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Persuasive Performance Feedback: The Effect of Framing on Self-Efficacy

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Self-monitoring technology



Activity
Fitbit

Self-monitoring technology



Sleep
Zeo

Self-monitoring technology



Activity & Sleep
Lark

Self-monitoring technology



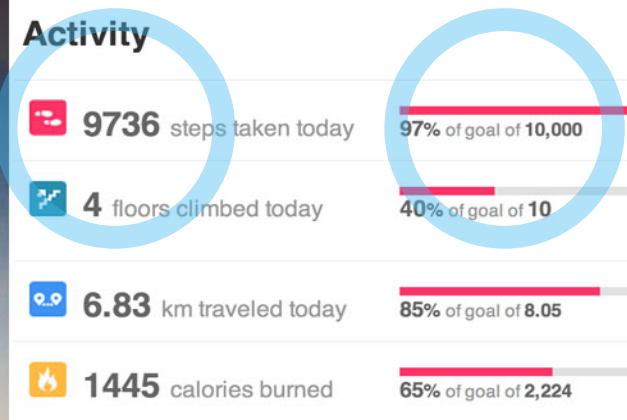
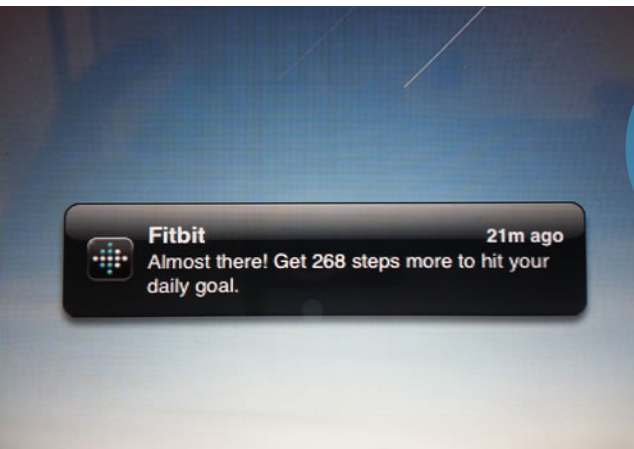
Activity & Sleep
BodyMedia

Self-monitoring technology



Feedback design is underexplored

Example—fitbit's step count



"Get 268 steps more to hit your daily goal"

Inspiration

Framing Effects [Tversky & Kahneman, 1981]

half empty?
half full?



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Odds of a grueling operation



"90 out of 100 patients are
alive after five years"

"10 out of 100 patients are
dead after five years"



[Marteau, 1989]

Power of positive valence framing



"90 out of 100 patients are
alive after five years"



"10 out of 100 patients are
dead after five years"



[Marteau, 1989]

Goal

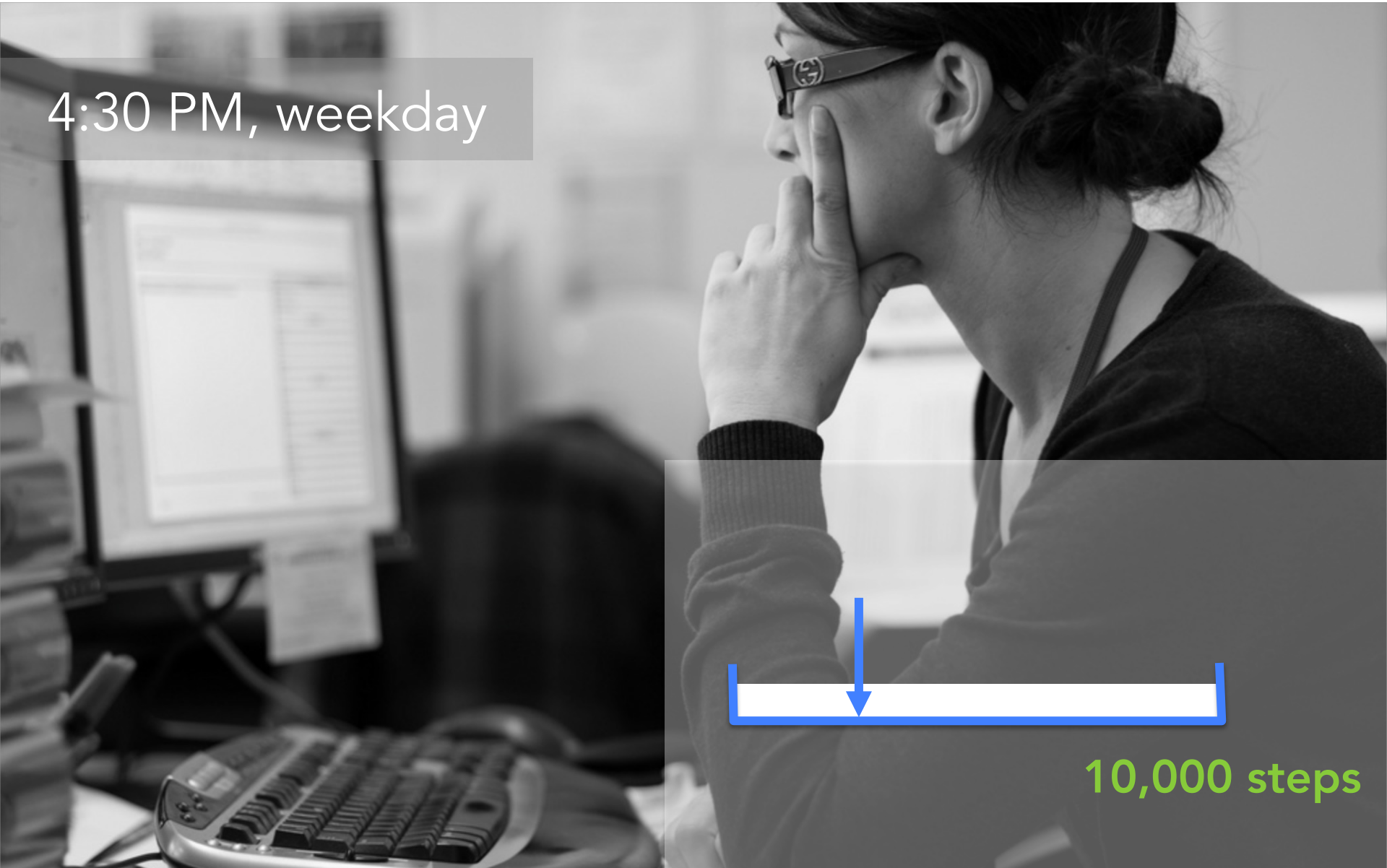
Persuasive performance feedback to **nudge** people toward **healthier behaviors**



[Thaler & Sunstein, Nudge, 2008]

Hypothetical scenario

4:30 PM, weekday



10,000 steps

Achieved steps

I've walked
2,500 steps!

2,500 steps

10,000 steps



Remaining steps

7,500 more
steps to take!

7,500 steps

10,000 steps

Three types of framing

Valence of Performance

Presentation Type

Data Unit

Three types of framing

Valence of Performance

achieved vs. remaining

2,500 steps achieved

7,500 steps remaining

Three types of framing

Valence of Performance

Presentation Type

text-only vs. text with visual

2,500 steps achieved



2500 steps **achieved**

Three types of framing

Valence of Performance

Presentation Type

Data Unit

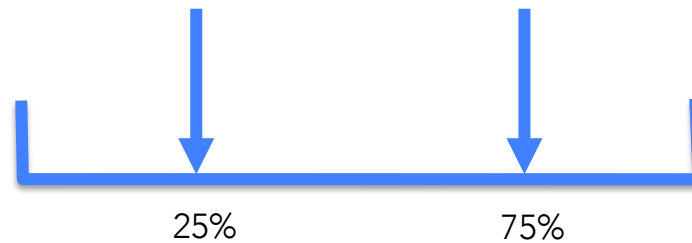
raw vs. percentage

2,500 steps achieved

25% achieved

Distance to the goal

Low achievement vs. High achievement



Feedback manipulation

Between-subjects Factors (2x2x2)

Valence	Presentation	Data Unit
Achieved	Text-only	Raw
		Percentage
	Text with visual	Raw
		Percentage
Remaining	Text-only	Raw
		Percentage
	Text with visual	Raw
		Percentage

Within-subjects Factor (x2)

Distance to the goal		
	Low achievement (25%)	High achievement (75%)
Condition 1	2,500 steps achieved	7,500 steps achieved
Condition 2	25% achieved	75% achieved
Condition 3	 2500 steps achieved	 7500 steps achieved
Condition 4	 25% achieved	 75% achieved
Condition 5	7,500 steps remaining	2,500 steps remaining
Condition 6	75% remaining	25% remaining
Condition 7	 7500 steps remaining	 2500 steps remaining
Condition 8	 75% remaining	 25% remaining

Dependent measures

Self-efficacy (per feedback) [Bandura, 1990]

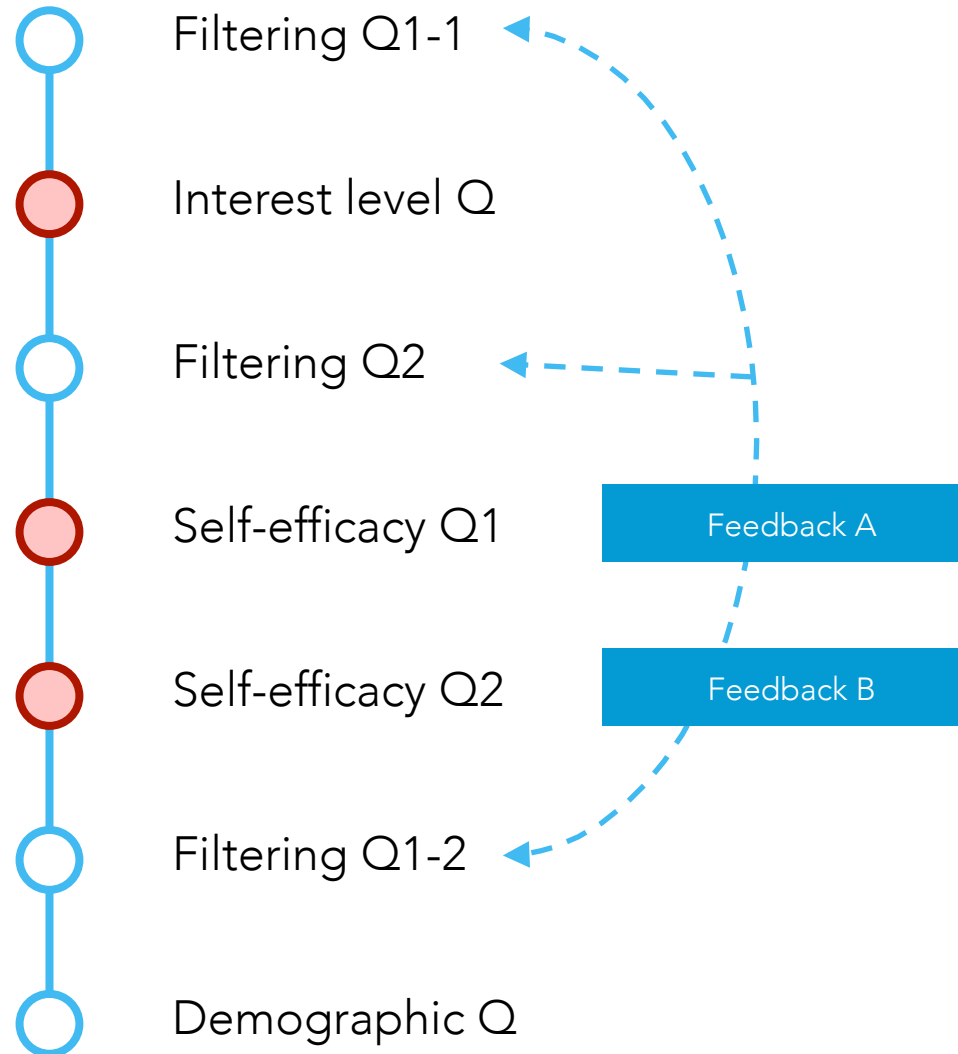
Rate how confident you are that you can achieve your daily goal as of now (**4:30 PM, weekday**).

0 = Certain I cannot meet my goal
10 = Certain I can meet my goal

Interest level in taking 10,000 steps every day (per subject)

0 = Not at all interested
10 = Very interested

Study procedure



Results

Participants (N = 400)

Convenience sampling (N = 511)

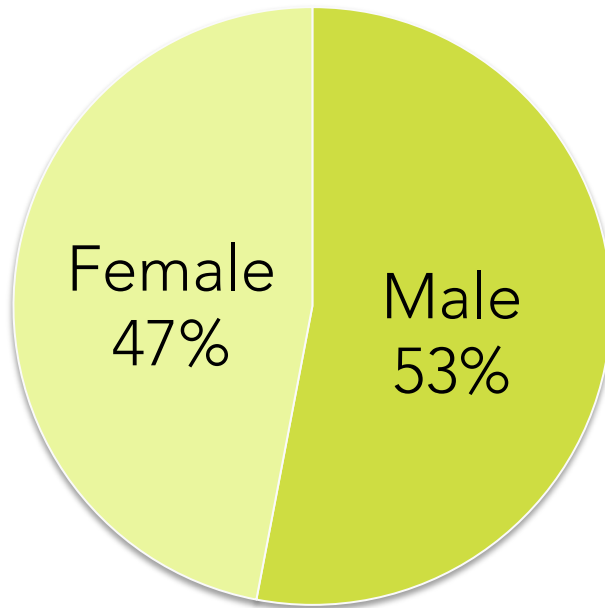
- Recruited from researchers' social network (e.g., post on facebook, email)
- Skewed toward highly educated, motivated, technical population

Removed 111 participants

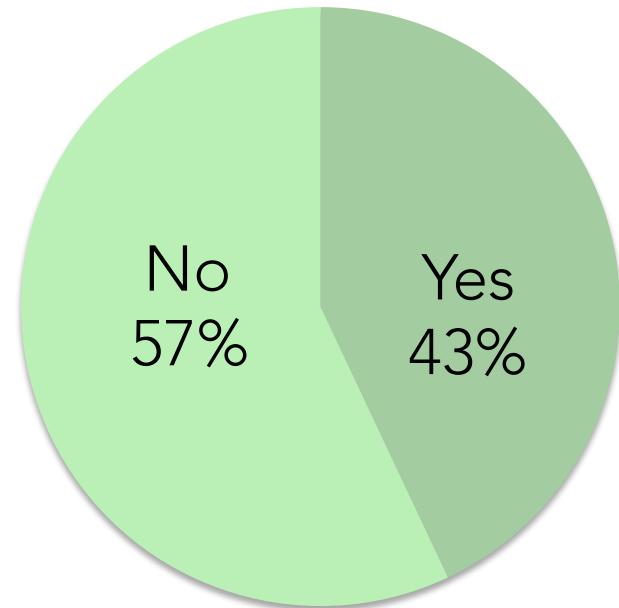
- Did not understand the feedback correctly (70 participants)
- Outside of U.S. (25 participants)
- Did not pay attention to the survey (9 participants)
- iPhone/iPad user (7 participants)

Participants (N = 400)

Gender Ratio

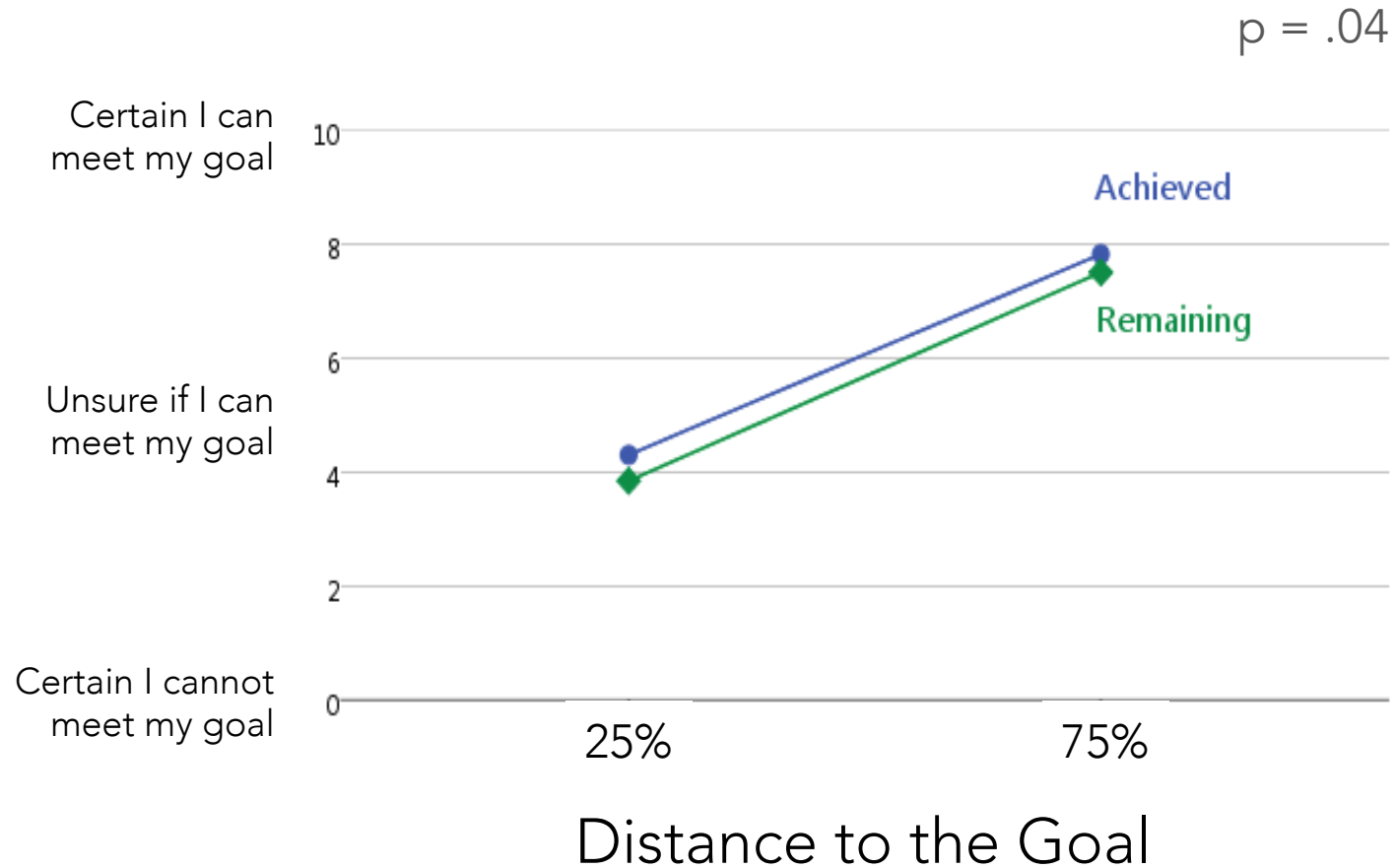


Pedometer Use



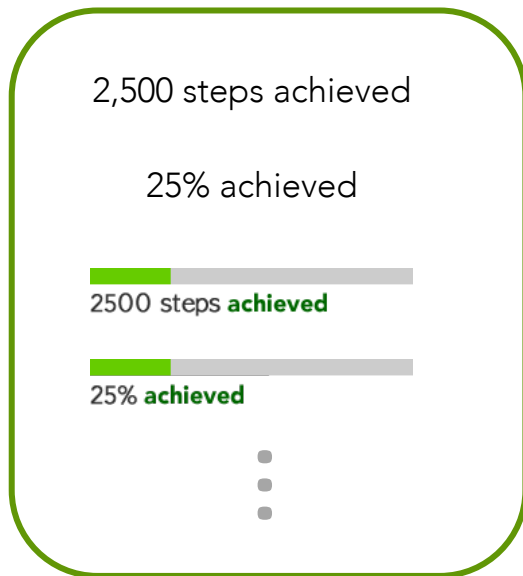
Participants' ages ranged from 19 to 68 (M = 32.7)

Main effect of valence framing

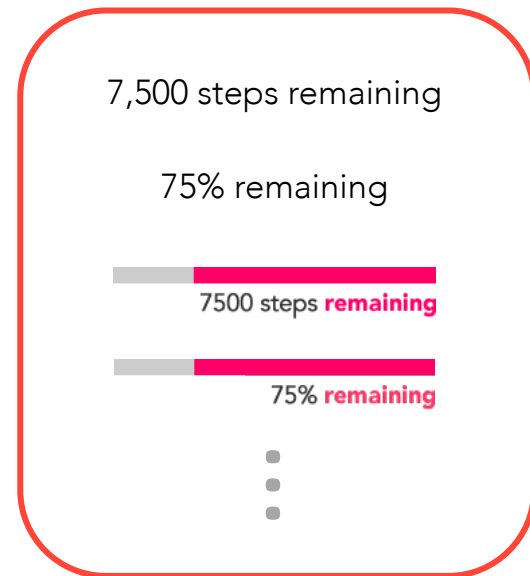


Main effect of valence framing

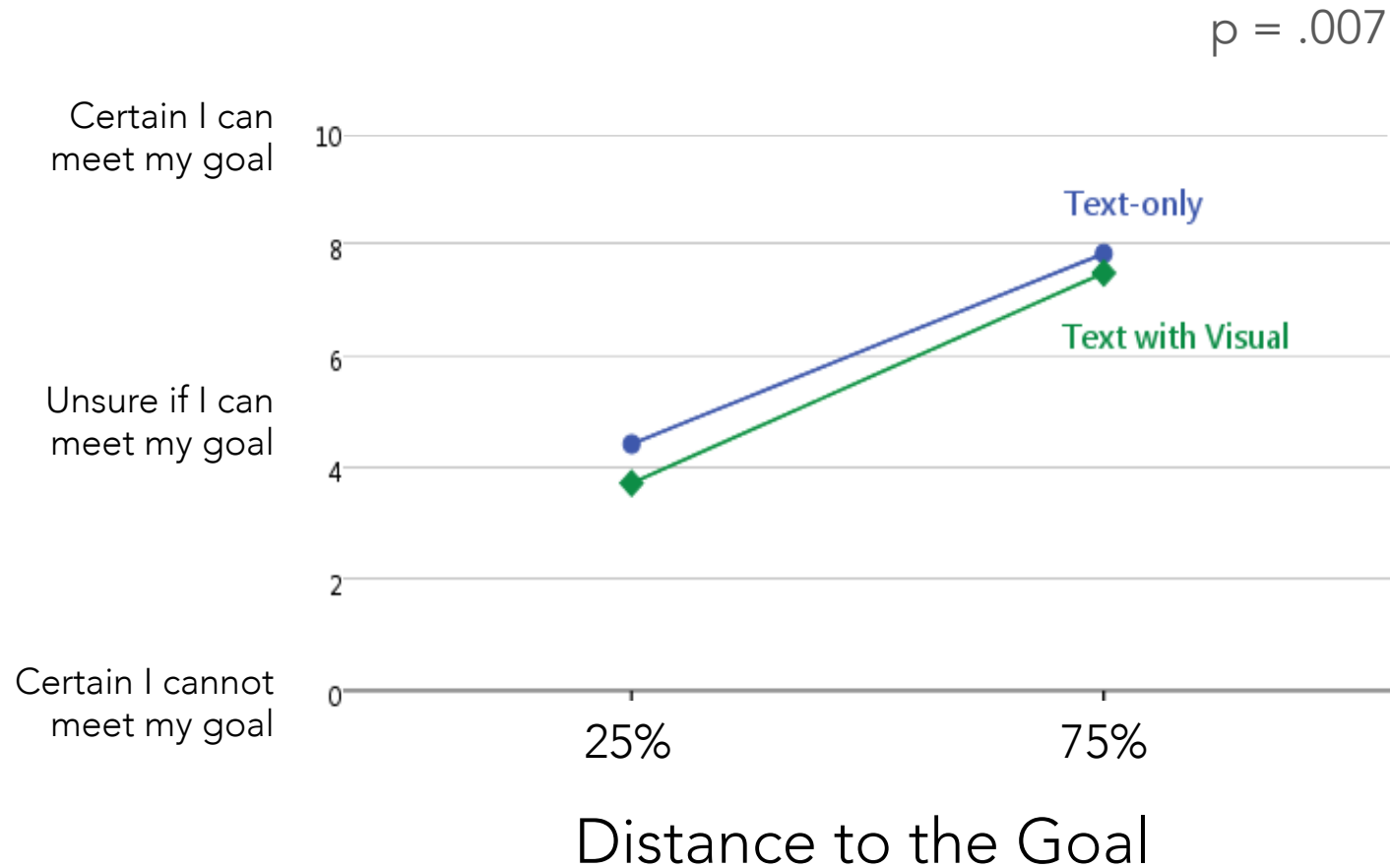
Achieved framing



Remaining framing



Main effect of presentation type



Main effect of presentation type

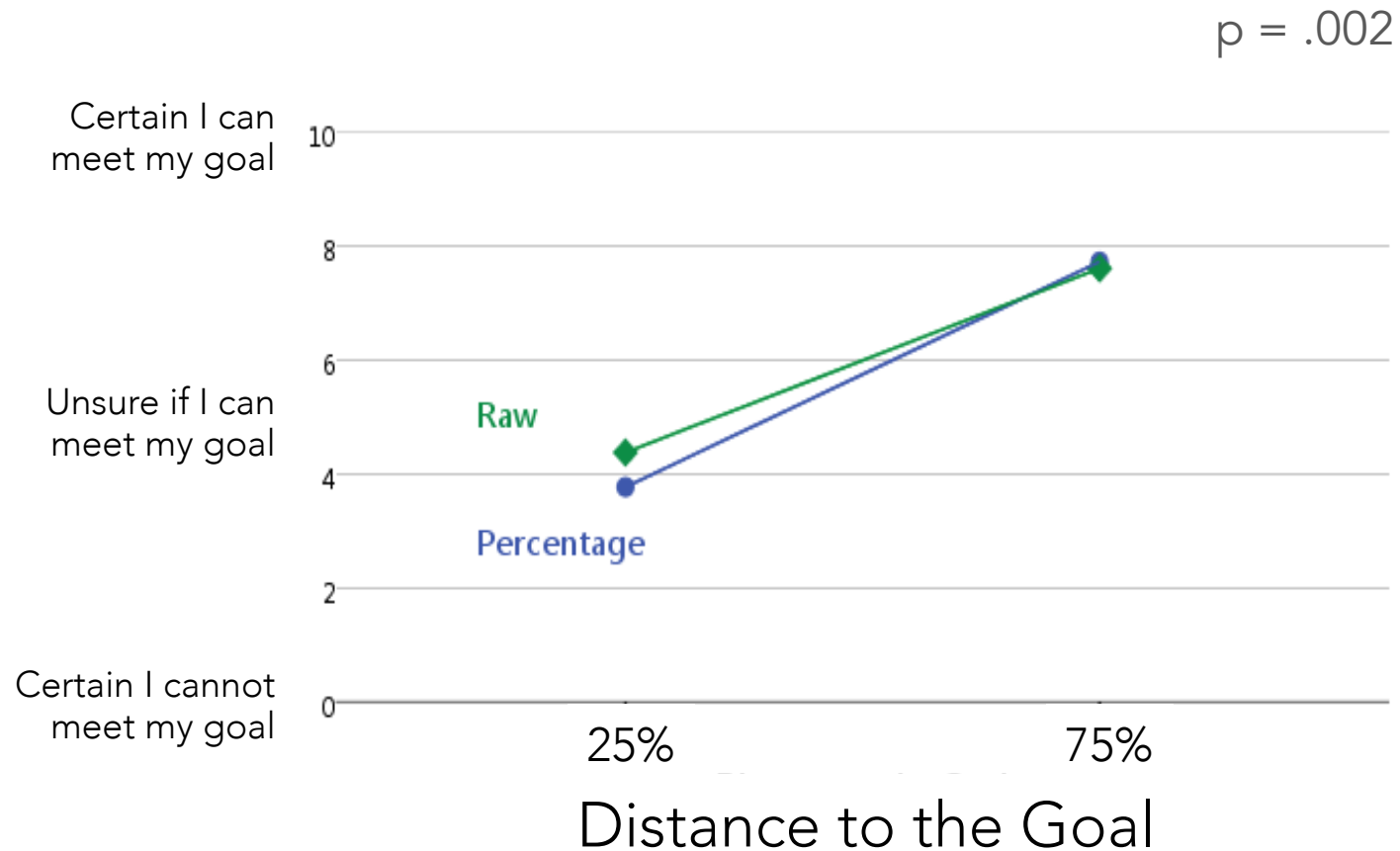
Text-only



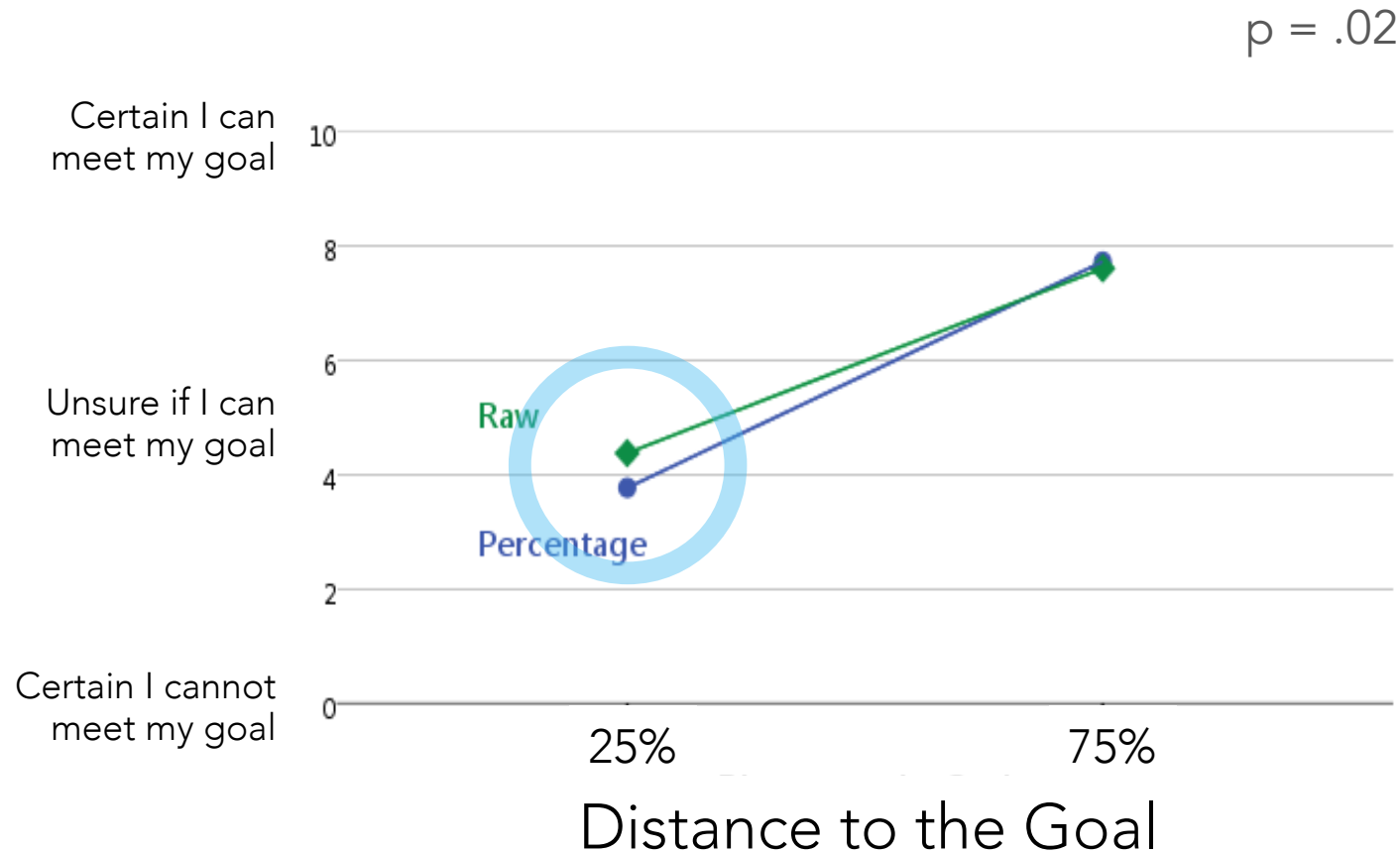
Text with visual



Interaction effect: Data Unit x Distance to the goal



Interaction effect: Data Unit x Distance to the goal



Interaction effect: Data Unit x Distance to the goal



This effect was **not** observed for the distance to the goal at 75% level

Discussion

Discussion

Give feeling of bigger achievement for higher self-efficacy

- Highlight what people achieved

- Data unit can contribute to this

High-interest sampling bias supports our findings further

- Less likely to observe framing effects in intrinsically motivated people

Future Work

Embedding persuasive performance feedback in real-world situations and testing through deployment studies

Testing at more extreme cases toward the both ends of the goal (e.g., 5%, 95%)

Using judgmental / exaggerated visuals for stronger framing effect



Contributions

Feedback design matters—context dependent
Leverage framing effect

Empirical guidance to create **influential, persuasive feedback**

Many application domains

- Health communication campaign

- Self-monitoring technology interface design

- Privacy...

Thank you!

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