Measuring Difficulty of Introductory Programming Tasks

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Why study difficulty?

- improved student skill estimates
- task sequencing
- content authoring and management

Obstacles

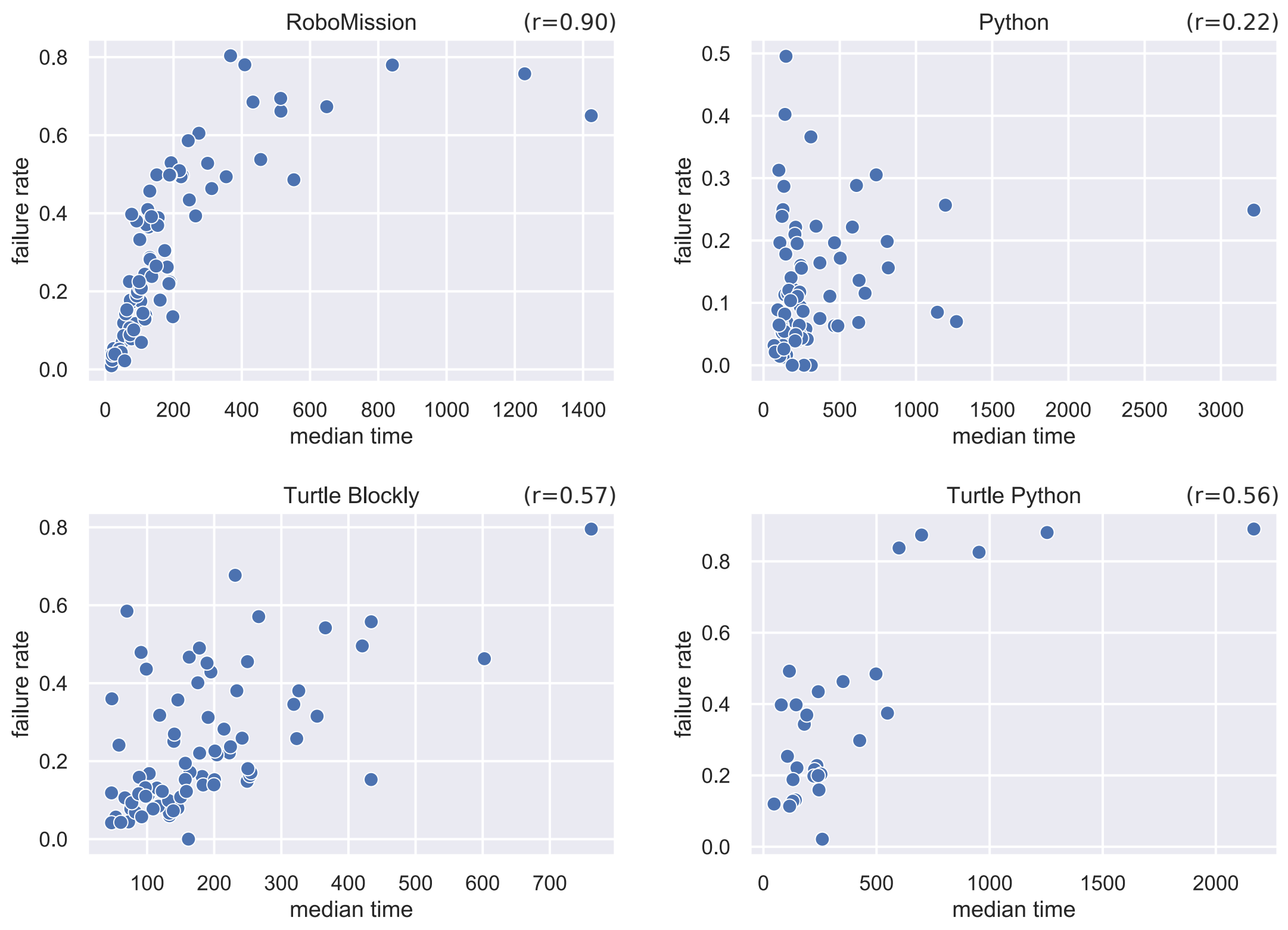
- many measures
- biases in data collection
- variations across exercises

Data

Exercise	Interface	Tasks	Students	Attempts
RoboMission	blocks	85	3,800	62,500
Turtle Blockly	blocks	77	11,000	63,600
Turtle Python	text	51	2,400	11,900
Python	text	73	2,000	10,700

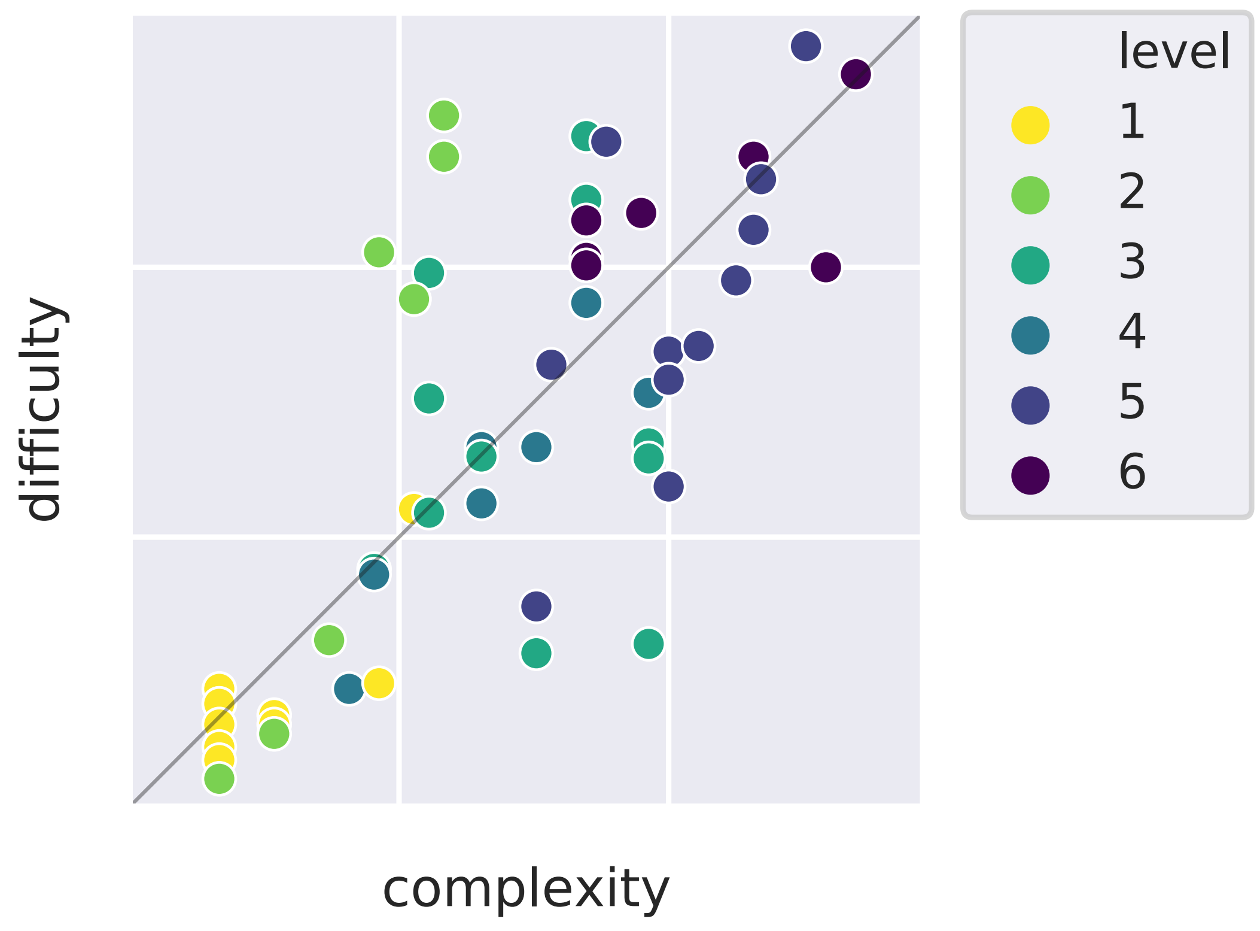
Performance Aspects

The correlation of the same measures can differ widely between exercises.



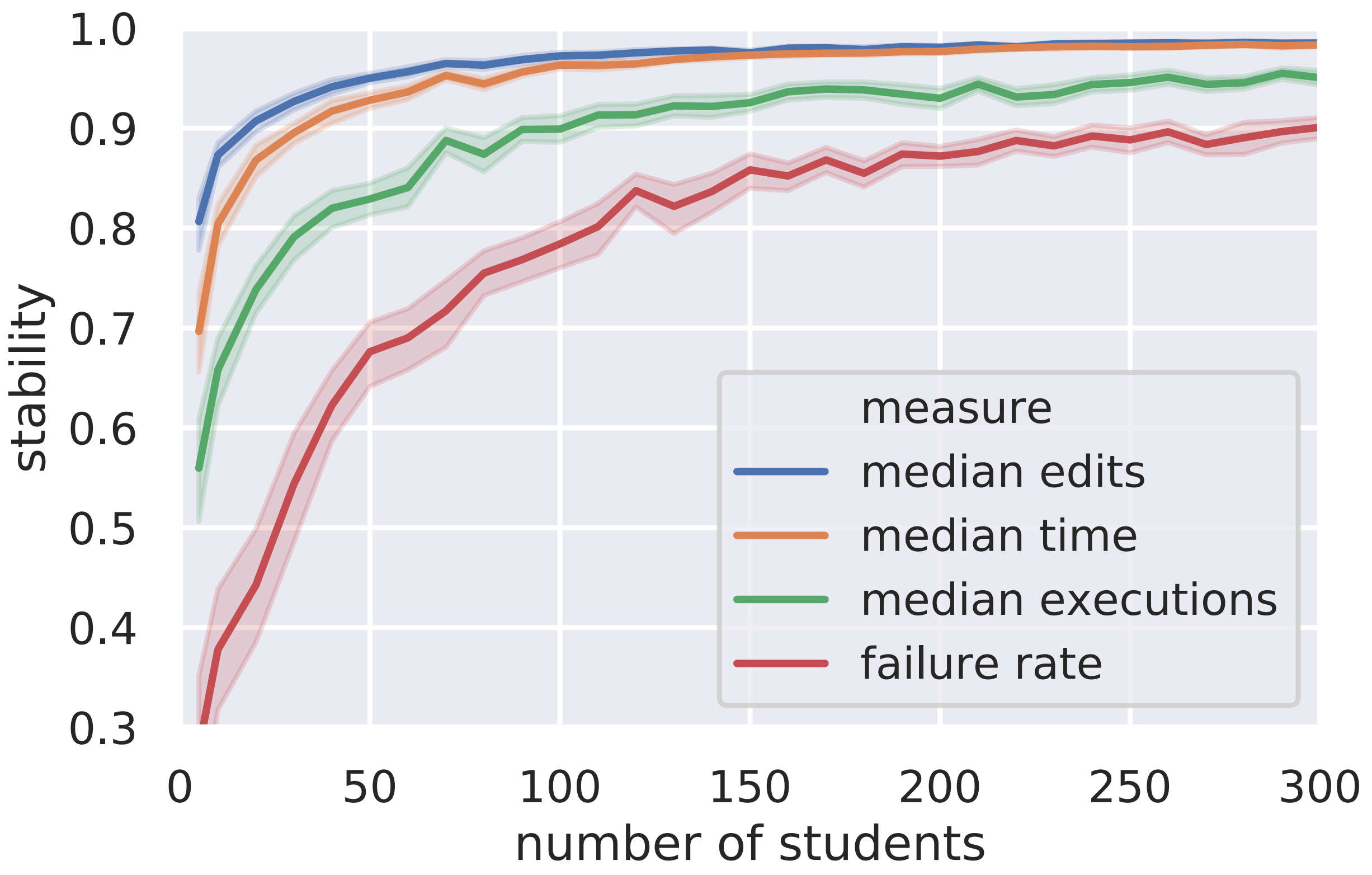
Difficulty vs. Complexity

Comparing difficulty and complexity of a task can reveal misplaced tasks and "tricky" puzzles.



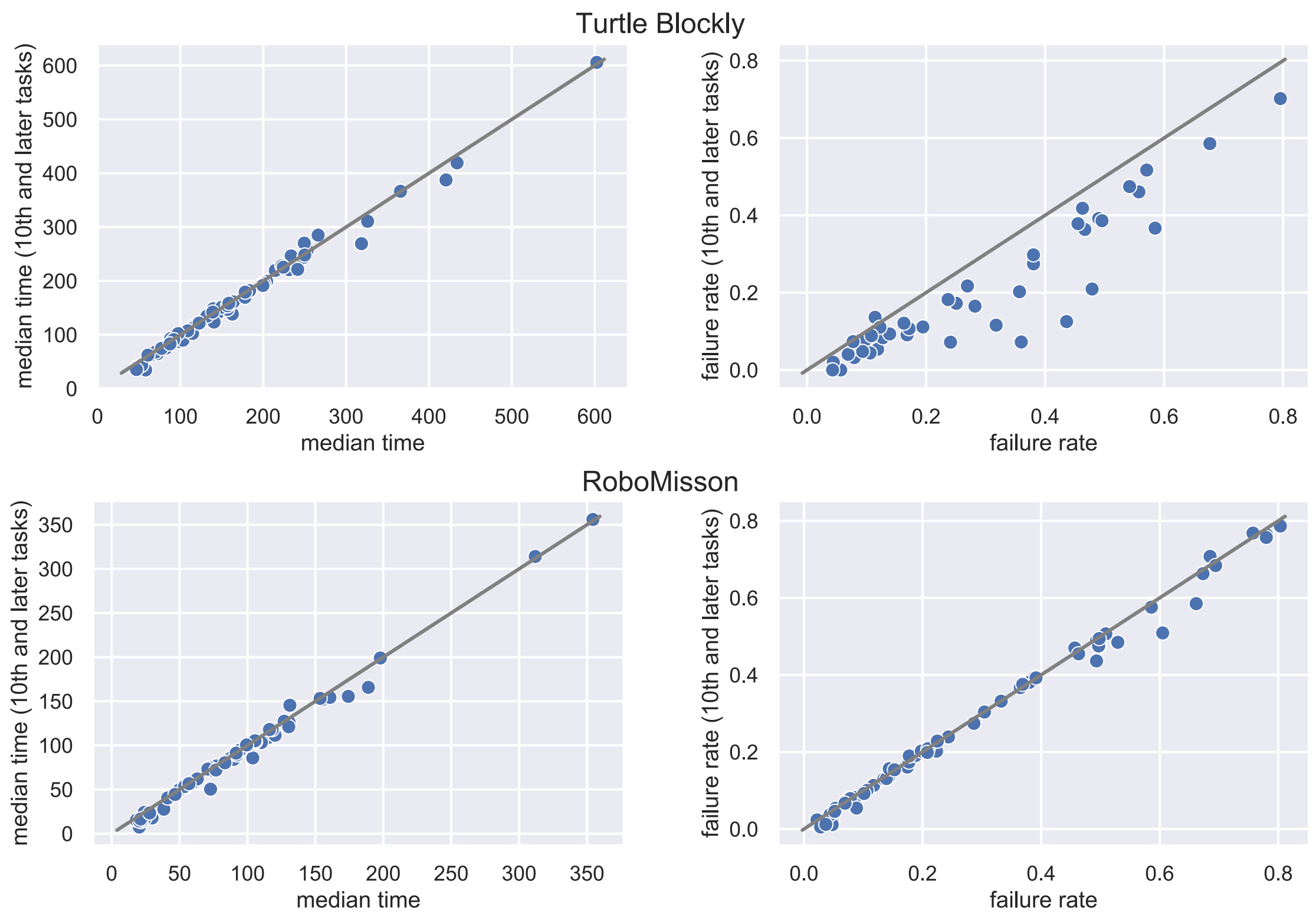
Stability

Measures using more bits of information from student attempts converge faster.



Biases and Filtering

Filtering attempts students can reduce biases depending on the learning system.



Summary

The behavior of difficulty measures varies widely across programming exercises.

Adaptive Learning

Research group, Masaryk university Brno

www.fi.muni.cz/adaptivelearning/