

Think fast, think slow : algebra learning

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Think Fast, Think Slow: Algebra Learning

Background and Motivation

- Why do students make **common** mistakes even if they do not conspire?
 - For example: $(a + b)^2 = a^2 + b^2$ is a common mistake students make when learning algebra
- Hypothesis: Some of the mathematical mistakes students make could be due to common human cognitive biases
- Daniel Kahneman is famous for his work on human cognitive biases (Thinking, Fast and Slow: System 1 & System 2)

Research Aims

- Use concepts in System 1 & System 2 to explain students' mistakes
- Explore if the concepts in System 1 & System 2 can influence teachers' interventions to reduce mistakes made by students

Data

- Interviews
- Observations
- Student Artefacts

Conceptual Framework

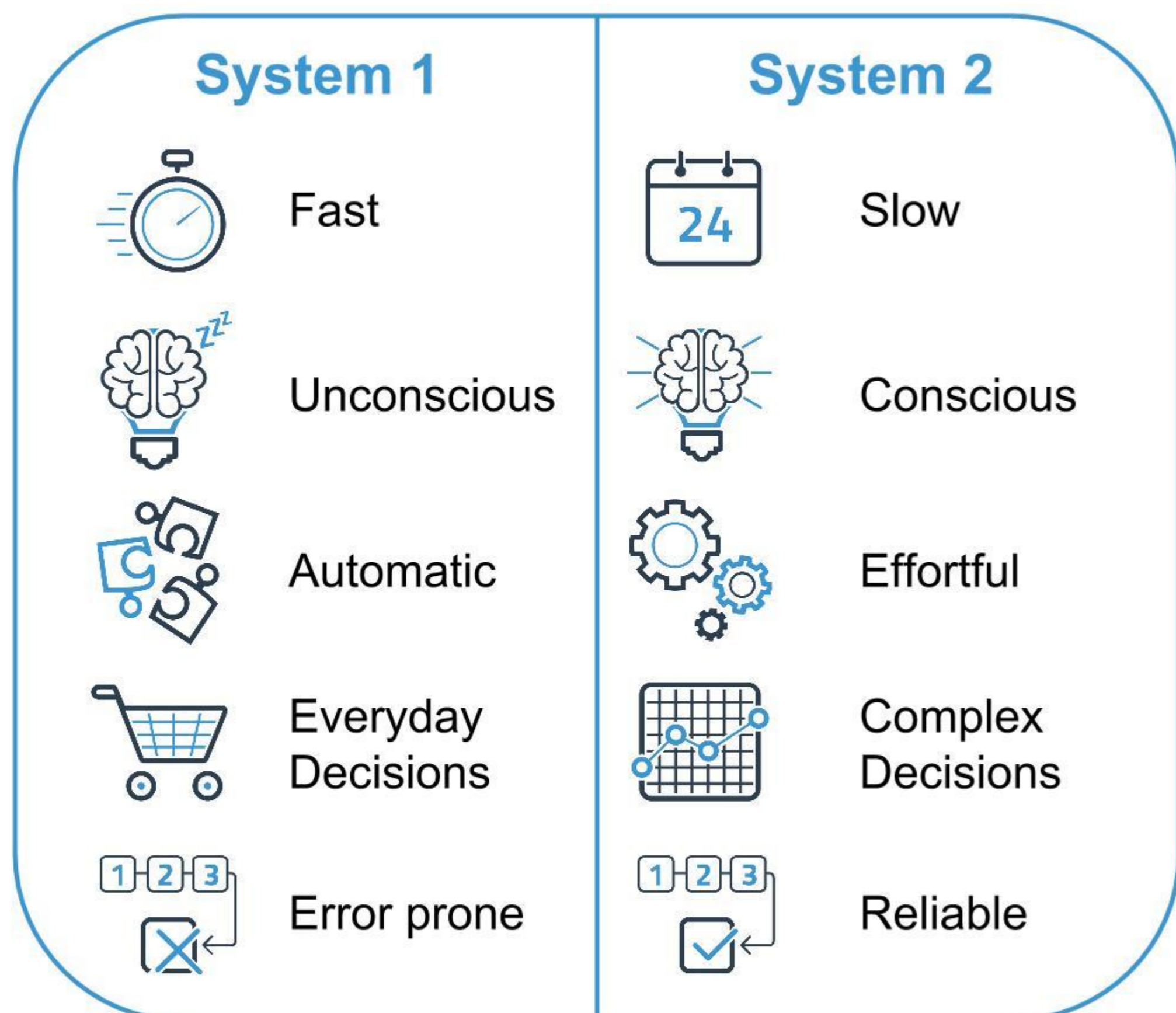


Figure 1: Characteristics of System 1 and System 2

Preliminary Findings

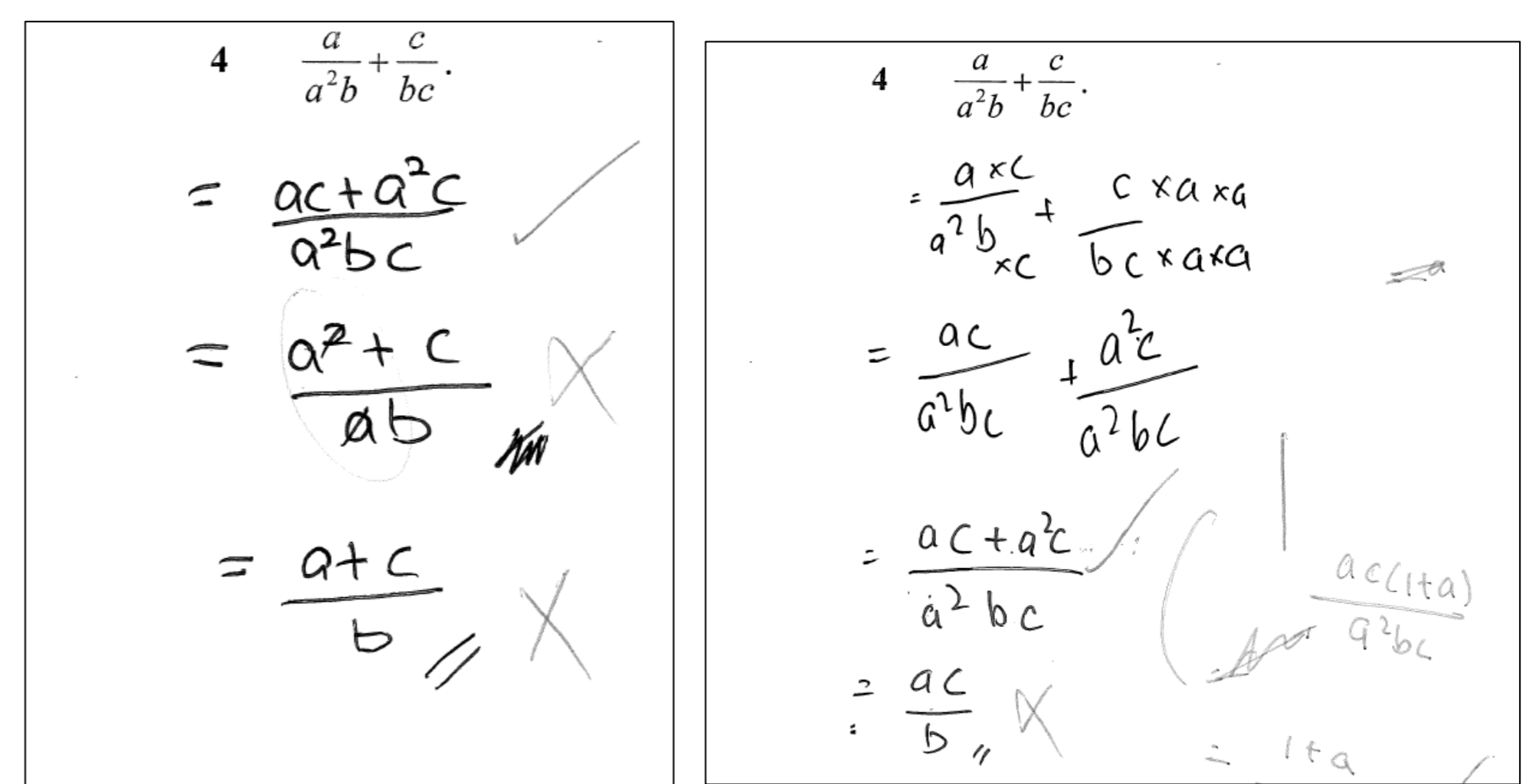


Figure 2a & 2b: Students' working for a pop quiz

- Bias of System 1: Priming Effect
 - Both students managed to obtain the single fraction expression $\frac{a+c}{a^2b+bc}$ but did not manage to simplify the fraction correctly
 - They could have been primed from past learning experiences to cancel immediately when they see common factors like a^2 and c in the numerator and denominator

Figure 1 Credits: CityFloodMap.com