Unpacking the Perceived Productivity of GitHub Copilot

SERT Conference 2024

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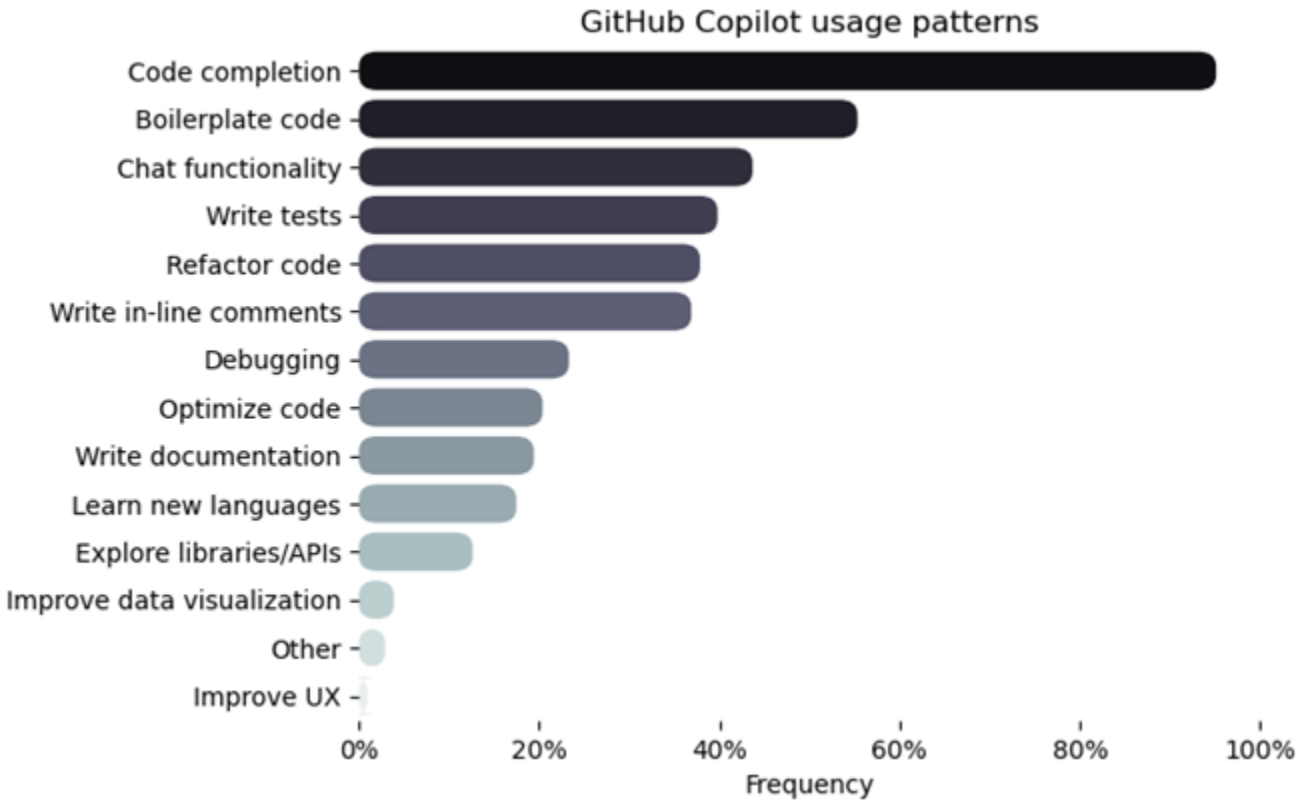
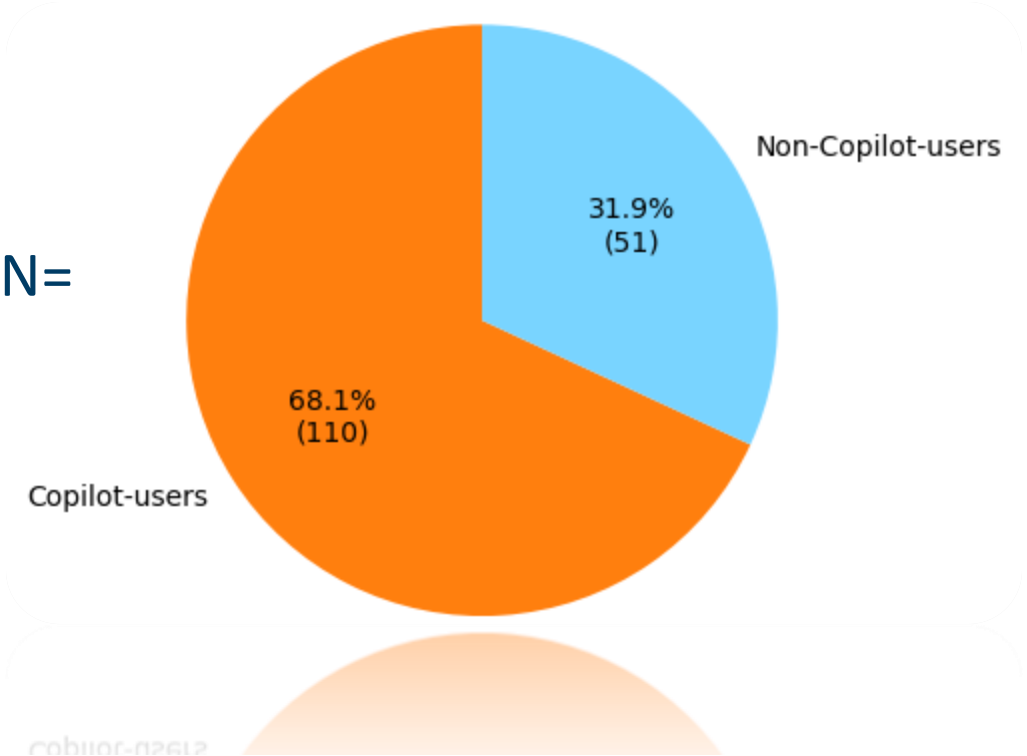
GitHub Copilot

- Official launch June 2022
- AI-based coding assistant
- Codex: LLM trained on English and code



Survey

- RQ: *«What are the effects of introducing GitHub Copilot as a developer tool?»*
- N=



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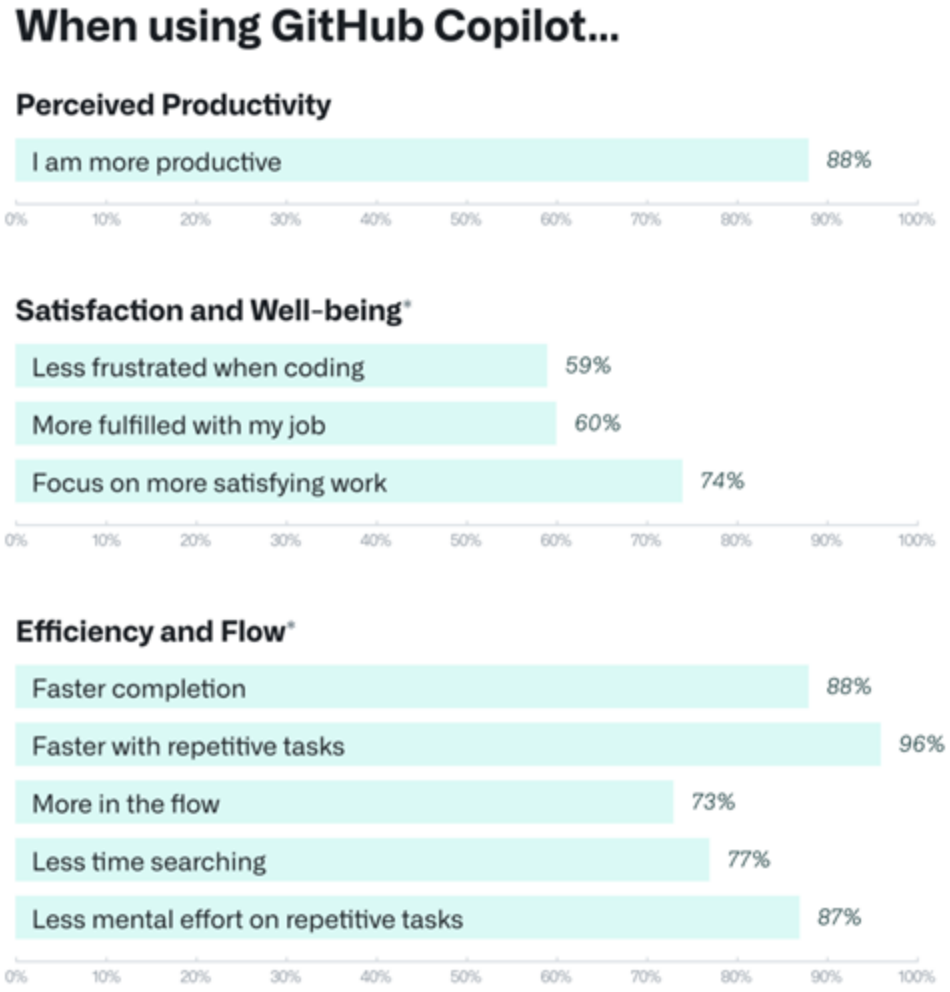
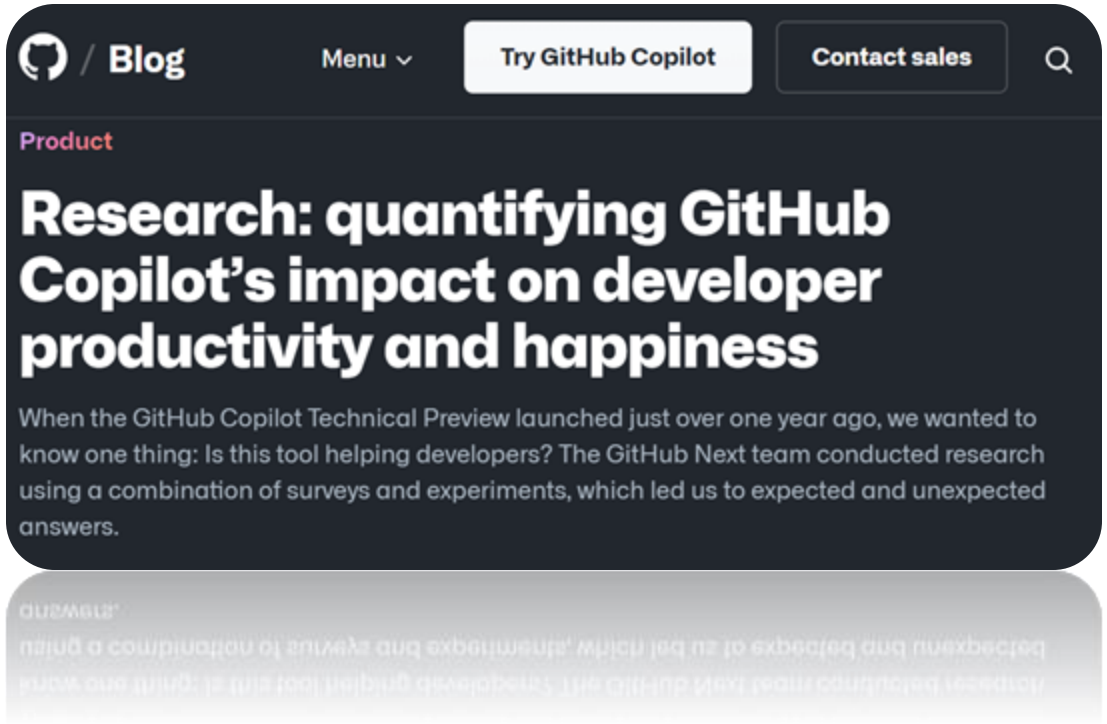
Self-assessment by Copilot preview users

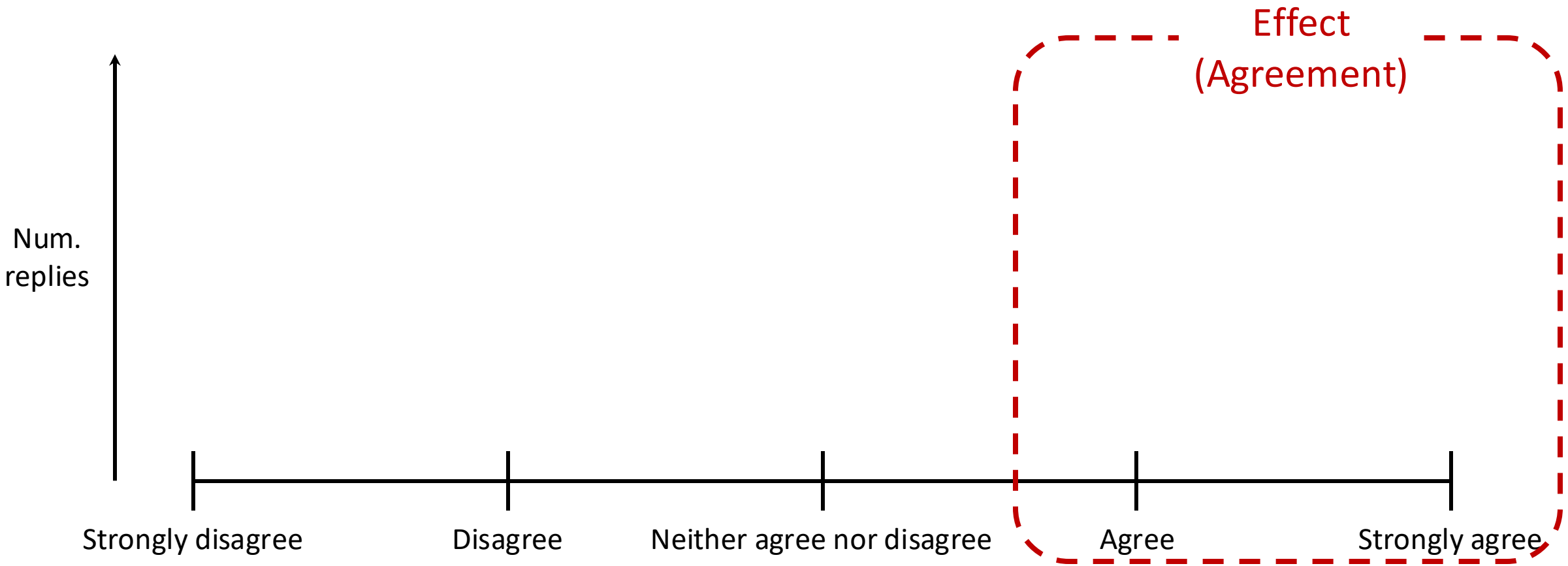




https://github.blog/2022-09-07-research-quantifying-github-copilots-impact-on-developer-productivity-and-happiness

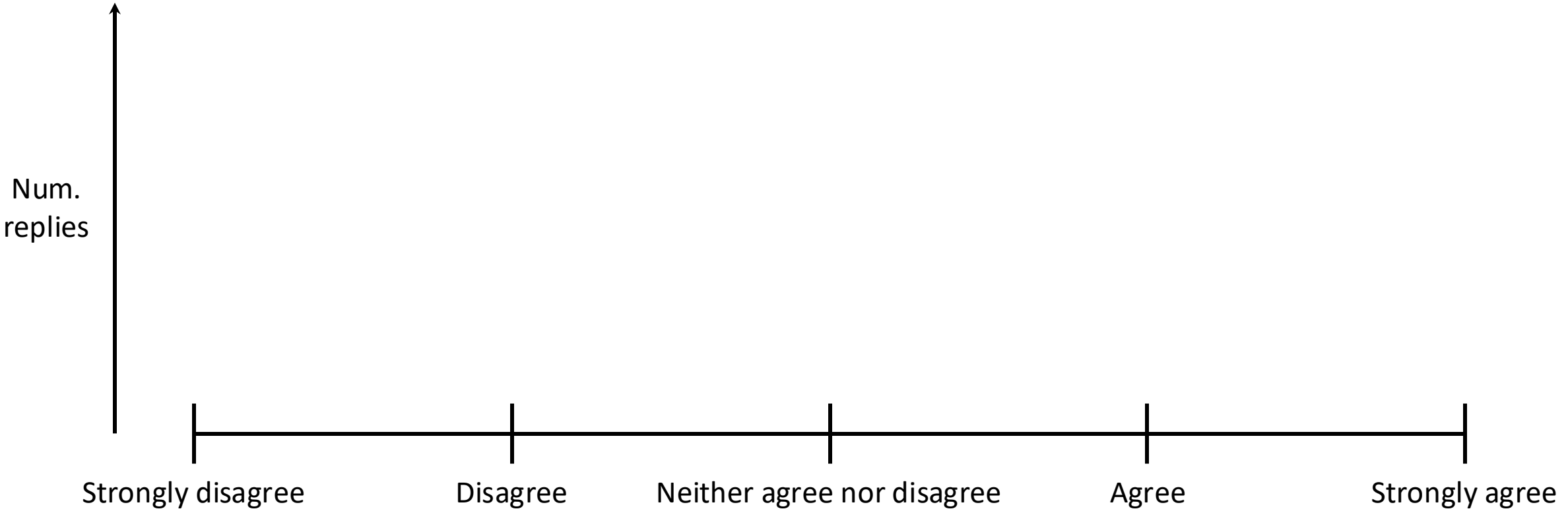
Likert scale: Agreement by users

«I am more productive when using GitHub Copilot»



Likert scale: Agreement between groups

«I generally feel productive when I code»



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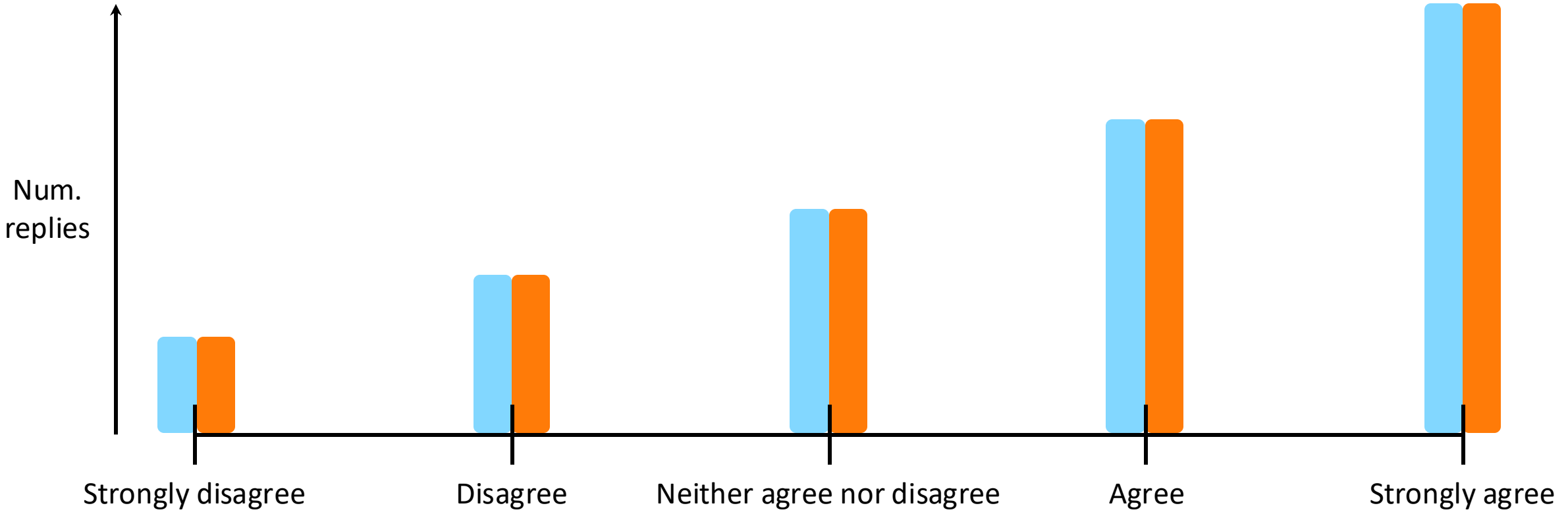

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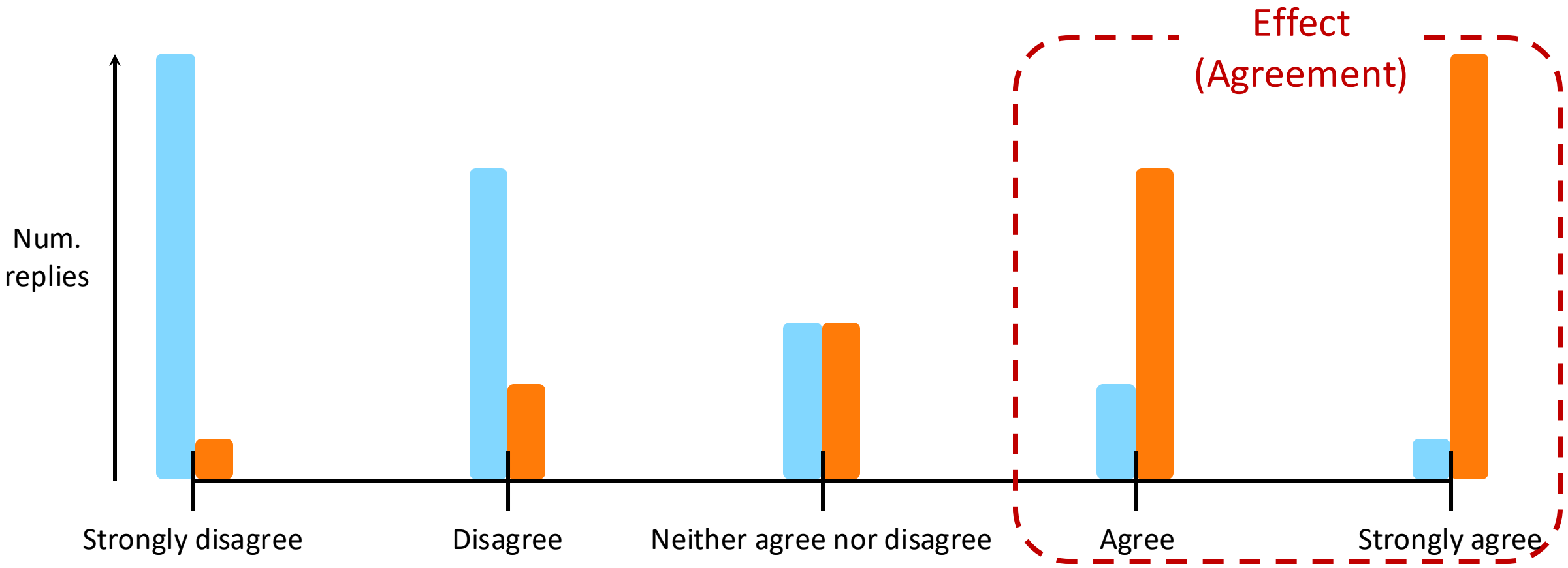
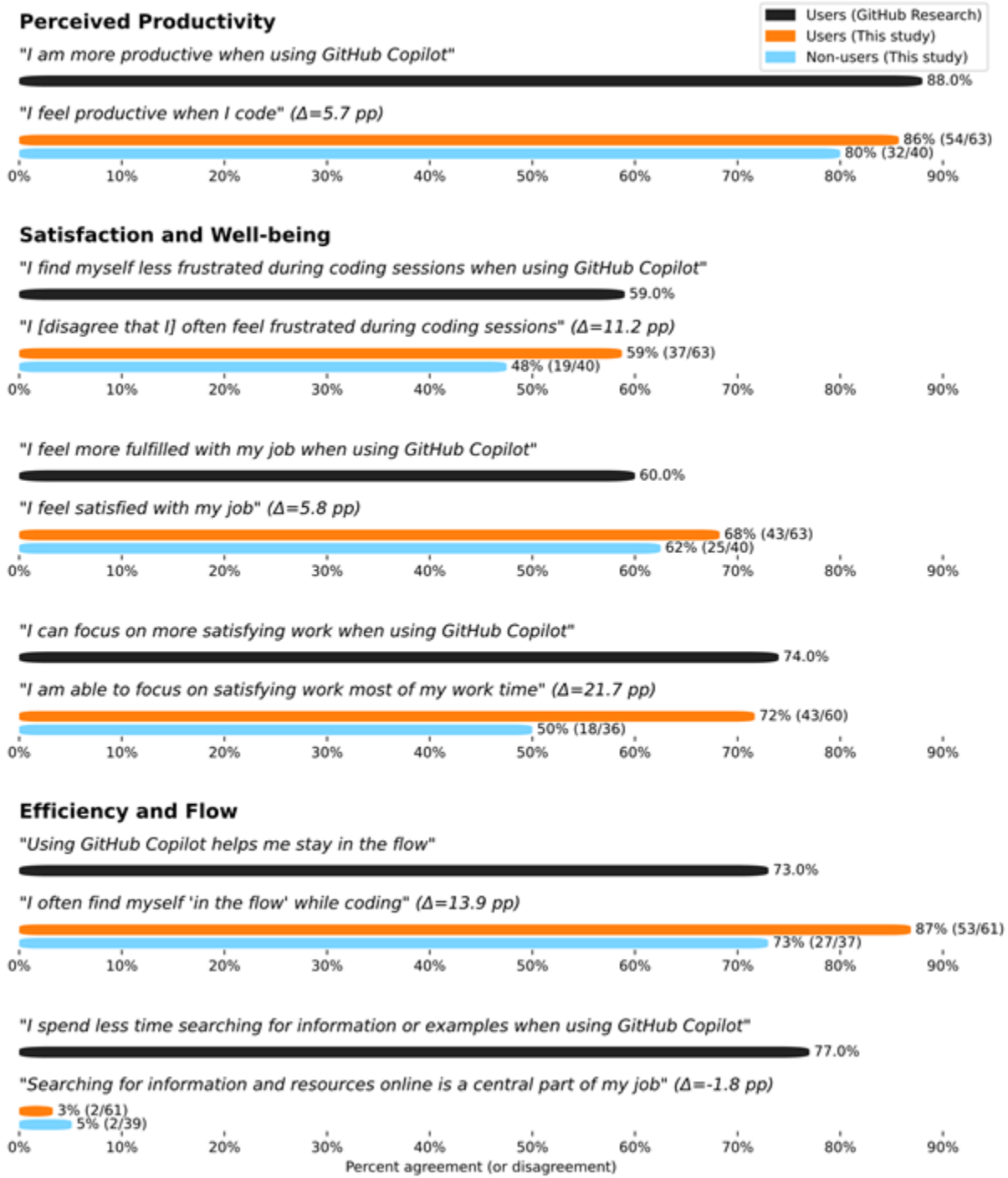
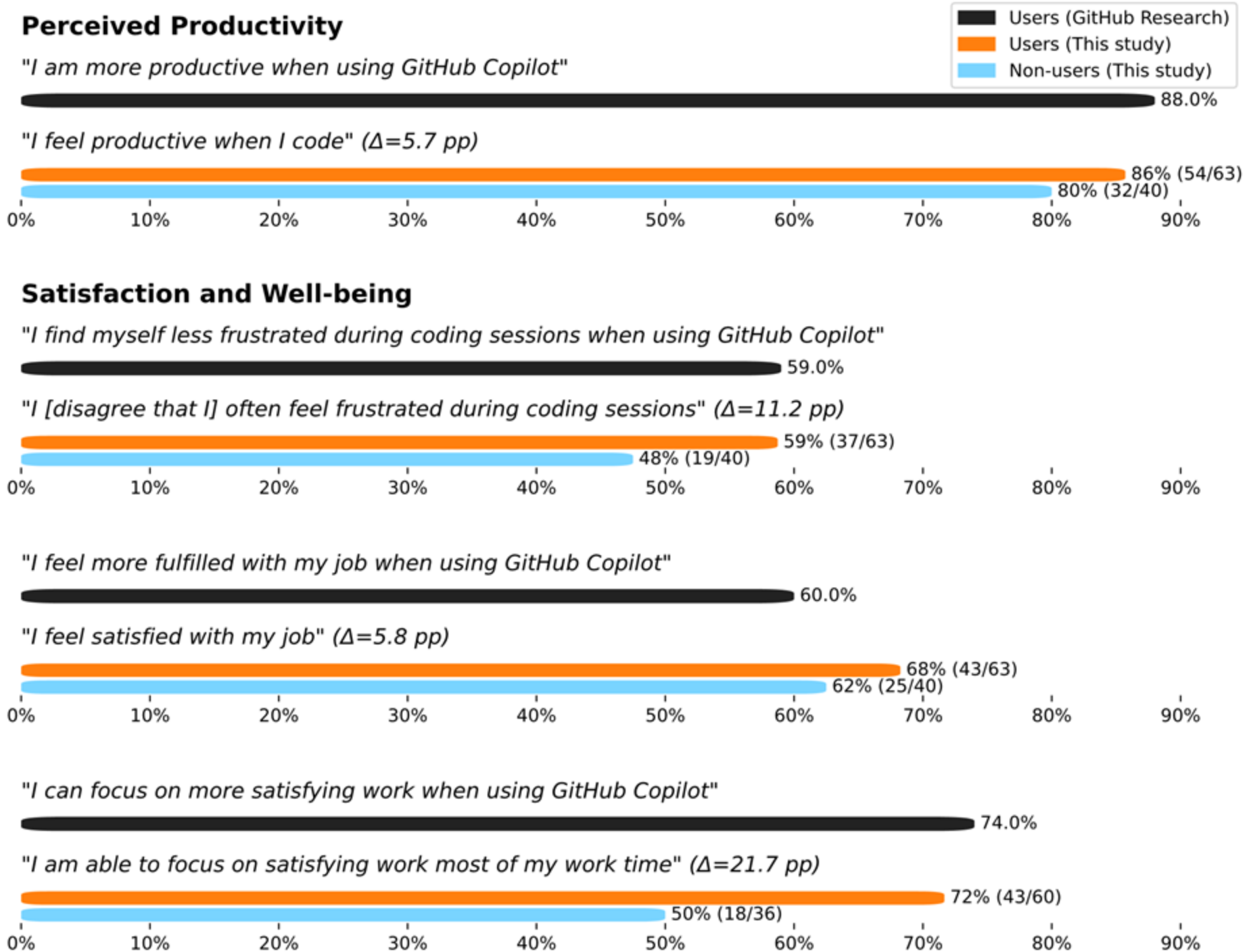



Perceived Productivity
Users (GitHub Research)
Users (This study)
Non-users (This study)
"I am more productive when using GitHub Copilot"
88.0%
"I feel productive when I code" (Δ=5.7 pp)
86% (54/63)
80% (32/40)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Satisfaction and Well-being
"I find myself less frustrated during coding sessions when using GitHub Copilot"
59.0%
"I [disagree that I] often feel frustrated during coding sessions" (Δ=11.2 pp)
59% (37/63)
48% (19/40)
"I feel more fulfilled with my job when using GitHub Copilot"
60.0%
"I feel satisfied with my job" (Δ=5.8 pp)
68% (43/63)
62% (25/40)
"I can focus on more satisfying work when using GitHub Copilot"
74.0%
"I am able to focus on satisfying work most of my work time" (Δ=21.7 pp)
72% (43/60)
50% (18/36)
Efficiency and Flow
"Using GitHub Copilot helps me stay in the flow"
73.0%
"I often find myself 'in the flow' while coding" (Δ=13.9 pp)
87% (53/61)
73% (27/37)
"I spend less time searching for information or examples when using GitHub Copilot"
77.0%
"Searching for information and resources online is a central part of my job" (Δ=-1.8 pp)
3% (2/61)
5% (2/39)
Percent agreement (or disagreement)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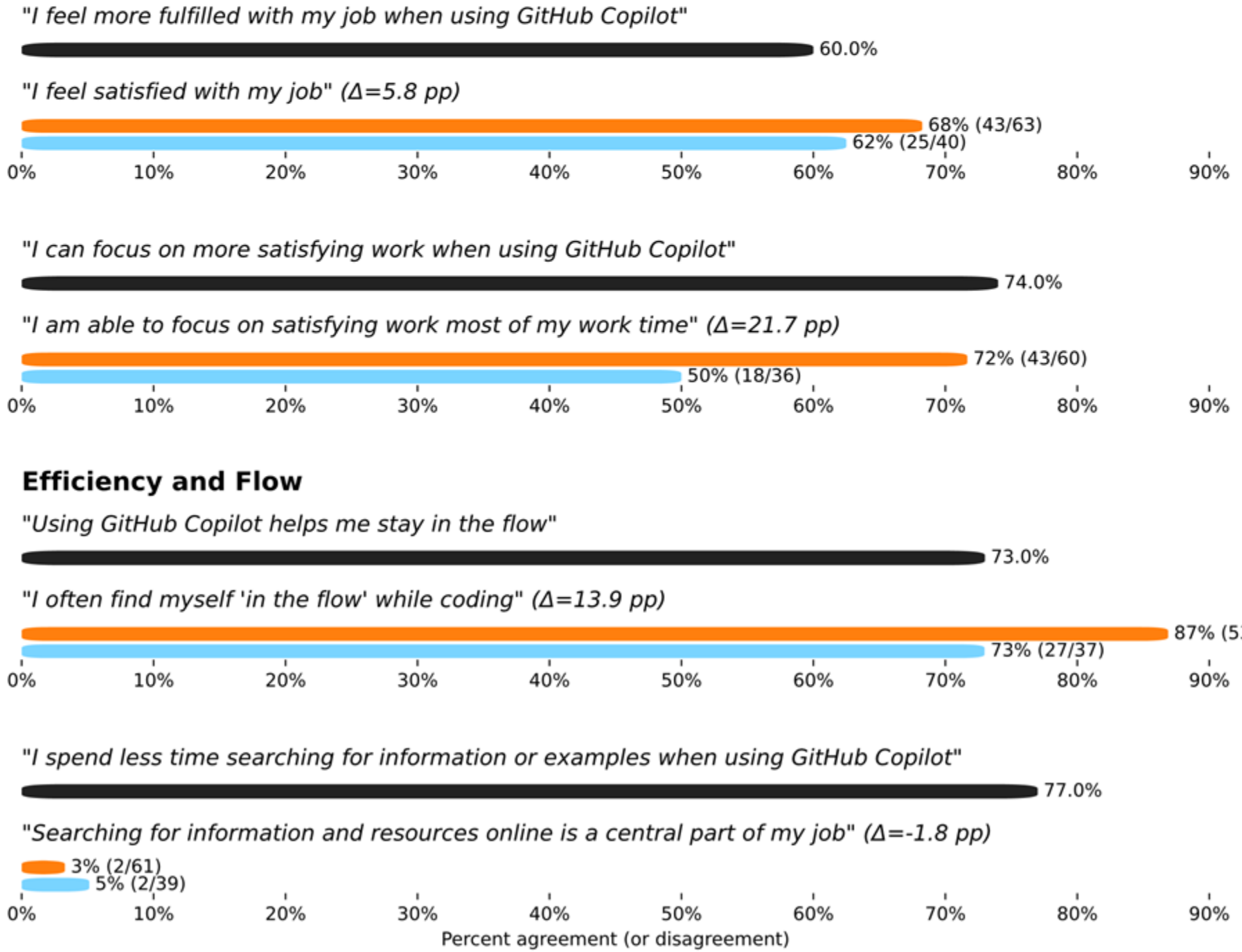
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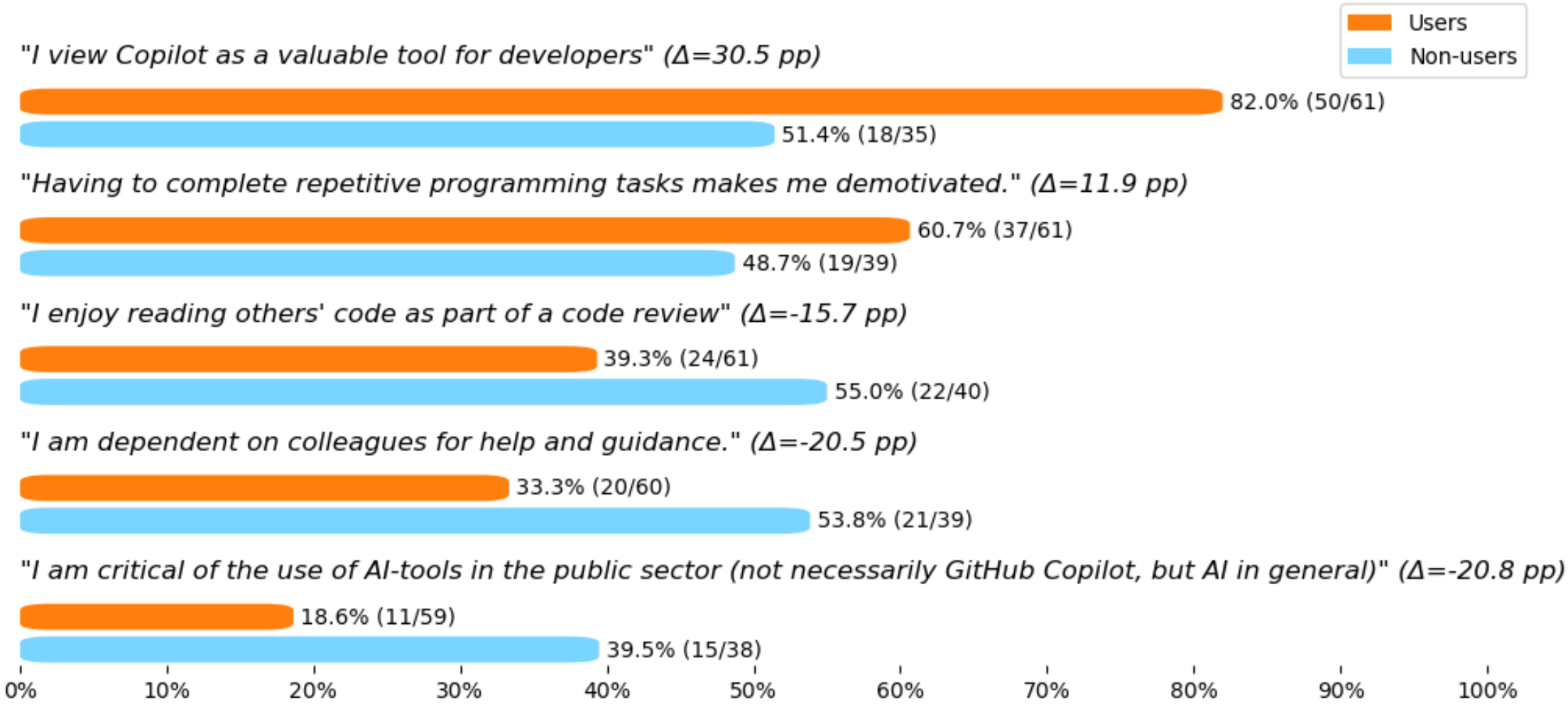
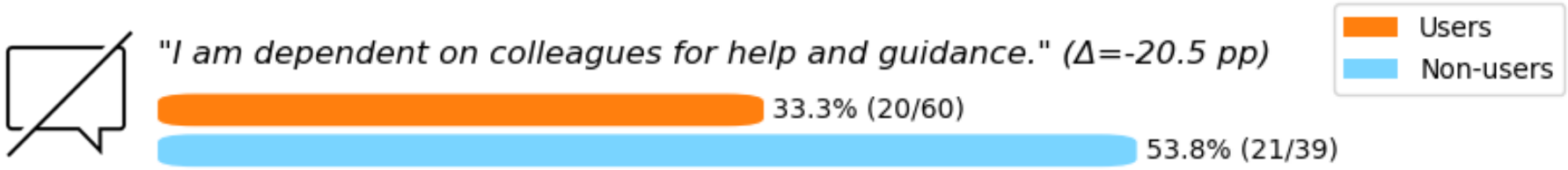
The greatest differences



Concern: GenAI might threaten collaboration



This summer, when I tried to work with one of my team members who likes to use AI, he was more interested in talking to the AI than to me. It was comical, but also very frustrating, because I felt that there was no point in us collaborating. Instead of asking me questions, he would ask ChatGPT.

Likert scale: Agreement vs. Change

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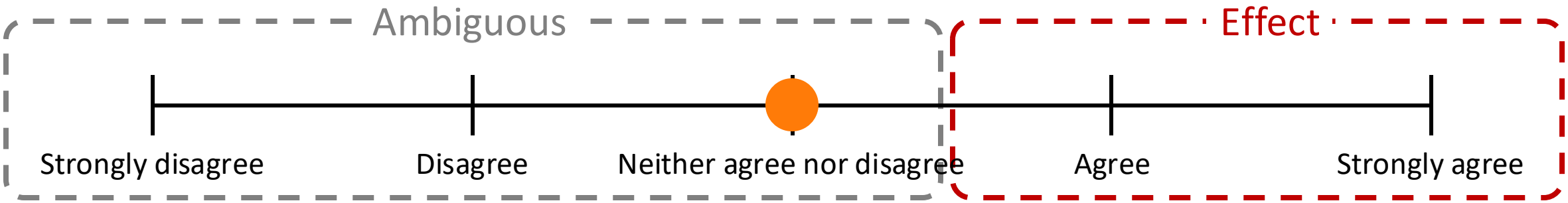

Likert scale: Agreement vs. Change

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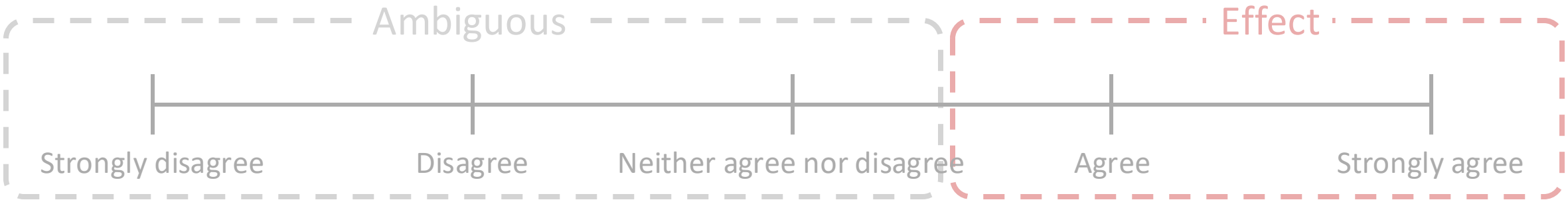
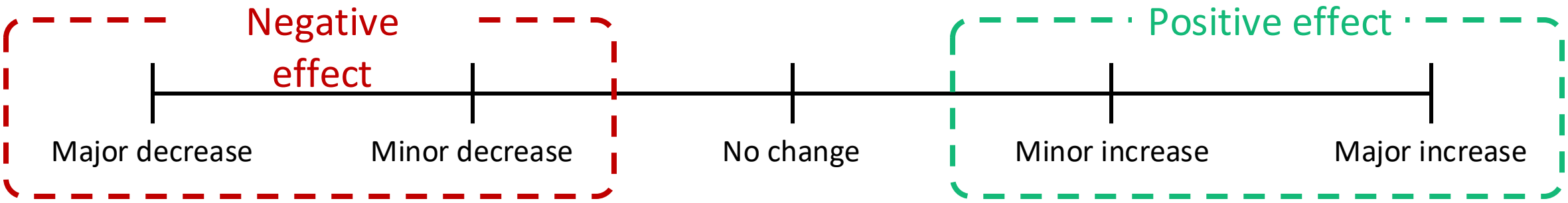
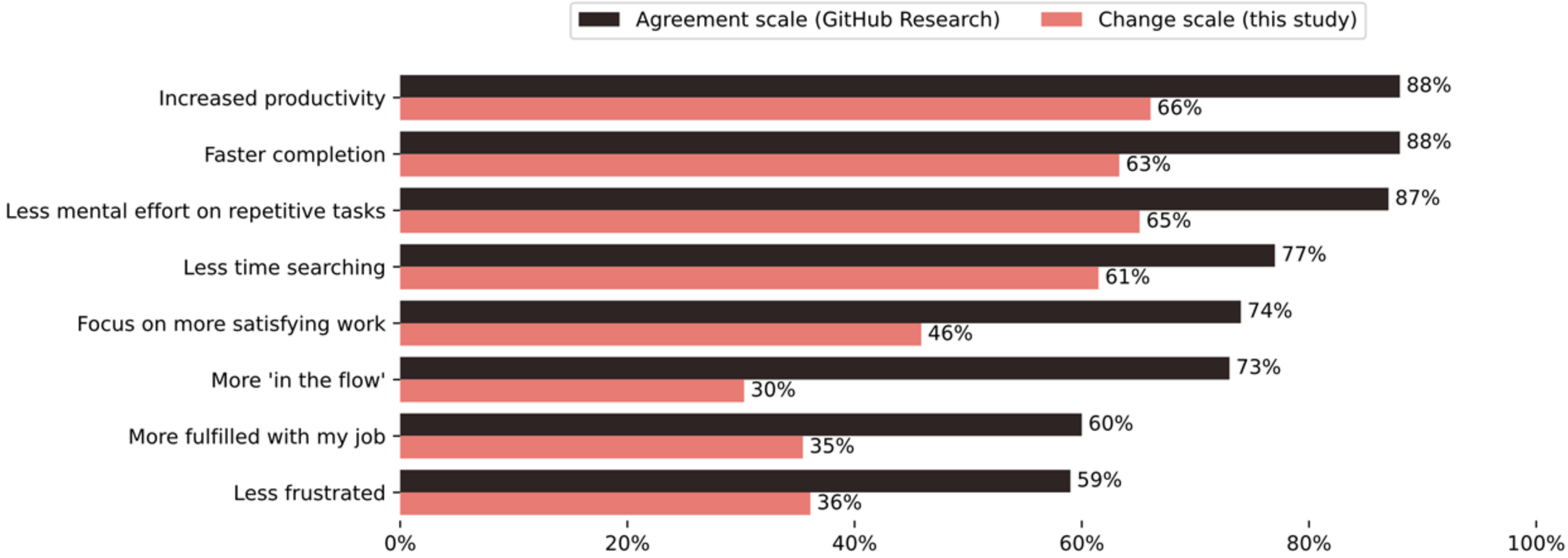


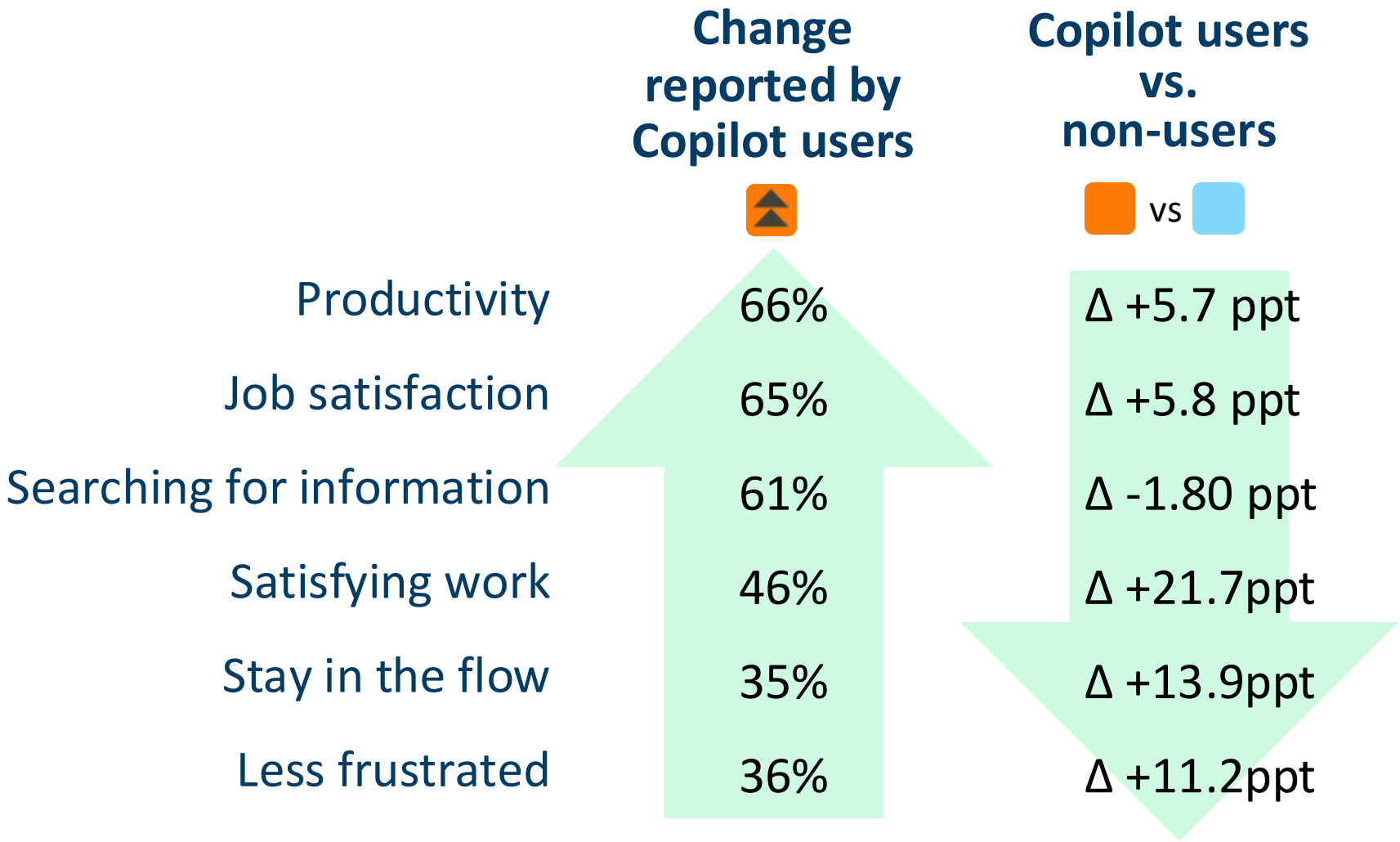
«How has GitHub Copilot changed your productivity?»



Agreement vs. Change scale



Now here's the kicker



Squaring the circle

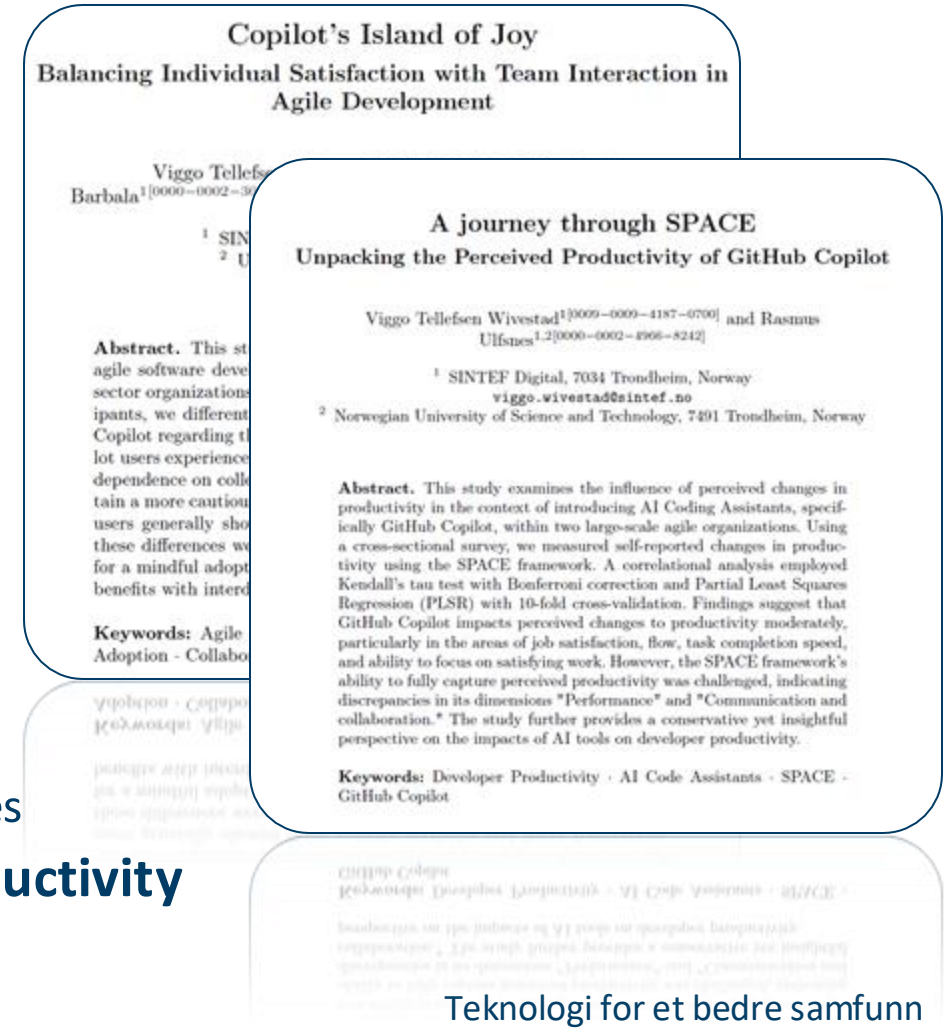
- Copilot-users *feel* **more productive**, **more in the flow**, and **less frustrated**
- But... this is not detectable when compared to non-users

+ Satisfying work
+ Stay in the flow
+ Less frustrated

+ Increased productivity
+ Less mental effort on repetitive tasks
+ Less time searching for information

Implications for Practice

- **Developers who adopt Copilot report**
  1. Increased productivity
  2. Faster completion
  3. Less mental effort on repetitive tasks
  4. Less time searching for information
- **Copilot-users stands out by being able to**
  1. Focus more on satisfying work
  2. Stay more in the flow
  3. Feel less frustrated when coding
- **Less dependent on colleagues**
  1. Advantage: Do not have to disturb colleagues
  2. Disadvantage: Leave (remote) people stranded as satellites
- **SPACE misaligned with developers' definitions of productivity**



Business as usual – just faster?

Productivity	Efficiency	Stay in the flow
Increase test coverage	Refactor/optimize old code	Migrate code

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