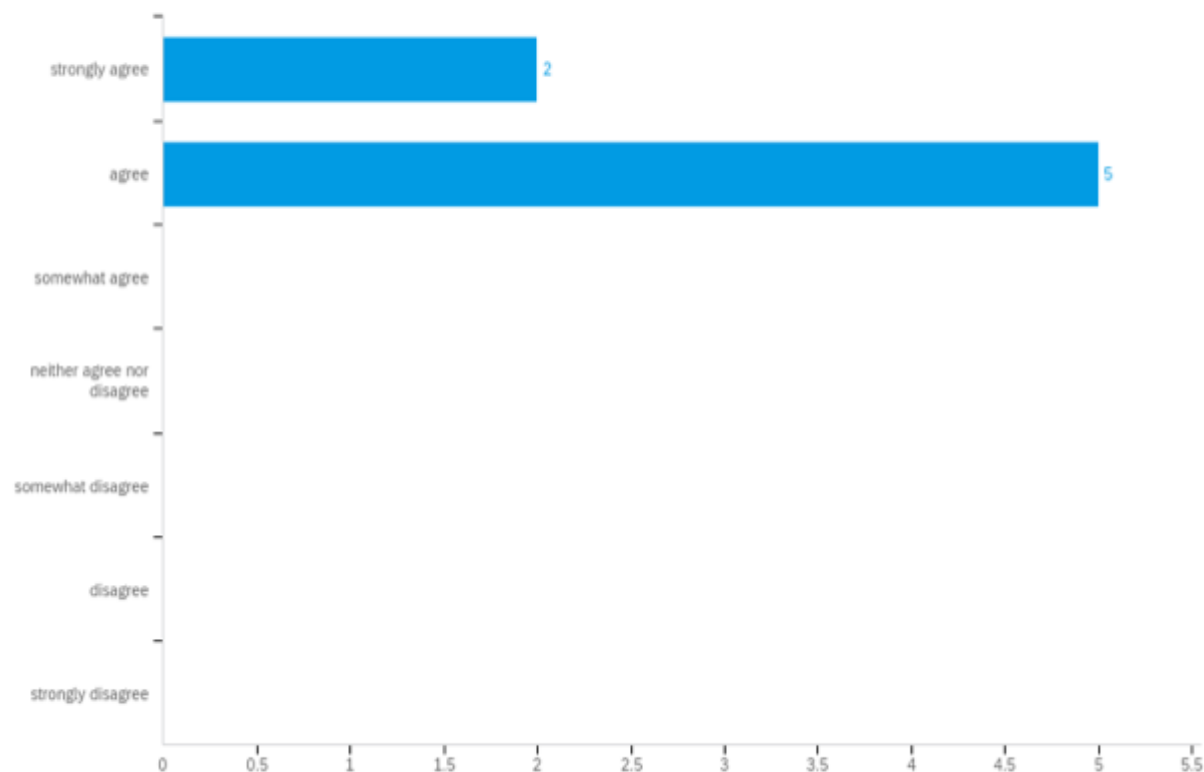
Challenges

- Finding Time
- Limitations; ex: not always in control of MCQs
- Belief that question should be tricky to test difficulty.

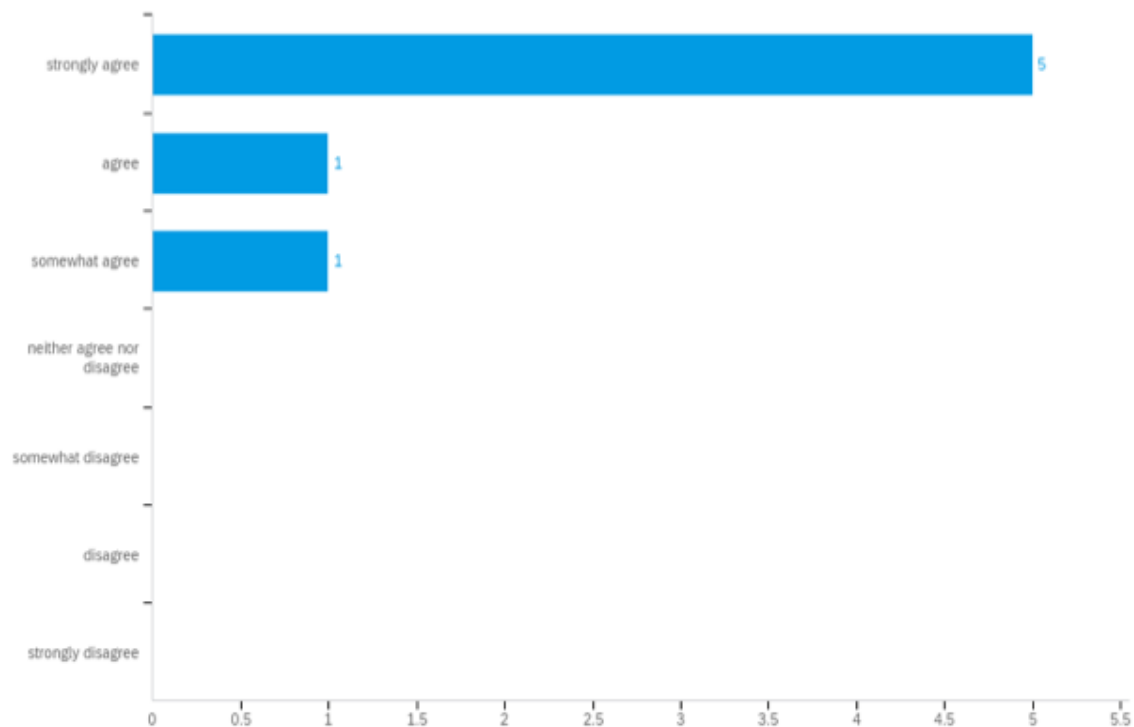
Project Outcomes: Faculty Perspective

- 2 GTAs underwent linguistic training in order to be consultants, offering a transferable skill set for graduate students interested in future work related to pedagogy and equity.
- 16 faculty members learned to revise MCQs as a result of training and GTA pairing.
- As MCQs are frequently used in large courses, 500-800 UBC students were affected during the funded year.
- Hopefully this has inspired further dialogue on campus about student diversity in relation to linguistic justice, inviting faculty to reflect on how language intersects with markers of racialization, and how linguistic assumptions are built into course texts.

Q14 - After this training, I feel that I am more prepared to address some of the challenges EAL students encounter in MCQ assessments.



Q22 - After this training, I feel that linguistic diversity is a relevant consideration in assessment design.





Implications for EAP Specialists

Thank You!

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Our Publications

Riccardi, D., Lightfoot, J., Lam, M., Lyon, K., Roberson, N. D., & Lolliot, S. (2020). Investigating the effects of reducing linguistic complexity on EAL student comprehension in first-year undergraduate assessments. *Journal of English for Academic Purposes*, 43, 100804. doi:10.1016/j.jeap.2019.100804

Lyon, K., Roberson, N. D., Lam, M., Riccardi, D., Lightfoot, J., & Lolliot, S. (2022). A Sociological Lens on Linguistic Diversity: Implications for Writing Inclusive Multiple-Choice Assessments. *Teaching Sociology*, 1-13. doi: 10.1177/0092055X2211341

