

# Liven Up the English Classroom with Academic Learning: Examples from Cognitive Psychology

学問で英語クラスを活気づけよう：  
認知心理学からの実例

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## **ABSTRACT**

*Topics in merchandised university English coursebooks are not necessarily interesting to students. By providing example activities on cognitive psychology topics, the present paper discusses one way of making the classroom a more exciting and engaging place to study English, along with academic content through English.*

**KEYWORDS:** English language teaching (ELT), English medium instruction (EMI), Cognitive psychology

## 1. INTRODUCTION

Widely marketed university coursebooks of English for (General) Academic Purposes or EAP largely avoid proactive topics, commonly known as PARSNIP, which are politics, alcohol, religion, sex, narcotics, isms (e.g., communism), and pornography or pork (Galloway, 2018; Gray, 2000). Activities in these ‘uncontroversial’ textbooks can be too insipid to encourage student engagement in learning. In reference to Airey’s (2016) language-content continuum, the present paper suggests moving from EAP (i.e., language) towards English Medium Instruction or EMI (i.e., academic content) with the help of classical topics in cognitive psychology. Given that Japanese students educated in Japan tend to take EMI as the opportunity to learn language (Murata & Iino, 2018), EMI has the potential to promote more active and purposeful language use through stimulating and fascinating content.

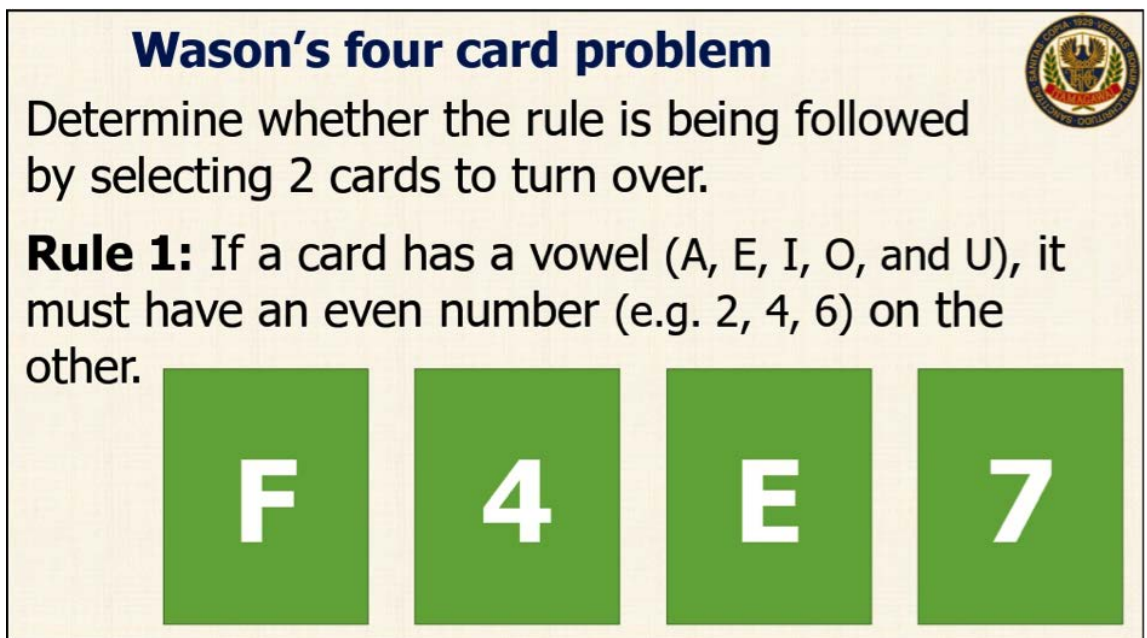
As such, it is not the author’s intention to encourage fellow English instructors to discuss controversial topics, such as PARSNIP, in their classrooms. Rather, he would like to demonstrate that incorporating academic learning into our teaching may be key to more student engagement in classroom activities. To this effect, what follows offers examples of classroom practices.

## 2. EXAMPLE ACTIVITIES

This main section introduces four classical topics in cognitive psychology, which may be used in the university English classroom for students across different English capabilities and from different disciplines. These topics are Wason’s (1966) four card problem (see 2.1), availability and representative heuristics (Kahneman & Tversky, 1972; Tversky & Kahneman, 1973; see 2.2 & 2.3), and change blindness (Simons & Levin, 1998; see 2.4). Figures 1 to 5 below are the actual slides the author has used in his teaching<sup>1</sup>.

### 2.1 Wason’s (1966) Four Card Problem

Based on a series of experiments reported by Wason & Shapiro (1971), we can include challenging but entertaining activities in class. Students will be shown four cards and given a rule to verify. Their task is to determine if the rule is being followed by selecting two cards out of the four to turn over.



The slide features a title 'Wason's four card problem' in bold blue text. Below the title is the instruction: 'Determine whether the rule is being followed by selecting 2 cards to turn over.' A circular logo of Tamagawa University is in the top right corner. The rule is stated as: 'Rule 1: If a card has a vowel (A, E, I, O, and U), it must have an even number (e.g. 2, 4, 6) on the other.' Below the rule are four green cards with white text: 'F', '4', 'E', and '7'.

Figure 1. Wason’s four card problem: Letters and numbers

It is worthwhile to explain what vowels and consonants as well as even and odd numbers mean to students. Obviously, while A, E, I, O, and U are the only vowel letters in English, there are infinite even numbers. Each card has a letter on the one side and a number on the other side. For example, the leftmost card (i.e., “F”) has some number printed on the back side, and the next one (i.e., “4”) has some letter on the reverse side.


A good number of students are likely to select the middle cards (i.e., “4” and “E”). At first sight, their decision is reasonable since the rule is about even numbers and vowels. However, it does not matter whether the other side of “4” is a consonant because consonant cards are irrelevant to the rule (i.e., “If a card has a vowel”). In other words, the rule does

<sup>1</sup> These slides will be compiled, together with others, as teaching material for one module at Tamagawa University’s Center for English as a Lingua Franca (see Ishikawa & McBride, 2019).

not say anything about consonants. After all, people may all suffer from confirmation bias, that is, the tendency to confirm rather than disconfirm information. To borrow Anderson's (2015) words, "[t]he number of people that make the right combination of choices, turning over only the E and the 7, is often only about 10%, which has been taken as a damning indictment of human reasoning" (p. 243).

Human reasoning often fails, and Wason's (1966) four card problem shows how good people are at modus ponens and tollens respectively.

## Wason's four card problem



**Modus ponens** [肯定式]

e.g. If today is a weekday, then Ali will go to work.

- Today is a weekday.
- Therefore, Ali will go to work.

Easier

**Modus tollens** [否定式]

e.g. If today is Saturday, then Ebba will go to work.

- Ebba will NOT go to work.
- Therefore, today is NOT Saturday.

Harder

Figure 2. Modus ponens and tollens

In the case of Rule 1 in Figure 1:

- Modus ponens (i.e., if  $p$  then  $q$ ): If a card has a vowel, then it must have an even number on the other.
- Modus tollens (i.e., if  $not-q$  then  $not-p$ ): If a card does not have an even number, then it must not have a vowel on the other.

The former logic requires task-takers to turn over "E" (i.e., a vowel), and the latter logic necessitates checking "7" (i.e., not an even number).

Students may want to try another card selection task. In the hope of more correct responses, we can state a problem in concrete everyday terms in relation to familiar everyday experiences.

## Wason's four card problem



Determine whether the rule is being followed by selecting 2 cards to turn over.

**Rule 2:** If people are drinking beer, they are over 19 years old.



Figure 3. Wason's four card problem: Drinks and ages

A few students might not be familiar with the word “coke”, which is short for Coca-Cola, and more importantly, a soft drink.

We can encourage small group discussion and make links to our textbooks. As an example, we can use the following boldfaced expressions from our current reading textbook for ELF101-102 courses (Ackert, Lee, Hawkins & Back, 2014, p. 77):

I think we should turn over \_\_\_\_ and \_\_\_\_.

- **Yes, I agree.** / **Yes, I know.** / **Yes, I think so, too.**
- **Well, maybe.** / You may be right. / **I'm not sure about that.**
- **Well, I don't think so.** / You don't say. / No way.

We may ask each group to reach agreement on the two cards to be selected through discussion, and share their ideas with the class afterwards.

This time, many students will probably select the correct cards: “beer” and “16 years old”. We should better not forget to praise students for their active participation in class and for their better reasoning in the second card selection task.

### 2.2 Availability Heuristic

Another area we can use to promote student discussion is what is called availability heuristic (Tversky & Kahneman, 1973) to be explained later. We can create classroom activities in accordance with interests of local learners, and Kusano (2016) seems to serve this purpose.

## Availability heuristic



Which is the largest in number in Japan?

- A. Beauty parlours
- B. Convenience stores
- C. Dental clinics

Kusano (2016) <https://note.com/kodaikusano/n/n73a39a92abfb>

I think \_\_\_\_\_ are the largest in number.

- Yes, I agree. / Yes, I know. / Yes, I think so, too.
- Well, maybe. / You may be right. / I'm not sure about that.
- Well, I don't think so. / You don't say. / No way.

Figure 4. Availability heuristic

It is a good idea to make sure that all students understand the above three options, and that beauty parlours are different from barbershops. At this stage, we need not, or ought not to, explain what availability heuristic is like. Note that the same expressions as in 2.1 are 'recycled' in Figure 4. Students will be able to proceduralise textbook expressions by using them on different occasions.

Again, we may encourage small group discussion to reach agreement on one of the three options as a group. This procedure will not take so much time since many students usually think that convenience stores are the largest in number. A few groups may choose dental clinics instead.

In reality, however, Japan has over 220,000 beauty parlours, far exceeding 35,100 convenience stores and 68,700 dental clinics (see Kusano, 2016). While more updated governmental statistics are not available, it would be fair to say that the first option (i.e., beauty parlours) is the factual answer to this three-choice question.

Human cognition is not perfect. In Tversky and Kahneman's (1973) original experiment, people commonly perceive that there are more words beginning with *k* than having *k* as the third letter, even though the opposite is true. With first letters a good memory cue, it is much easier to think of the former than the latter.

Likewise, in the case of the above three-choice question, convenience stores easily occur to students' mind as the places they regularly use. Even if they spend more money at beauty parlours than at convenience stores, they use the former far less often. On a side note, more convenience stores are normally available around railway stations. Tamagawa University, where we work, is close to a station, and its students inevitably see different convenient stores while walking to and from the university.

As seen in both Tversky and Kahneman (1973) and Kusano (2016), the more memorable or striking examples are, the more likely people are to judge their occurrence



in real life. To put it differently, people are liable to make a probability judgment of a given item by its retrieval fluency (e.g., Reber, 2017), that is, how easily its examples come to mind.

To convince students further, we can add an anecdote like this: Student A has three close friends in her English class, and none of the three likes studying English. She tells her mother at home loudly that everyone in the class dislikes studying English even if a dozen other students in the same class feel the opposite way. Having heard this anecdote, we may see students smiling or laughing. We tend to exaggerate what easily comes to mind. Again, we may want to praise students for their understanding academic content through English.

### 2.3 Representative Heuristic

Similarly, we are prone to judge by representativeness or characteristic features without regard to base rate or statistical probability. To put it technically, we often use the representative heuristic (Kahneman & Tversky, 1972). The following example is adapted from Swinkels (2003).

**Representative heuristic**

Tamao lives in Japan. He loves horror movies, performing arts, and yoga. He has tattoos on several parts of his body. His friends all know that he sometimes acts too aggressively. What do you think his occupation is likely to be?

1. Businessperson	2. Farmer
3. Lawyer	4. Surgeon
5. Trapeze artist	

[Swinkels \(2003\) https://doi.org/10.1207/S15328023TOP3002\\_08](https://doi.org/10.1207/S15328023TOP3002_08)



Figure 5. Representative heuristic

It is likely that students at Tamagawa University are familiar with what its Performing Arts department is like and therefore with this term (i.e., performing arts), but that some of them are unfamiliar with the words “aggressively” and “occupation” as was the case in the author’s ELF101-102 class. When the author used this slide, Naomi Osaka created a sensation in the media by winning the 2018 United States Open tennis tournament. He took the second-place winner Serena Williams as an example of *aggressive* athletes, and referred to Williams’ and Osaka’s *occupation* as playing tennis. Also, we can allow students to search by image through the Internet and discuss what trapeze artists are like, as well as other occupations in Figure 5 as necessary.

Yet again, we may encourage small group discussion to decide on one of the five options. We can ‘recycle’ any set of textbook expressions and put them in a communicative context (see 2.2). Different ideas will emerge from different groups, making the subsequent class discussion lively. It is true that the description of the person named Tamao seems to be suggestive of a performer. Importantly, however, the number of any of the other options (i.e., business people, farmers, lawyers, and surgeons) is significantly higher than that of trapeze artists in Japan and elsewhere. Disregarding this base rate information, students may well be swayed into believing that Tamao belongs to a circus troupe. Given that 60.04 out of 67.24 million workers in Japan are categorised as business people as of 2019 (Statistics Bureau of Japan, 2020), it is the most reasonable to consider him to be a businessperson. Students will be ‘all ears’ to this explanation, perhaps wondering why they have ignored the base rate information themselves.

## 2.4 Change Blindness

If we left the classroom shortly and came back with a different tie or scarf, how many students would notice the change? To the same effect, we may show the first 38 seconds of NOVA’s (2011) video clip to see whether students will notice a change of persons within a brief story.

Simons and Levin’s (1998) well-cited experiment on change blindness is reproduced in the same video clip of NOVA (2011, 1’40”–2’35”). In their study, an experimenter stopped pedestrians and asked for directions (see Figure 6). While talking, they were interrupted by ‘workers’ who were carrying a large board and passing between them. Even though one of the workers replaced the original experimenter during that interruption (see Figure 7), around half of the participants did not notice the change, thus illustrating how greatly contextual information affects our perception of the world.



Figure 6. Change blindness: Asking for directions, captured from NOVA (2011, 2’07”)



*Figure 7. Change blindness: Asking for directions, captured from NOVA (2011, 2'09")*

Once students get the idea that people are often biased by contextual information and thereby unable to keep track of current information, we can show another video clip, such as Chambers (2016), in which instructions are given in English. Chambers (2016) starts with the text instruction, “You’re about to see two images switching back and forth in rapid succession” (0’00”–0’03”), and includes three tasks of this kind (see Figure 8 for the first task as an example). Students will be glued to the quickly alternating images, possibly forgetting the fact that they are reading instructions in English and listening to our explanation through English, rather than their mother tongue.







*Figure 8. Change blindness: Two switching images, captured from Chambers (2016, 0'13"–0'17")<sup>2</sup>*

With students, we will experience “[t]he inability to detect a change in a scene when the change matches the context” (Anderson 2015, p. 366). At the same time, we will observe students’ ability to enjoy and learn about cognitive psychology.

### 3. CONCLUSION

Classical topics in cognitive psychology may provide English classes with a lot of fun. We can facilitate English use when it is combined with academic learning which is both intellectually intriguing and relevant to everyday life. Wason’s (1966) four card problem, availability and representative heuristics (Kahneman & Tversky, 1972; Tversky & Kahneman, 1973), and change blindness (Simons & Levin, 1998) are among good examples. They highlight the human tendencies to have a confirmation bias, overweight what easily comes to mind, ignore base rate information, and not to see changes in a visual scene respectively. We can find similar examples in Anderson (2015) and other cognitive psychology textbooks.

By identifying weaknesses in cognition, we may be able to think more carefully and effectively. By finding a place of learning these weaknesses in the English classroom, we may be able to bring more excitement and engagement in studying English as well as academic content through English.

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2 Note the difference in colour of the trousers worn by the person on the far left.

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