Human Factors Engineering II

Discussion Questions for *Thinking, Fast and Slow*

Kahneman, D. (2011). *Thinking, Fast and Slow*. New York: Farrar, Straus and Giroux.

Part I. TWO SYSTEMS

Chapter 1. The Characters Of the Story

1. What is System 1? System 2? How do they work together? And in competition?
2. What are some of the characteristics of System 1? Give some examples of System 1 operating in your RTDM domain (see Discussion Questions for the Introduction).
3. What are some of the characteristics of System 2? Give some examples of System 2 operating in your RTDM domain.
4. What is wrong with the following statement? "System 1 recognizes common patterns and System 2 carefully compares alternatives."

Chapter 2. Attention and Effort

1. What are some factors that affect the effort required for a mental task in your RTDM domain? How could that effort be empirically measured, if only approximately?
2. What mental activities in your RTDM domain are especially demanding of effort? What is the physiological effect of that demand?

Chapter 3. The Lazy Controller

1. Describe a time in which you experienced *flow*.
2. Why is coming up with examples for these questions so difficult?
3. What do self-control and cognitive effort have in common? What are some implications of this?
4. What are the moral implications of the busy mind?
5. Use the concepts presented in this chapter to explain why your RTDM domain's decision maker might be more apt to *confidently* overestimate some parameter?

Chapter 4. The Associative Machine

1. Explain how a physician's "associative machine" might work in diagnosing a disease from the signs and symptoms the doctor observes or the patient describes. How conscious is the physician of this process?
2. How might we use priming to *subtly* induce drivers to keep to the speed limit? Were it successful, would you expect the drivers to be able to explain why they drove slower?
3. Which System is at work here?

Chapter 5. Cognitive Ease

1. Explain how the phenomena depicted in Figure 5 (p. 60) might induce complacency in the

decision maker of your RTDM domain.

2. Referring again to Figure 5, what can you do with a printed message to make it seem more credible?
3. A display of a numeric parameter may use averaging of the values provided by the sensor to prevent the pointed from "wobbling" and being difficult to read. But if the sensor is faulty, what effect might that have on confidence the operator has in the displayed value?
4. How might the finding reported on p. 65 concerning font change your idea about display design?
5. How might you plant a false memory in a person's mind?

Chapter 6. Norms, Surprises, and Causes

1. Pilots often speak of "automation surprises"; for a more familiar example, imagine the cruise control in your car suddenly accelerating or disengaging entirely for no apparent reason. Explain the role of System 1 in this situation. Why might it be less surprising the next time it occurs?
2. Nearly everyone who has looked into it knows that the *Titanic* was traveling at 22½ knots, near its top speed, when it struck the iceberg that sank it. How might that fact give rise to misleading explanations of the wreck?
3. After filling her recently purchased but used car's gas tank, a driver notices that the fuel indicator does not immediately rise, absentmindedly taps the indicator, and notices that the pointer moves to F. From then on, she always taps the indicator after a fill-up . Explain how this might be an example of the impression of causality.
4. Illustrate one of the phenomona of this chapter with an example from your RTDM domain.

Chapter 7. A Machine For Jumping To Conclusions

1. An airplane is low (but not out of) fuel and its left engine stops due – unknown to the pilot – to a blocked fuel valve. Quickly concluding fuel starvation caused by an empty left wing tank (which was not filled before the hasty departure), the pilot begins to transfer fuel from the right wing tank to the left tank. Distracted by bad weather and low visibility, the pilot allows the right tank to be exhausted and the right engine quits. Explain this incident using the concepts covered in this chapter. NB: Twin-engine aircraft are designed to be safely operable under the power of just one engine, though speed, maneuverability, and safety margins are reduced.
2. What should the pilot have done?
3. You meet a young man at a social gathering and your first impressions of him are good: he is well-groomed, well-mannered , polite, soft-spoken, reflective, and articulate. Later, the host tells you that a certain other guest, having had too much alcohol to drive, needs a ride home, and asks you for a recommendation. Not having a car yourself and not knowing anyone besides the host well, you are at a loss to help. Then you remember the pleasant young man and recommend him. Explain the halo effect and how it might have made that a dangerous recommendation.
4. Explain WYSIATI using an example from your RTDM domain.

Chapter 8. How Judgments Happen

1. Speculate on the respective roles of System 1 and System 2 in how a pilot (or other system operator) monitors displays to confirm normal operation or to detect and respond to non-normal conditions. What are the *basic assessments* in this case and what System is responsible for them?
2. The phenomenon of intensity matching would suggest that aircraft altitude or other numerical parameter could be represented with a simple display consisting only of a lamp of variable luminance where its luminance is proportional to the current value of the parameter. Comment on this idea drawing on the principles covered in this book.
3. As part of a highway safety study, you are counting the number of vehicles passing through a pretty busy four-way stop intersection which has two lanes arriving from each of the four directions, tallying those vehicles that come to a *complete* stop separately from those that do not. How might your mental shotgun interfere with the accuracy of your tallies?

Chapter 9. Answering An Easier Question

1. Capt. Joseph Smith, master of the *Titanic* on its maiden voyage, has just finished a pleasant dinner with several of his richest passengers when approached by Fifth Officer Harold Lowe on the bridge. Lowe asks him "Will we be all right in the ice region, sir?". Smith responds "Why, of course!"[1] How might *substitution* have influenced Smith's response?
2. Explain the respective roles of System 1 and System 2 in answering these questions.
   a. How's life?
   b. Regarding your life *as a whole*, how good has it been?

   Considering how System 1 and System 2 work, how is question b *likely* to be taken?
3. Give a specific example of how the affective heuristic may affect your judgment. Choose from any domain you wish: flying, driving, politics, sports, religion, …
4. Explain – in the vernacular, unpack – the last sentence of the chapter: "An active, coherence-seeking System 1 suggests solutions to an undemanding System 2."
5. Give, in your own words, succinct descriptions of System 1 and System 2.

1 A fanciful interchange. There is no record that Lowe (who survived) or anyone else had such a conversation with Smith (who did not).