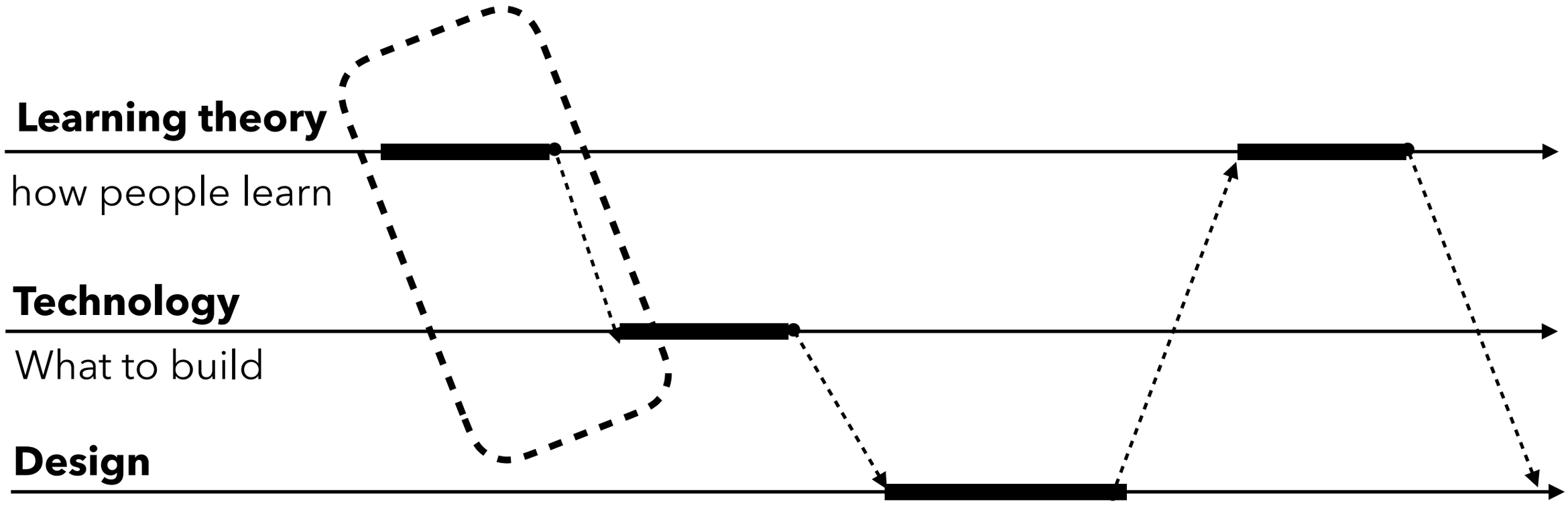
Today



"There is nothing more practical than a good theory" - Kurt Lewin

First, reflections on HW

- **Pankaj**: Assistments supports only single path solutions.
  Roger: Assistments simplifies students' knowledge to either right or wrong, unless alternate answers are cleverly picked so as to elicit common misconceptions.
  Anne: The rule-based approach is biased towards processes with standard formulas and procedures. The computer can only provide as much scaffolding as the teacher/content developer had anticipated in advance.

Reflections cont’d

- **Yeyu Wang**: The student’s social network is neglected, although it is a quite important part of student’s learning. Other learning systems like Piazza are more focusing on the student’s interaction with peers.

Reflections cont'd

- **Lauren**: My experience working with technology development in education has always been that working with students tends to be more passive and observational, because of their age and legal restrictions, whereas working with teachers allows for the stakeholder to play a more active role.
…If we were to try to repeat this, it may not be as successful because the focus may be on a less integrated aspect of education.

Assignment 2: video

- Create an 8-min ish video explaining how an everyday object works.
- Decide what relevant prior knowledge you assume
- Create original content, but feel free to use clips (less than 25% of your video)
- Create script, then capture video (Captivate/Powerpoint)
- Test video with two people
- Include a spot for a quiz (quiz will be added in future assignment)

Feedback

- **Operational definition for this section:** actions taken by an external agent to provide information regarding some aspect of one's task performance

“You should come to class sooner”

“You should come to class early”

“I am proud of you”

“Do you feel you did well on the test?”

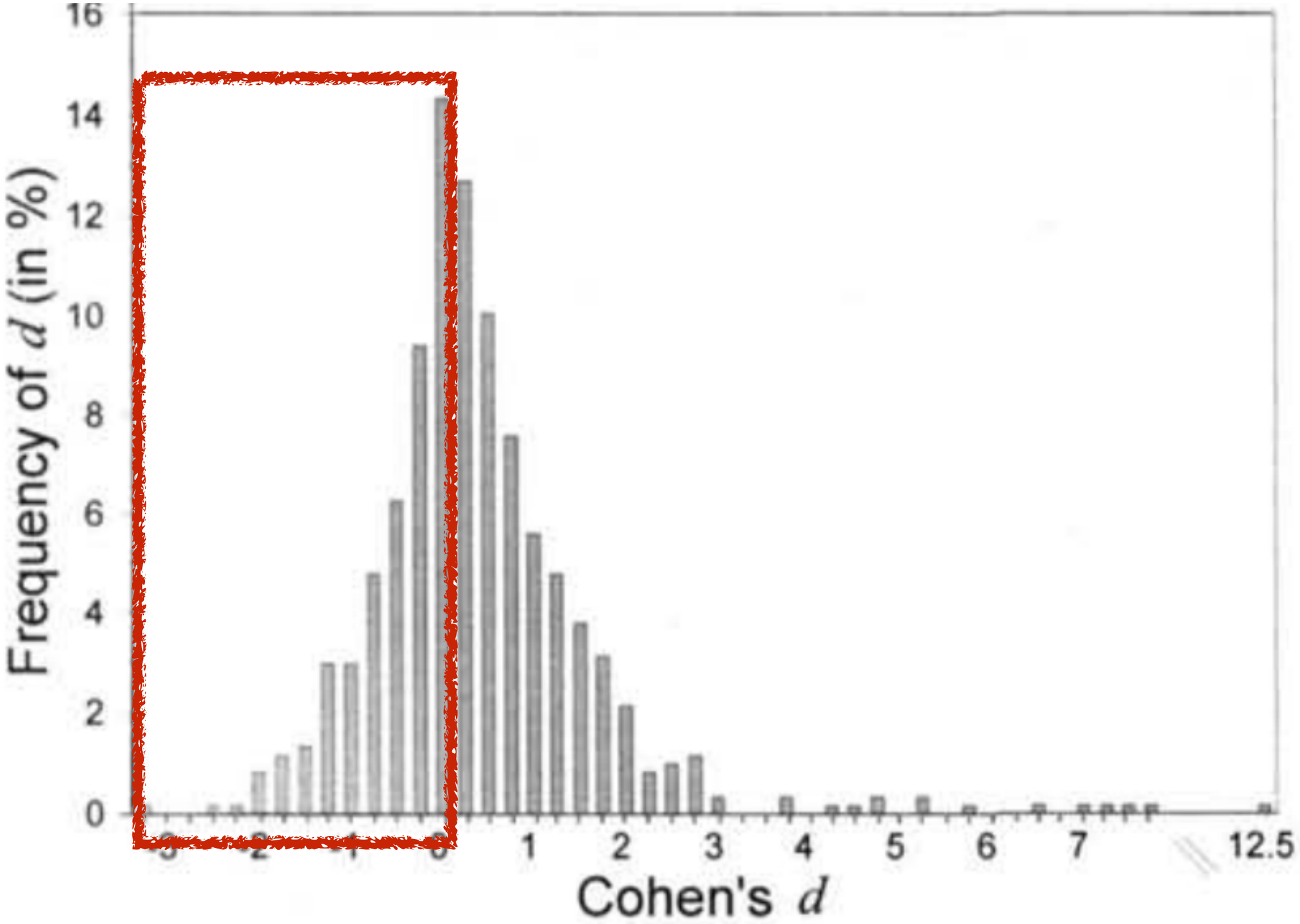
“Most people fail on their first try”

Is feedback necessary for learning?

Feedback

The sure-fire way to improve learning
(66% of the time)

Feedback doesn't always improve learning



What doesn’t work?

- Discouragement
- Feedback on some physical tasks
- Praise (sometimes, more on this in a bit)

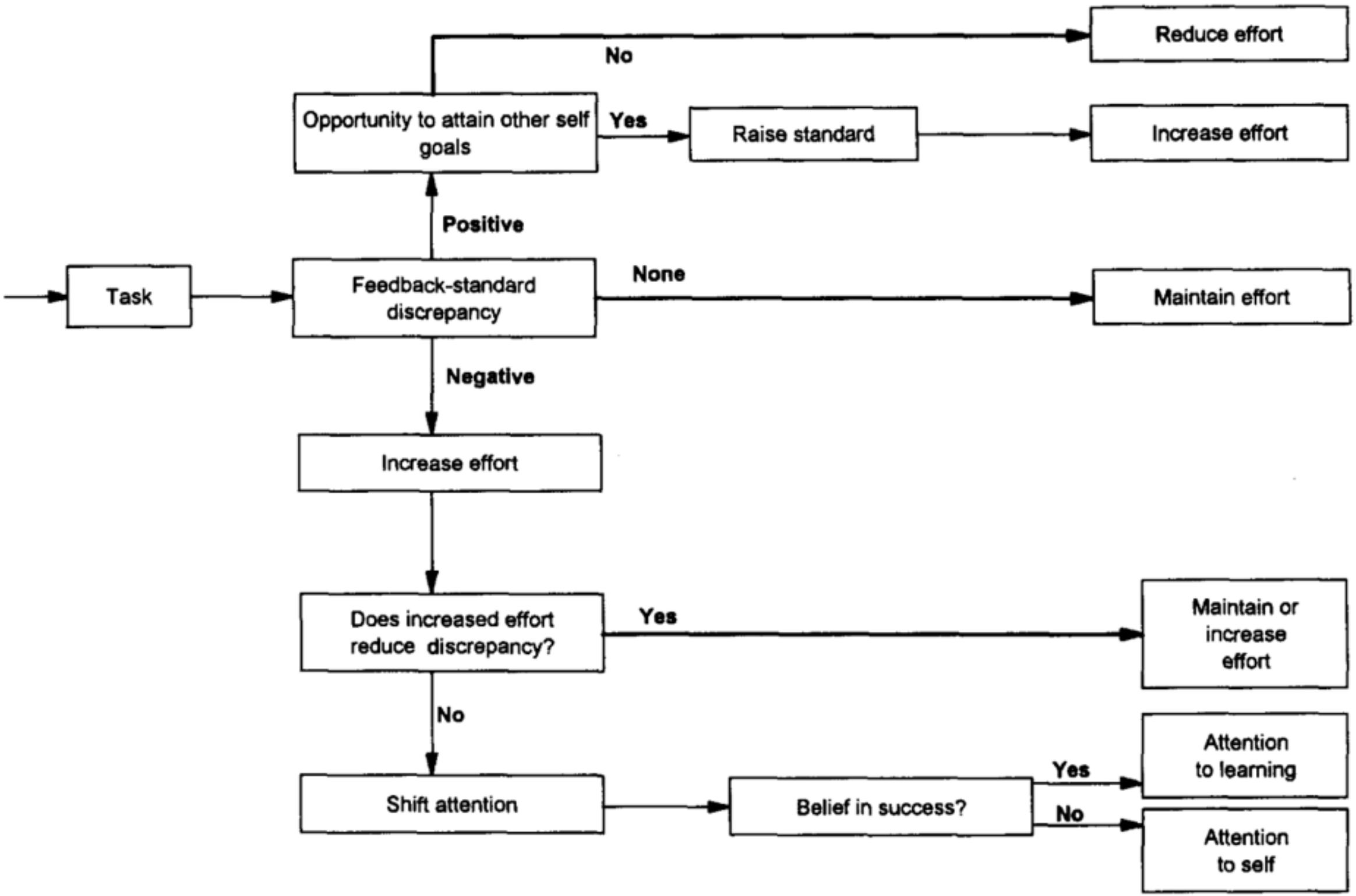
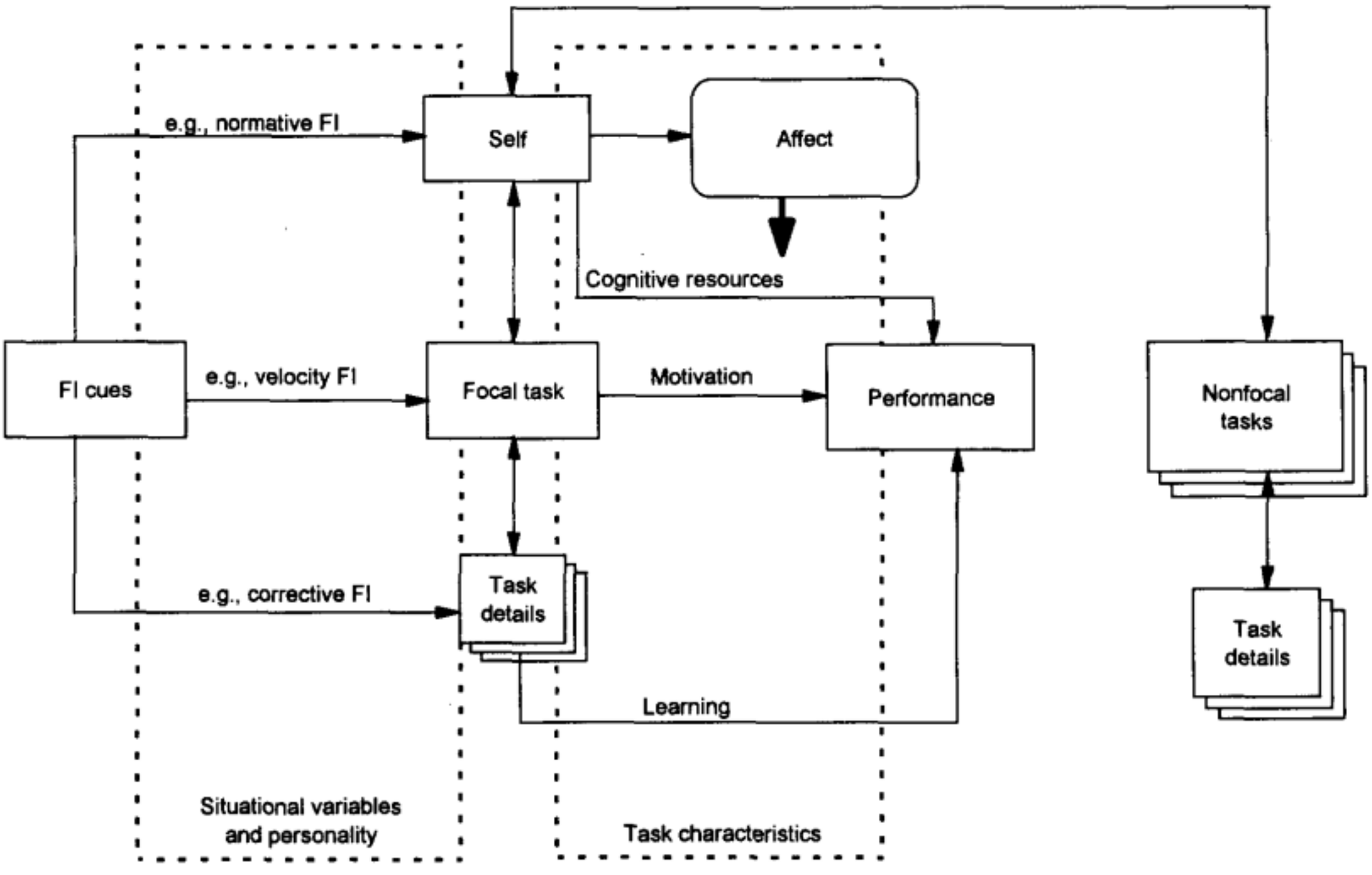


Figure 2. The effects of feedback intervention (FI)-induced attention on task-motivation processes and their consequences for performance. (Simple cybernetic processes are marked with wide arrows; putative FI-performance effects are illustrated by the boxes at the right-hand side of the figure.)

Everything together



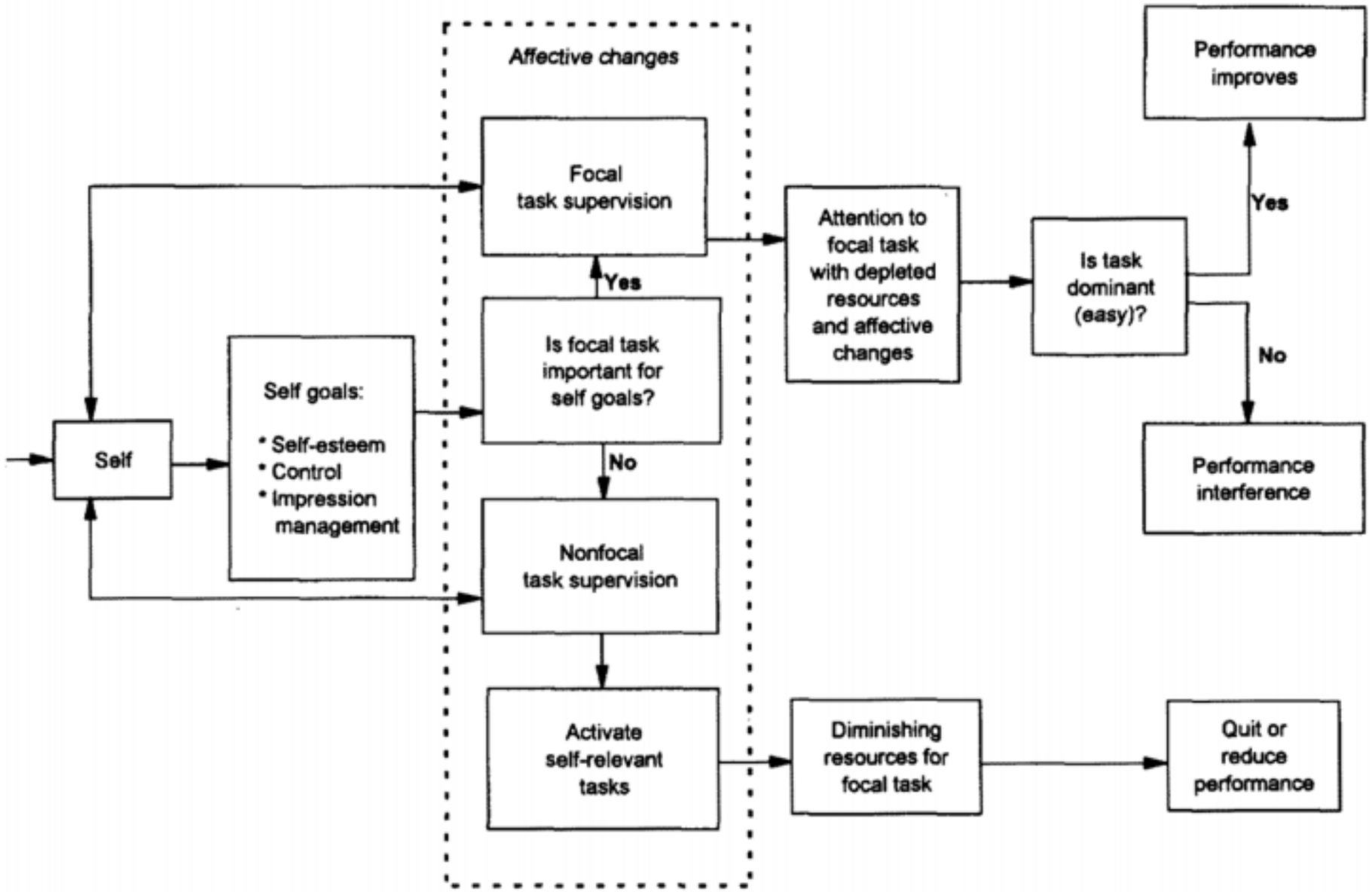


Figure 4. The effects of feedback intervention (FI)-induced attention on meta-task processes and their consequences for performance. (Putative FI-performance effects are illustrated by the boxes at the right-hand side of the figure.)

What's most effective?

Table 1
FI Moderators: Descriptive Statistics, Correlations with d values, and Intercorrelations (Before Exclusions)

Moderator	*K*	*M*	*SD*	*d*	*d'*	*d''*	*d'''*	1	2	3	4	5	6	7	8	9	10	11
1. FI sign	596	3.73	1.31	*24**	*09*	*−01*	−01	(82)										
2. Correct–incorrect	596	0.59	0.48	*−13**	*−03*	*−02*	01	−25	(91)									
3. Correct solution (P2)	596	0.25	0.42	**23***	**19***	**18***	**19***	10	35	(87)								
4. Attainment level (P4)	596	0.30	0.44	07	−01	08	02	13	−27	−10	(85)							
5. Velocity (P2)	596	0.13	0.33	**18***	**15***	**23***	**14***	11	−21	−06	45	(89)						
6. Normative information (P1)	596	0.13	0.32	02	−04	−01	−04	23	−37	−20	12	02	(78)					
7. Norms (P1)	596	0.08	0.26	02	−02	−04	−05	03	−26	−06	19	12	34	(79)				
8. Discouraging FI (P1)	596	0.25	0.42	**−31***	**−16***	**−21***	**−20***	−71	18	−34	−25	−22	−08	−11	(92)			
9. Praise (P1)	596	0.16	0.36	−03	−09	−18*	**−17***	62	−28	−24	−06	02	34	08	−10	(94)		
10. Verbal FI (P1)	596	0.56	0.48	−13*	−02	−12*	**−12***	−12	−01	−27	−27	−15	05	03	42	18	(89)	
11. Written FI (P2)	596	0.24	0.41	09	02	07	06	07	−06	19	30	13	10	04	−17	00	−47	(84)
12. Graphical FI (P2)	596	0.12	0.32	*11**	*07*	*04*	−08	07	−08	06	18	26	−06	02	−17	−08	−20	−06
13. Computer FI (P2)	596	0.18	0.37	*09*	*04*	*12**	12	06	16	24	−01	06	−13	−12	−28	−20	−53	−13
14. Public FI (P1)	596	0.11	0.30	*20**	*17**	*17**	06	11	−30	−03	34	55	08	16	−21	−04	−06	−07
15. Group FI (P2)	596	0.06	0.22	*14**	*13**	*17**	−02	11	−20	−07	31	45	11	02	−12	04	−03	12
16. FI frequency	548	3.83	2.75	−07	07	13*	**15***	−29	42	18	−24	−11	−37	−24	23	−26	−07	−09
17. Task novelty (P3)	597	3.67	1.52	00	01	03	02	00	21	04	−17	−16	−04	−07	09	05	18	−19
18. Task complexity (P3)	597	3.07	1.03	−01	−08	−08	−11	08	−11	01	02	06	−06	−03	−08	08	13	−08
19. Time constraint (P3)	596	0.55	0.48	*−11**	*00*	*03*	08	−27	00	−13	10	01	03	09	28	−13	06	−06
20. Time duration (P3)	444	−0.30	3.08	*21**	*12*	*20**	04	25	−25	18	29	43	13	−02	−39	00	−21	19
21. Creativity (P3)	597	1.59	0.86	*14**	*15**	*09*	07	13	−27	−20	12	02	18	01	−04	14	22	−05
22. Quantity–quality	464	1.36	0.76	08	12	07	04	−15	19	23	−17	−18	−23	−22	16	−13	−02	17
23. Performance rating	597	0.10	0.29	*17**	*15**	*15**	03	12	−25	−05	23	26	04	−01	−17	−04	00	02
24. Transfer measure	597	0.23	0.41	*−27**	*−08*	*−05*	−04	−40	25	−29	−34	−18	06	−14	62	04	39	−27
25. Latency measure	597	0.11	0.30	−01	−01	07	09	−07	06	07	−11	−02	−10	−07	01	−08	−15	−23
26. Physical task	597	0.12	0.32	**−16***	**−23***	**−29***	**−28***	04	−25	−22	09	−02	−08	12	11	24	07	−02
27. Reaction time	597	0.04	0.20	01	−01	02	04	04	−05	−01	05	22	−09	00	−11	−07	−14	−09
28. Memory task	597	0.20	0.38	04	16*	10	**14***	−13	14	15	−24	−13	−03	−04	12	−02	06	−06
29. Knowledge task	597	0.46	0.48	02	05	03	08	−05	17	11	−01	−19	−08	−16	−02	−17	−01	20
30. Following rules	597	0.23	0.41	01	−07	−07	**−16***	03	−11	06	01	24	07	07	−04	16	00	09
31. Vigilance task	597	0.19	0.37	−08	01	08	11	−16	15	−05	−14	−03	−06	02	20	−07	05	−06
32. Goal setting (P4)	552	0.08	0.27	*11**	*08*	*16**	11	08	−24	−12	28	36	03	08	−15	06	−13	25
33. Threat: Self-esteem (P1)	597	2.88	1.26	−08	−10	−09	**−14***	−23	−08	−09	11	06	00	−03	19	−16	02	12
34. Rewards–punishments	597	2.12	1.33	*12**	*05*	*02*	−08	18	−26	−07	13	22	21	10	−26	08	−13	10
35. Experimental control	500	0.78	0.42	*−13**	*−06*	*−09*	−01	−26	33	06	−33	−23	−15	−04	30	−12	13	−13
36. Lab–field	562	0.93	0.26	*−17**	*−15**	*−17**	−04	−09	25	08	−30	−49	−08	−04	17	−01	07	−11

Feedback Intervention (FI) Effects by Levels of Significant FI Moderators After All Exclusions

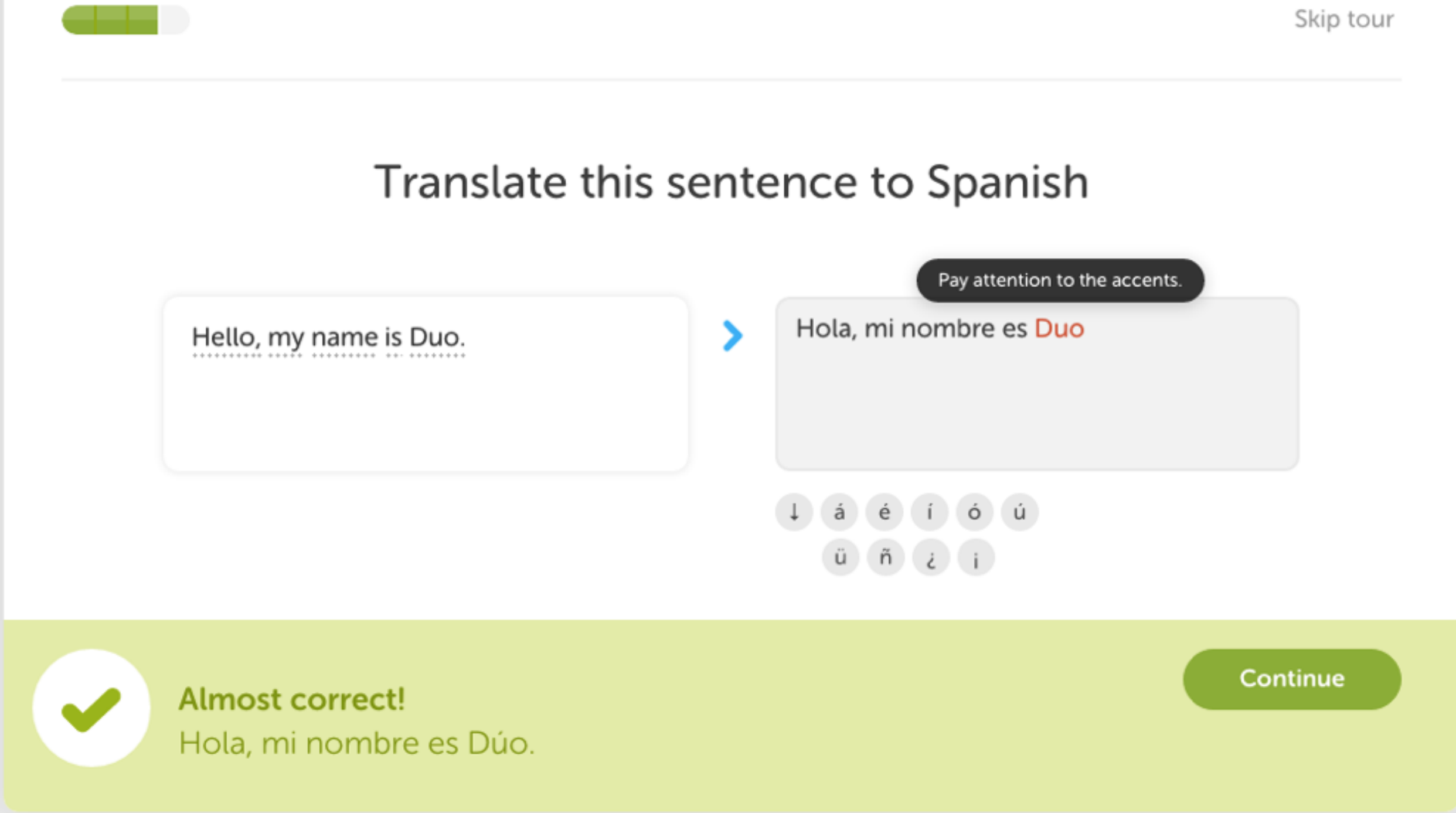
Moderator	K	$\bar{d}$	σ_d
Correct solution (P2)			
Yes	114	.43	.38
No	197	.25	.44
Velocity (P2)			
Yes	50	.55	.46
No	380	.28	.40
Discouraging FI (P1)			
Yes	49	−.14	.52
No	388	.33	.37
Praise (P1)			
Yes	80	.09	.38
No	358	.34	.39
Verbal FI (P1)			
Yes	194	.23	.40
No	221	.37	.42
Computer FI (P2)			
Yes	87	.41	.40
No	337	.23	.42
FI frequency			
Top quartile	97	.32	.31
Bottom quartile	171	.39	.34
Task complexity (P3)			
Top quartile	107	.03	.46
Bottom quartile	114	.55	.39
Physical task			
Yes	65	−.11	.39
No	378	.36	.38
Memory task			
Yes	43	.69	.54
No	357	.30	.39
Following rules			
Yes	100	.19	.52
No	320	.36	.37
Goal setting (P4)			
Yes	37	.51	.40
No	373	.30	.45
Threat to self-esteem (P1)			
Top quartile	102	.08	.30
Bottom quartile	170	.47	.48

What’s most effective?

Correct solution	0.23
Velocity	0.18
Discouragement	-0.31
Physical task	-0.16
Praise (n.s.)	~0.03

https://www.brainpop.com/games/additionblocks/

- https://www.brainpop.com/games/battleshipnumberline/



- https://www.duolingo.com/register

What to do

- Look at the task that learners actually do
  - What performance standards do they see?
  - How would they meet those standards?
- Give them the best feedback possible (correctness, velocity)

Other feedback issues

- What if we deliberately want to move learner's attention to their self?
    - Why do this?
- What if we focused on changing perseverance of goals?

Goal setting responses

- Give up/Change goal
- Dis-regard feedback
- Increase effort

- Next class: how to guide goal setting using the environment

Mindset

- What is it?
  - Assumptions, beliefs & methods held by people
- Two rather important kinds of mindsets: Growth and fixed

“You can learn new things, but you can’t really change your basic intelligence”

“struggle and setbacks in school do not indicate limited potential; rather, they provide opportunities to learn.”

Read more: “Mind-Set Interventions Are a Scalable Treatment for Academic Underachievement”

Next class: What could go wrong?