Come take a **look!**

Let’s **chat** for a moment. Here’s **one more** to look at. **17 x 24 = ???**

Let’s **chat** for another minute.

## Background

- Conventional thought has been that a majority of students come with an inconsistent analytic reasoning pattern into collegiate studies.
- **Extended heuristic-analytic theory of thinking and reasoning** proposed by Evans¹
  - **Heuristic:** involving or serving as an aid to learning, discovery, or problem-solving by experimental and especially trial-and-error methods.²
  - **Analytic:** skilled in or using analysis especially in thinking or reasoning.²
  - Process 1 (Fast thinking)
  - Process 2 (Slow thinking)

## Methods

### Questioning sequence

- **Screening Question**

### Target Question

- **Part 1:** A student pushes a wooden block, initially at rest at $x = 0.0$ m, a distance of 8.9 m across a smooth, level ice surface as shown. Assume that friction is negligible. As the block covers the first 4.0 m, the student exerts a constant horizontal force of magnitude $F_a$.

- **Part 2:** As the block moves beyond the 4.0 m and 8.9 m marks, the student continuously decreases the magnitude of the horizontal force from $F_a$ to 0.5 $F_a$.

## Results

- **Looking at both** screening and target answers
  - 39% (36 of 92) showed consistent analytic reasoning (slow thinking) of conceptual questions [6_0, 5_1 & 5_0 combined]
  - 51% (47 of 92) showed inconsistent analytic reasoning [4_2 thru 2_2 combined]
  - 10% (10 of 92) showed consistent heuristic (fast thinking) [remaining].

- **Looking at target answers only**
  - 56% (49 of 87) showed consistent analytic reasoning (slow thinking) of conceptual questions [3_0, 2_1 & 2_0 combined]
  - 44% (38 of 87) showed inconsistent analytic reasoning [remaining]

- More students seem to be consistent analytic thinkers (slow) than originally thought.
- Question that arises: How do we get to the other population of inconsistent (fast, slow, fast) thinkers?

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