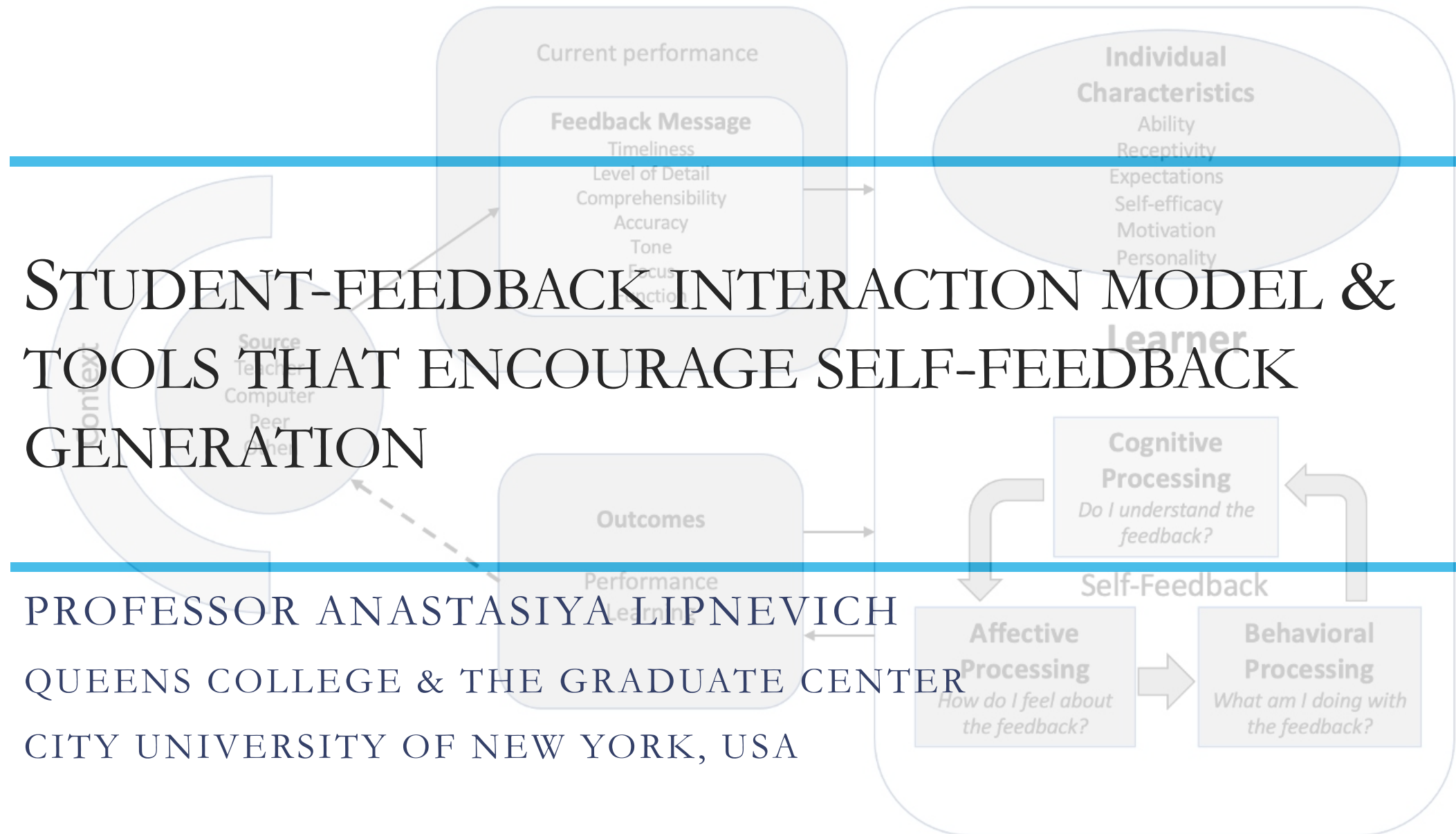# Student-feedback interaction model & tools that encourage self-feedback generation

Professor Anastasiya Lipnevich

Queens College & The Graduate Center

City University of New York, USA

Feedback is everywhere

Feedback is omnipresent in any classroom

Questions

Does context matter or are there universal feedback rules across contexts?

Does student processing of feedback differ depending on individual characteristics?

What type of feedback is most useful?

And useful for what?

What are the indicators of its effectiveness?

How do we save instructors' time? (Feedback takes time)

Feedback

- Different types of feedback

- Different levels of processing

(Lipnevich & Smith, 2016, 2018)

Instructional feedback is any information related to a performance that learners can use to improve their performance or learning. Feedback might come from any source, including teachers, peers, or the task itself. It may include information on where the learner is, where the learner is going, or what steps should be taken and strategies employed to get there.

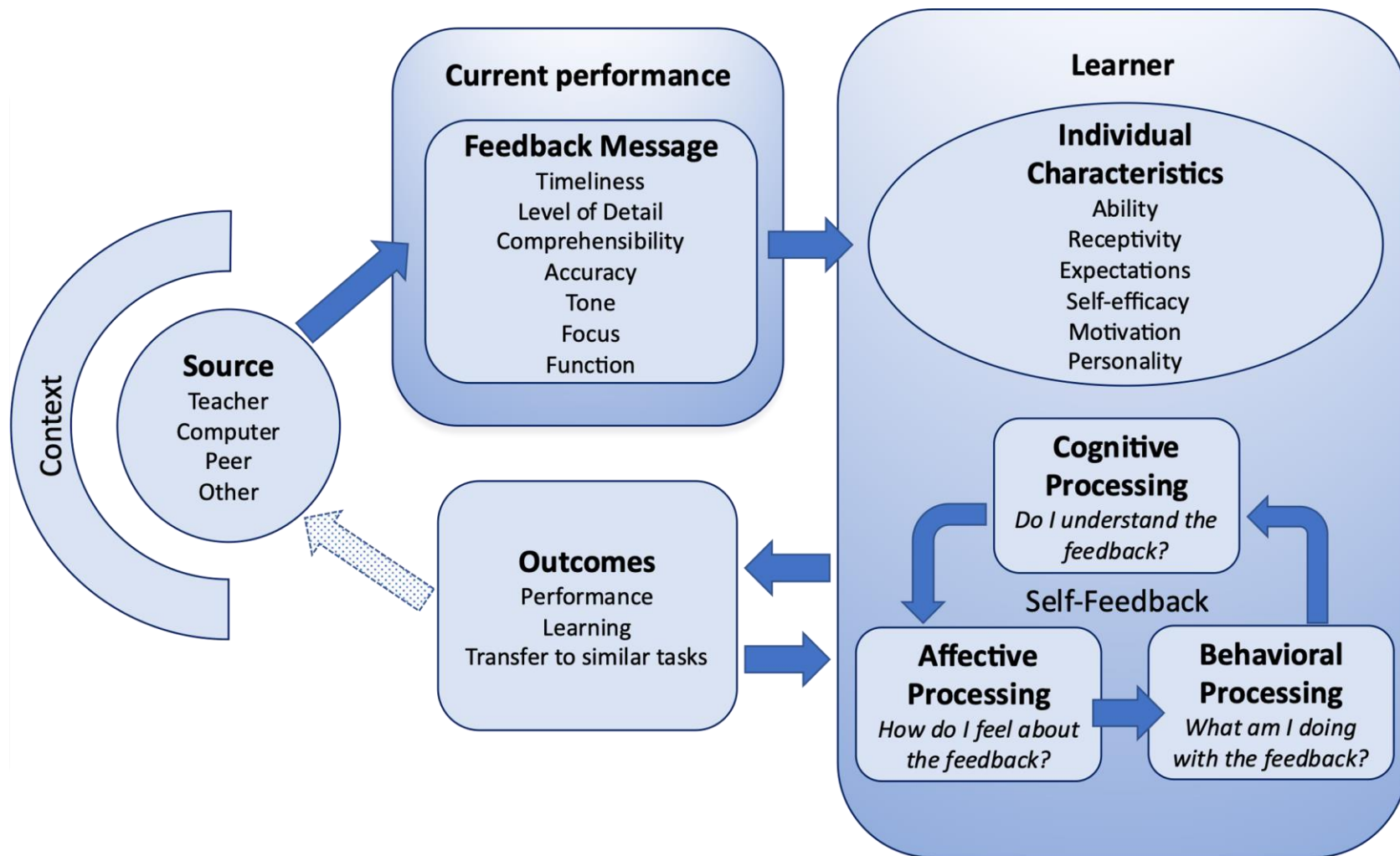- Any feedback, if processed, becomes self(directed) feedback.

Shifting views

Teachers as providers of feedback

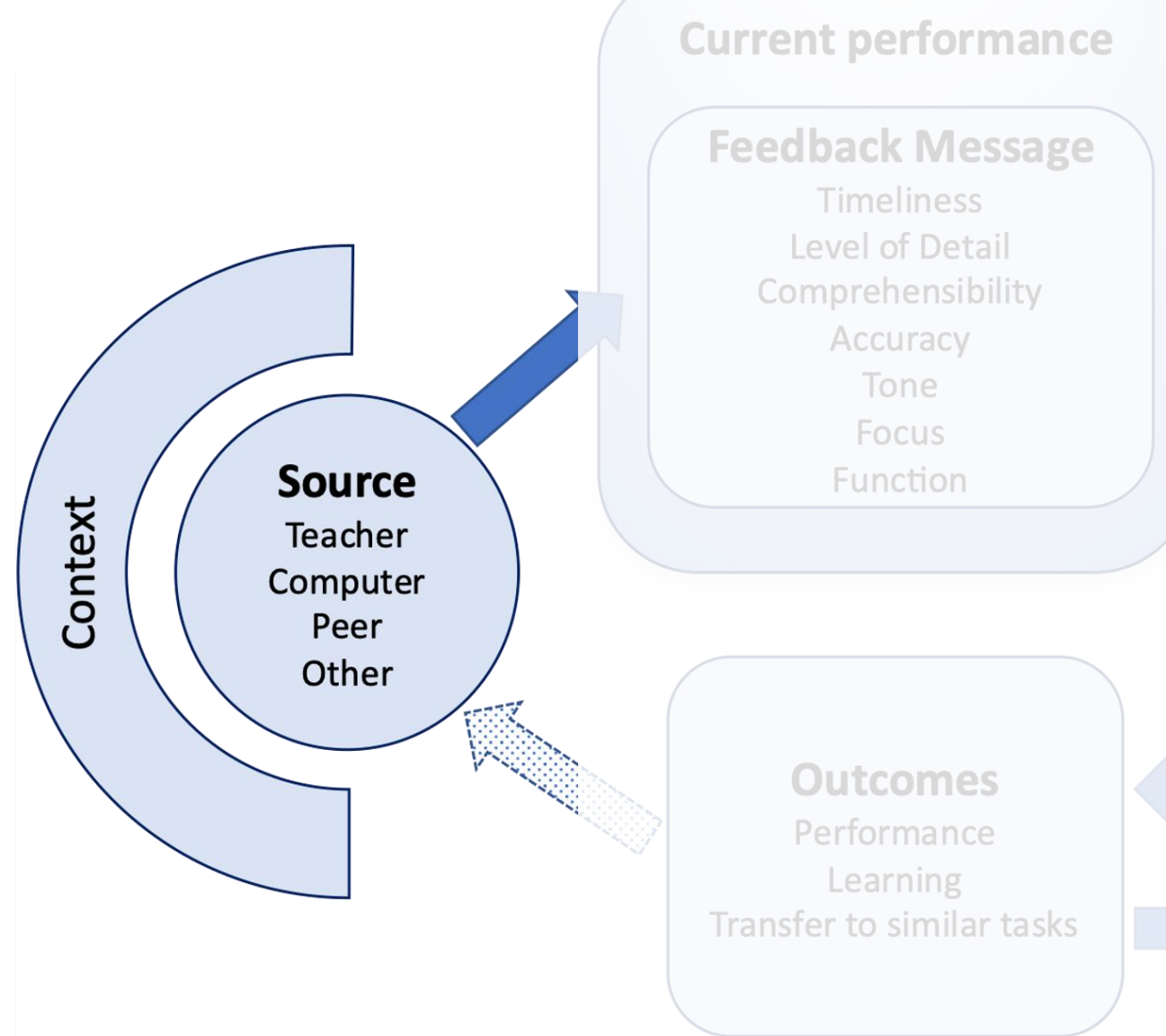Students as active agents and "users" and "implementers" of feedback

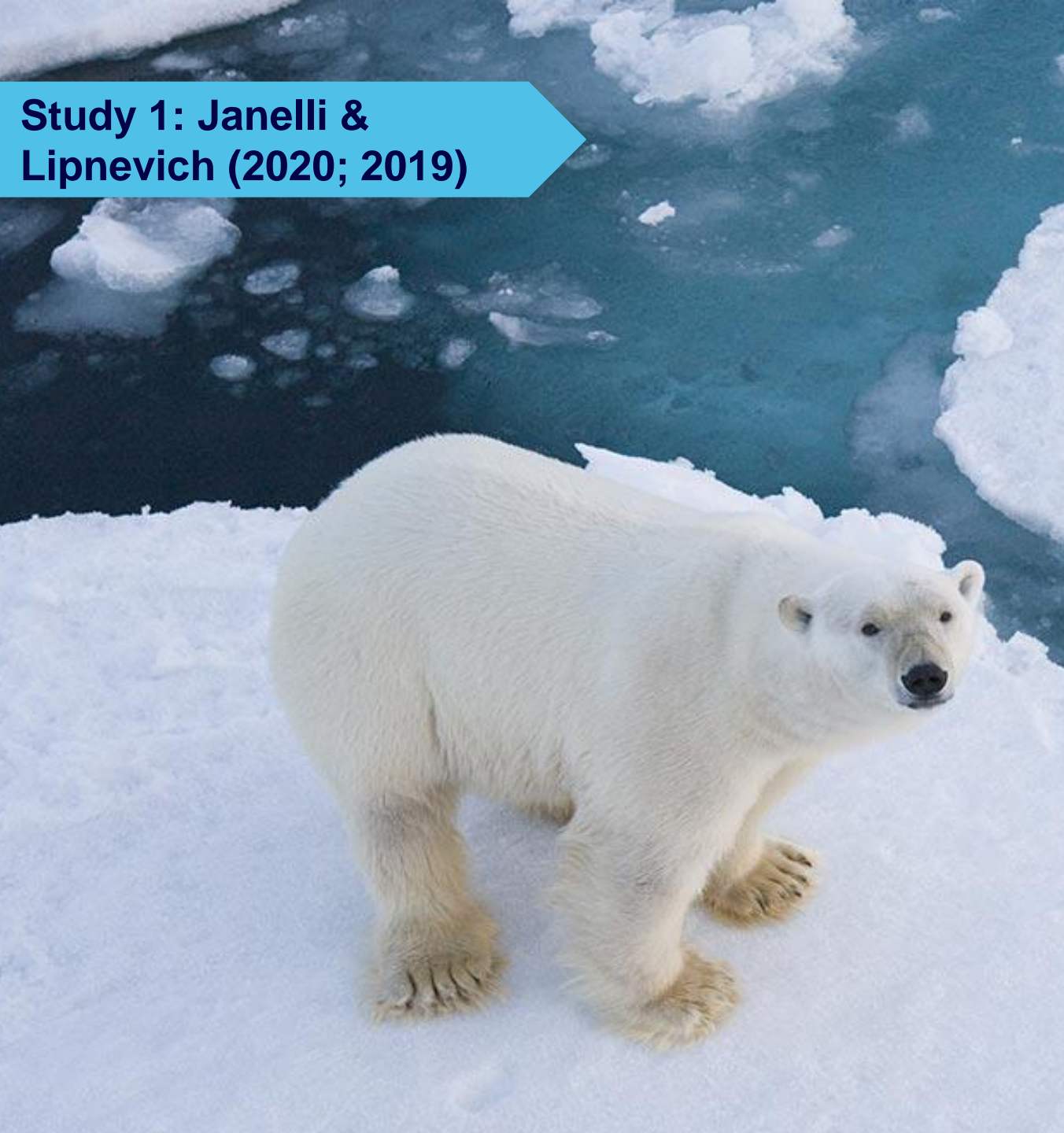## Focus on both the provider and the recipient is important

…and after

Lipnevich & Smith (under review). Student–Feedback Interaction Model: Revised

Context Matters

Context

Source
Teacher
Computer
Peer
Other

Current performance

Feedback Message
Timeliness
Level of Detail
Comprehensibility
Accuracy
Tone
Focus
Function

Outcomes
Performance
Learning
Transfer to similar tasks

This experimental study was designed to identify **the effects of pre-tests and feedback** on learning and persistence in a MOOC on climate change
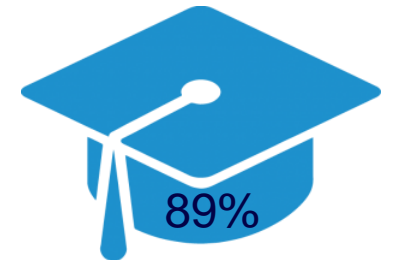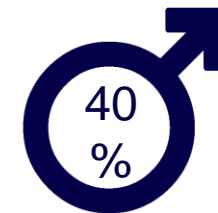
COURSERA

150 YEARS | AMERICAN MUSEUM of NATURAL HISTORY

MOOC attrition: 92-97%

AMNH MOOC attrition: 91.78%

N=606

42%

60%

40%

89%
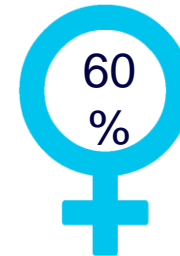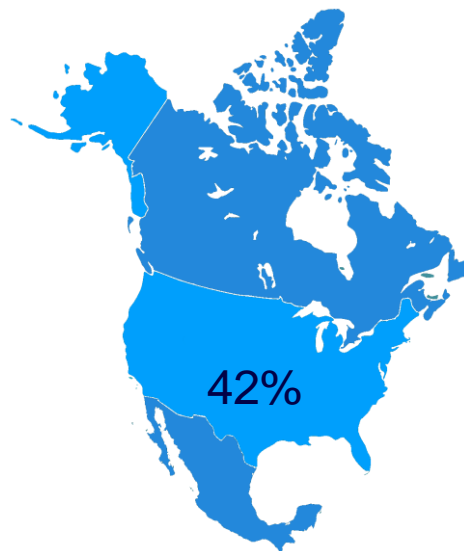
CLIMATE CHANGE COURSE

	self-efficacy survey	pre-test no feedback	pre-test basic feedback	pre-test elaborate feedback	post-test
control group	✓				✓
sample one	✓	✓			✓
sample two	✓		✓		✓
sample three	✓			✓	✓

FIVE WEEK COURSE

Pre-tests and feedback <u>did not</u> affect outcomes.
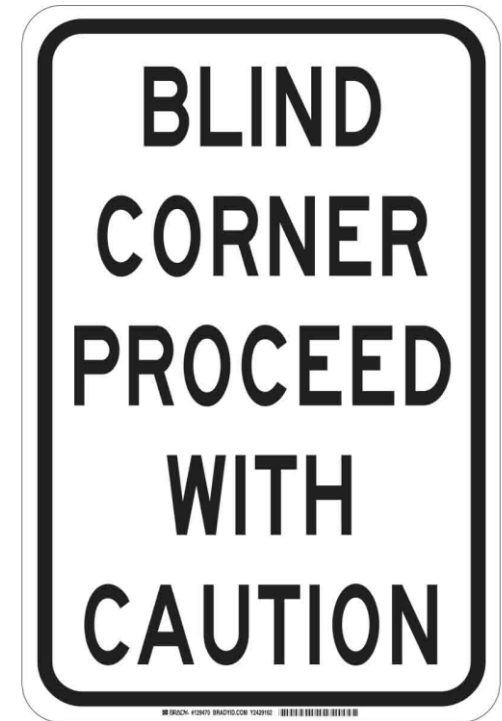
Why was there no effect of feedback whatsoever?

The context of the MOOC is very different from a traditional setting

Limited prior knowledge

Participants' individual characteristics Motivation

Traditional

MOOC
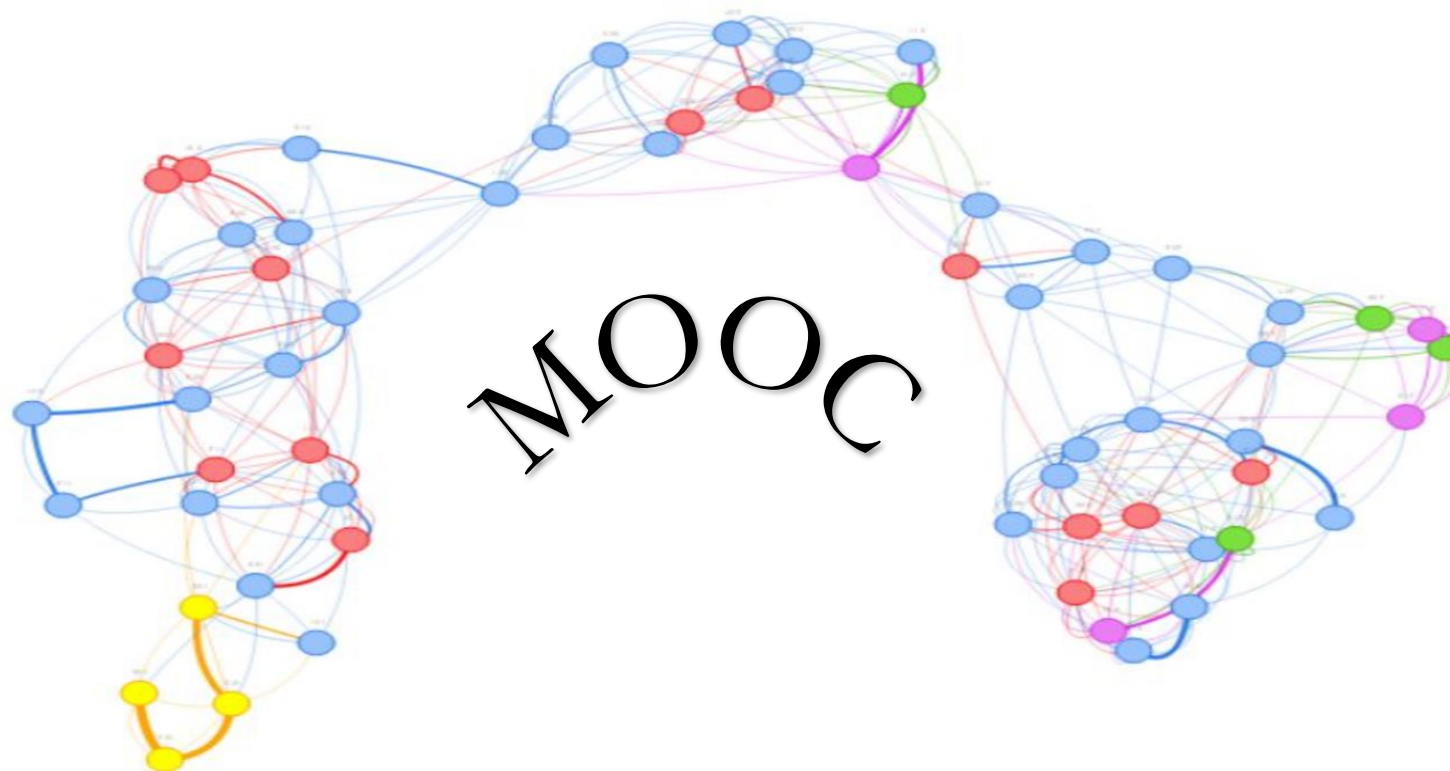
Source and Message
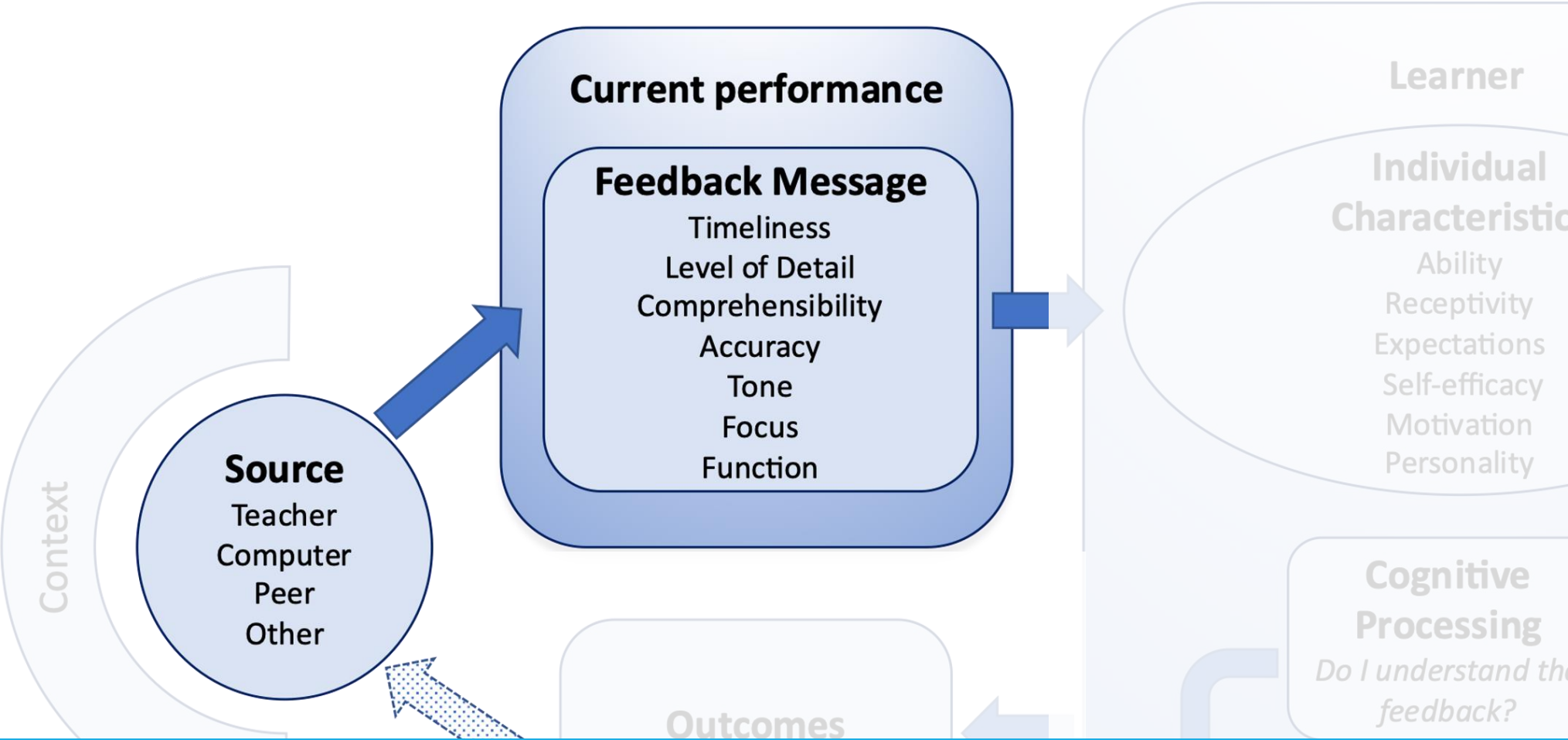
Type of feedback	Source of feedback
• Grades	• Computer
• Praise	• Instructor
• Detailed comments	

Study 2 & 3: Design and Participants

**Study 1:
Experiment**

464 general psychology students

**Study 2:
Focus Groups**

49 selected participants

**Two sessions,
a week apart**

First essay draft

Revisions

Lipnevich & Smith (2009a, 2009b)

	No grade		**Grade**	
	No praise	**Praise**	**No praise**	**Praise**
No feedback	*No feedback* *No grade* *No praise*	No feedback No grade Praise	No feedback Grade No praise	No feedback Grade Praise
Computer feedback	Computer feedback No grade No praise	Computer feedback No grade Praise	Computer feedback Grade No praise	Computer feedback Grade Praise
Instructor feedback	Instructor feedback No grade No praise	Instructor feedback No grade Praise	Instructor feedback Grade No praise	Instructor feedback Grade Praise

Final Score, General Summary
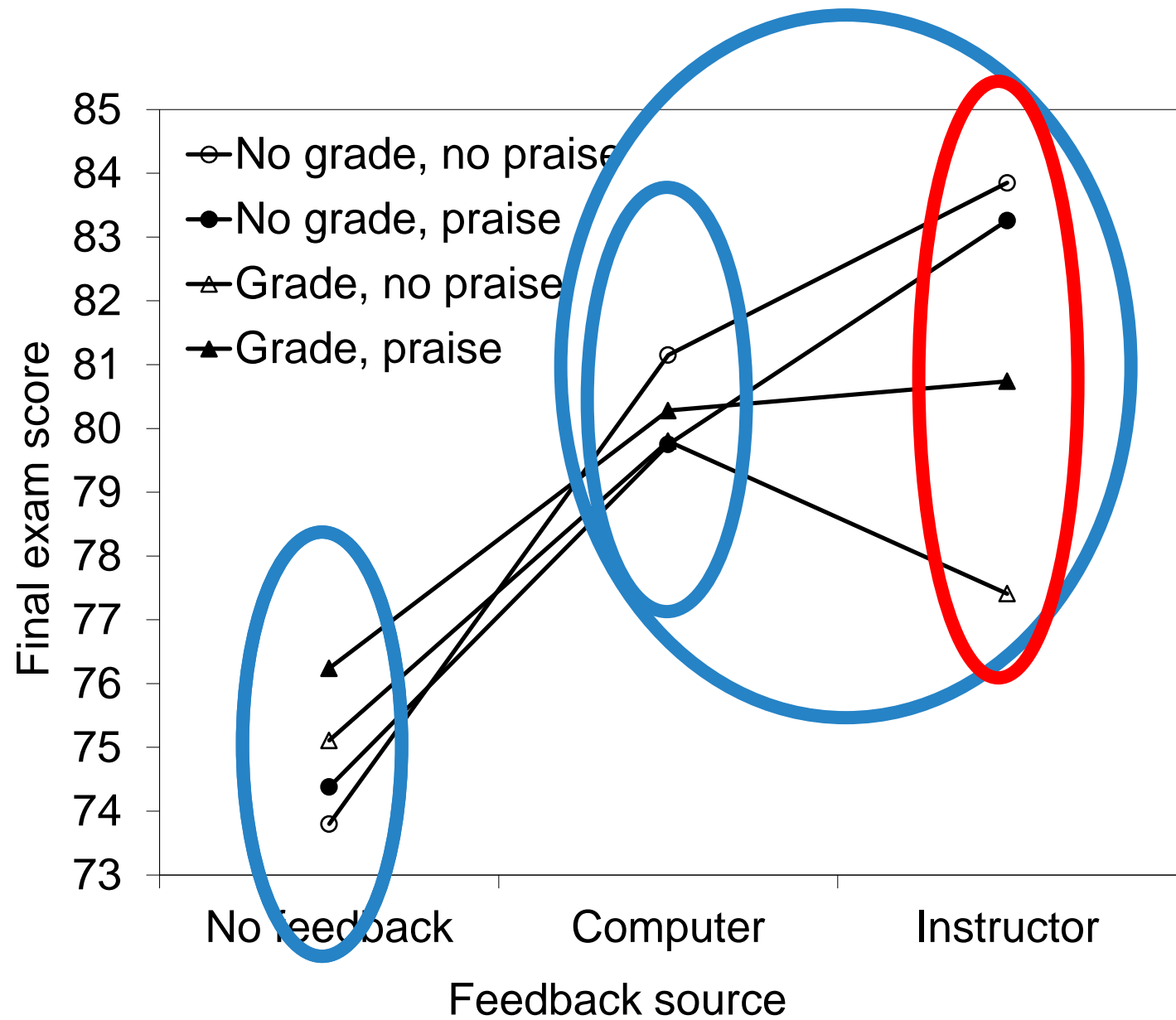
Final Score, Grade by Feedback Source
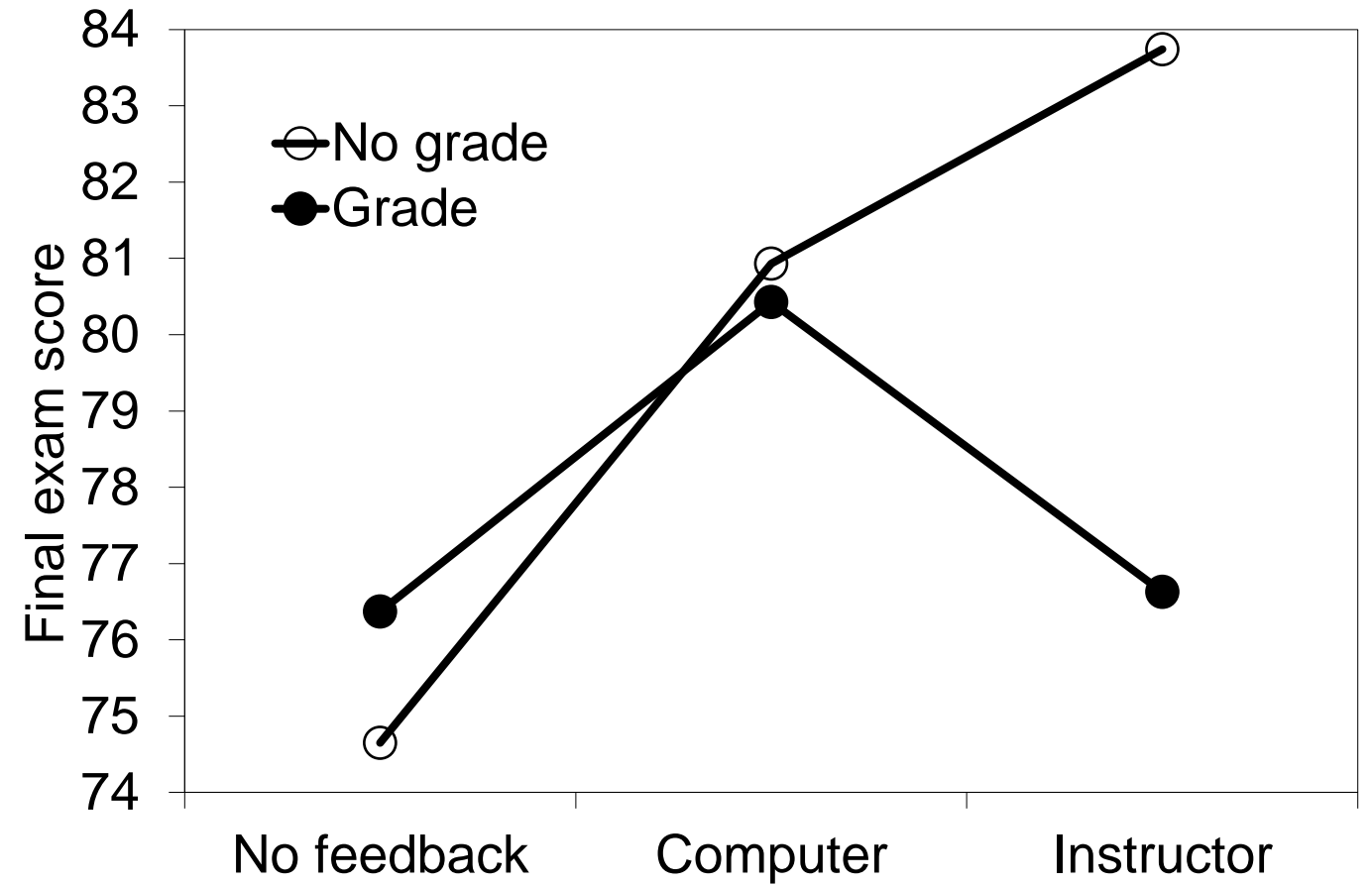
Summary

- Students need feedback AND the opportunity to revise
- Detailed, specific comments are most conducive to improvement
- Grades are not effective in promoting learning
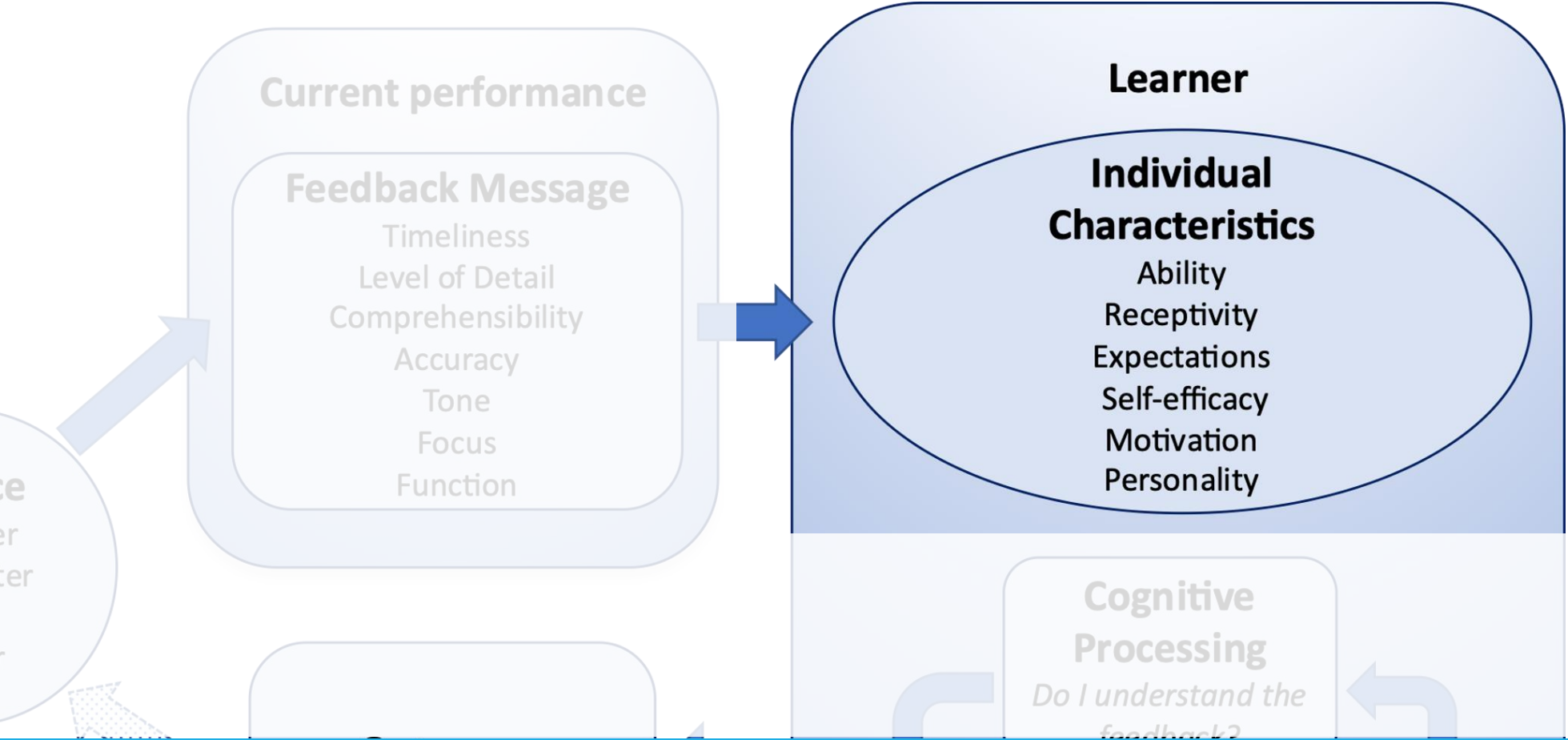- Praise mitigates the negative effect of grades
- Source matters: Students did better when they thought that feedback came from the instructor
- Type of feedback matters

Individual Characteristics

Study 4: Receptivity to Feedback Scale
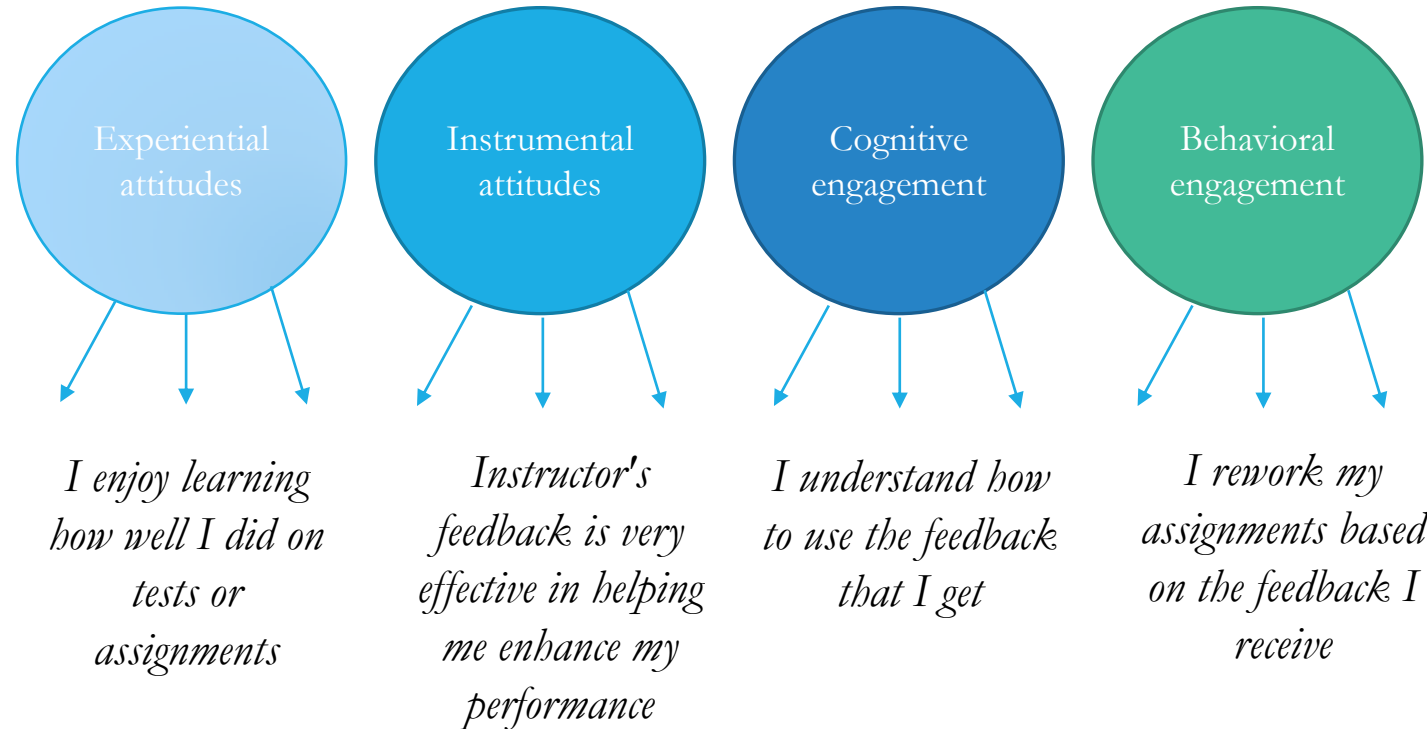
Model fit indices: RMSEA = 0.069 [90% CI: 0.063, 0.076]; CFI = 0.975; TLI = 0.972; SRMR = 0.041.

Lipnevich et al. (2021).

Receptivity and Personality

College students in the USA and NZ (Lipnevich et al., 2021)

Avoid Jingle-Jangle (Block, 1995)
- Conscientiousness and Openness were the strongest predictors of the four factors of receptivity
- Agreeableness yielded weak links with the RIF factors
- Neuroticism negatively predicted behavioural engagement

Study 5: Three-Wave, Feedback + Emotions + Grades

5 schools, 15 classes in Singapore

3 classes (English) per school

3 waves of data collection
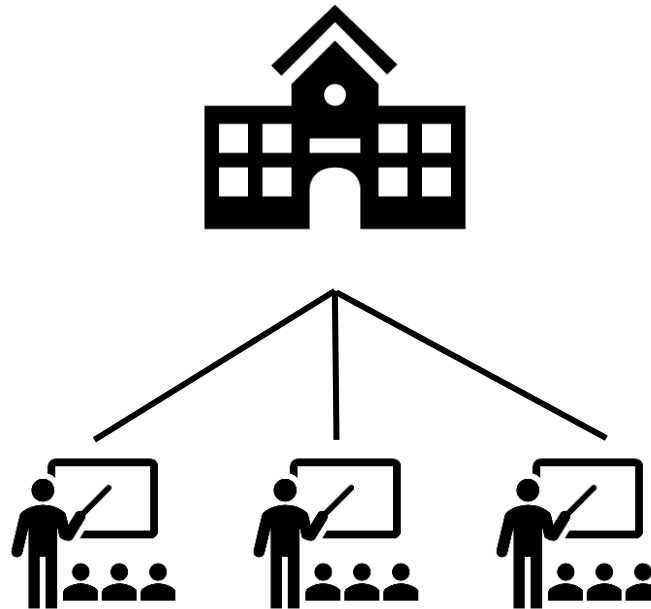
144 male   170 female

315 students in total

Receptivity to Feedback as Predictor of Grades

(Lipnevich & Lopera-Oquendo, under review)
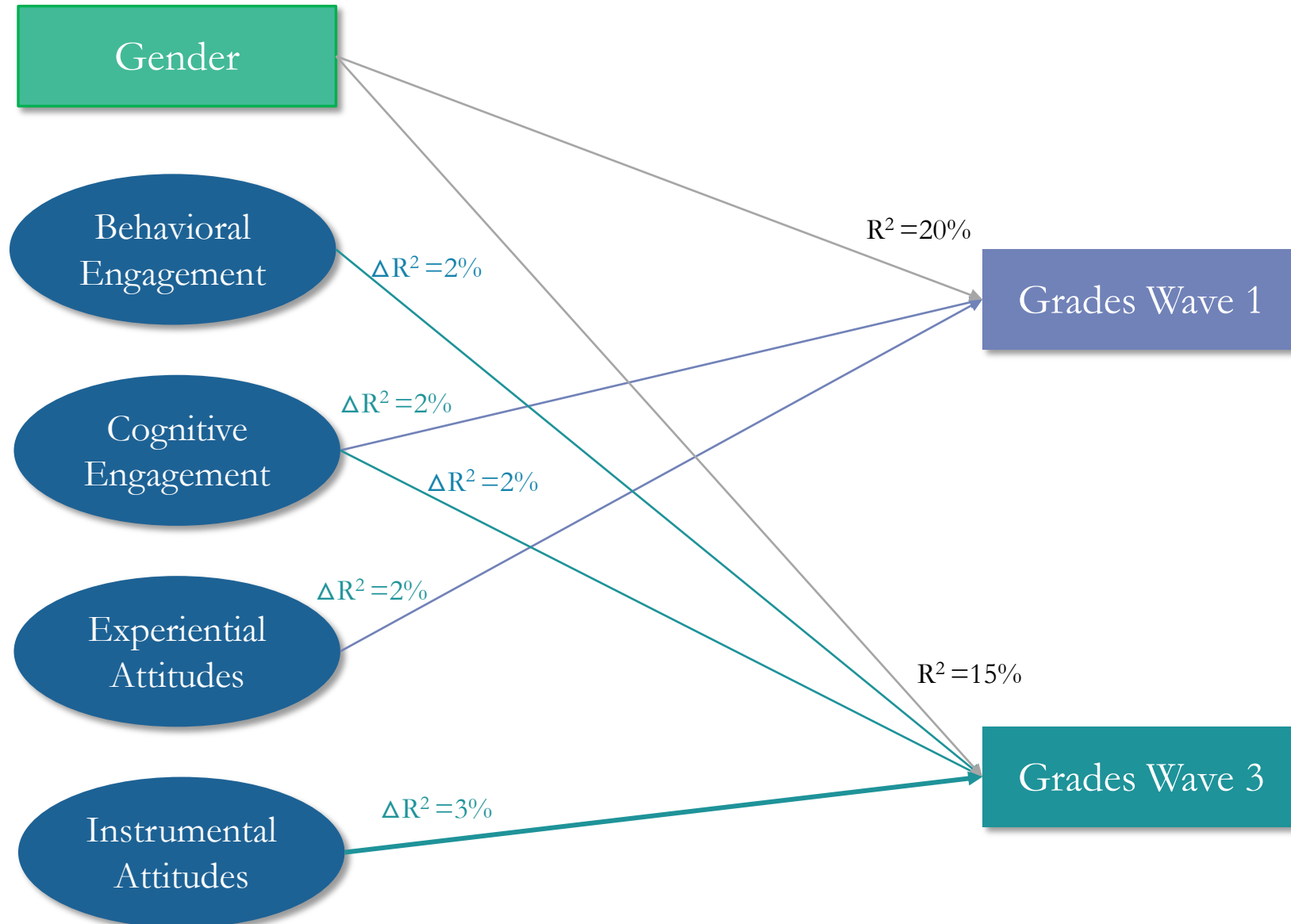
Positive Emotions (positive correlations with RIF scale)

	Affective Engagement	Instrumental attitudes (value)	Cognitive engagement	Behavioral engagement
Enjoyment	●	●	●	●
Pride	●	●	●	
Hope	●	●	●	●
Excitement	●	●	●	●

Negative Emotions (negative correlations with RIF scale)

	Experiential Attitudes	Instrumental Attitudes	Cognitive engagement	Behavioral engagement
Anger	◯	◯	◯	◯
Anxiety			◯	
Shame	◯		◯	
Hopelessness	◯	◯	◯	◯

So what?

RIF replicated in 4 countries, including in Spanish in both high school and university level
- Class-based interventions
- Enhance the value of feedback
- Teach specific strategies for cognitive, affective, behavioral engagement

Processing
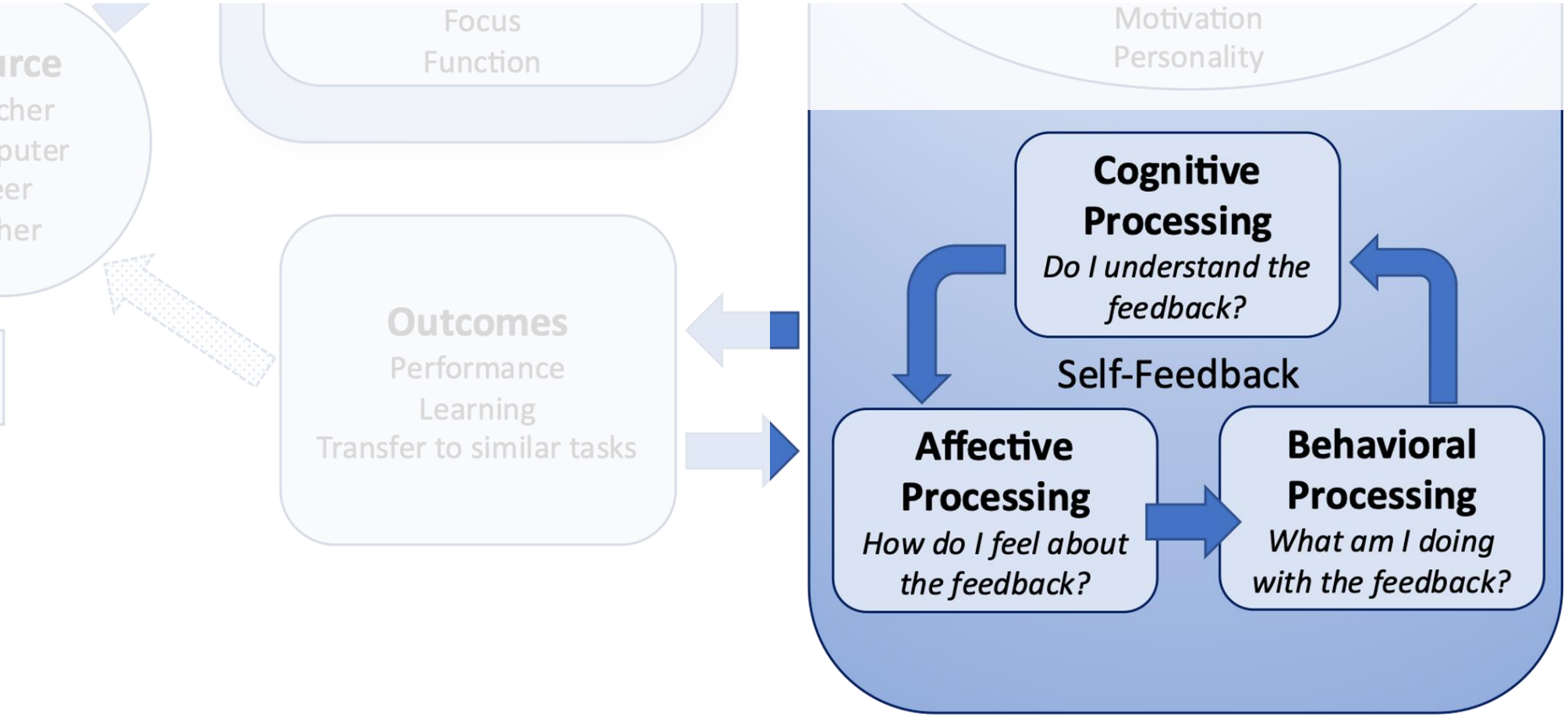
Study 6: Affective responses

Overall negative affect, as well as discrete negative emotions, mediated the relation between receiving feedback and student performance.

The direct effect of receiving a numeric score negatively predicted students' performance on an essay exam and positively predicted the experience of negative emotions.

The indirect effect was positive, suggesting that the experience of negative emotions may have served as a motivational factor in students' desire to improve performance.
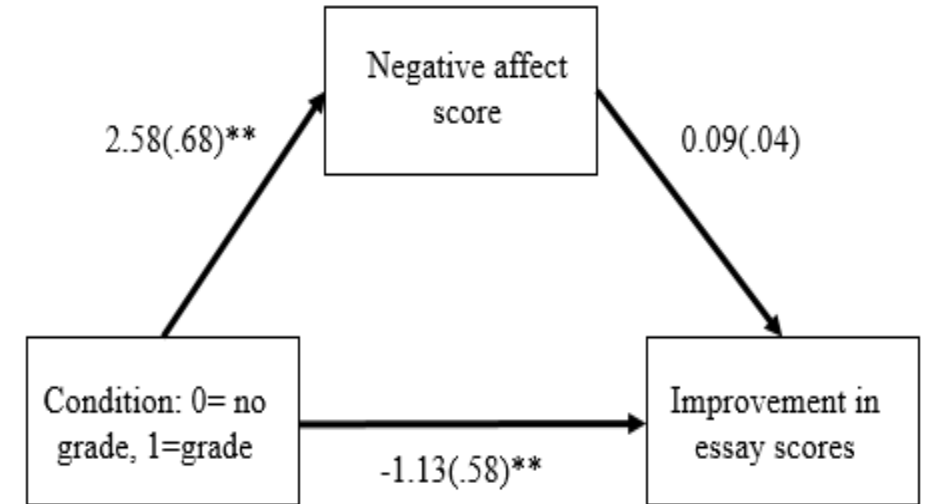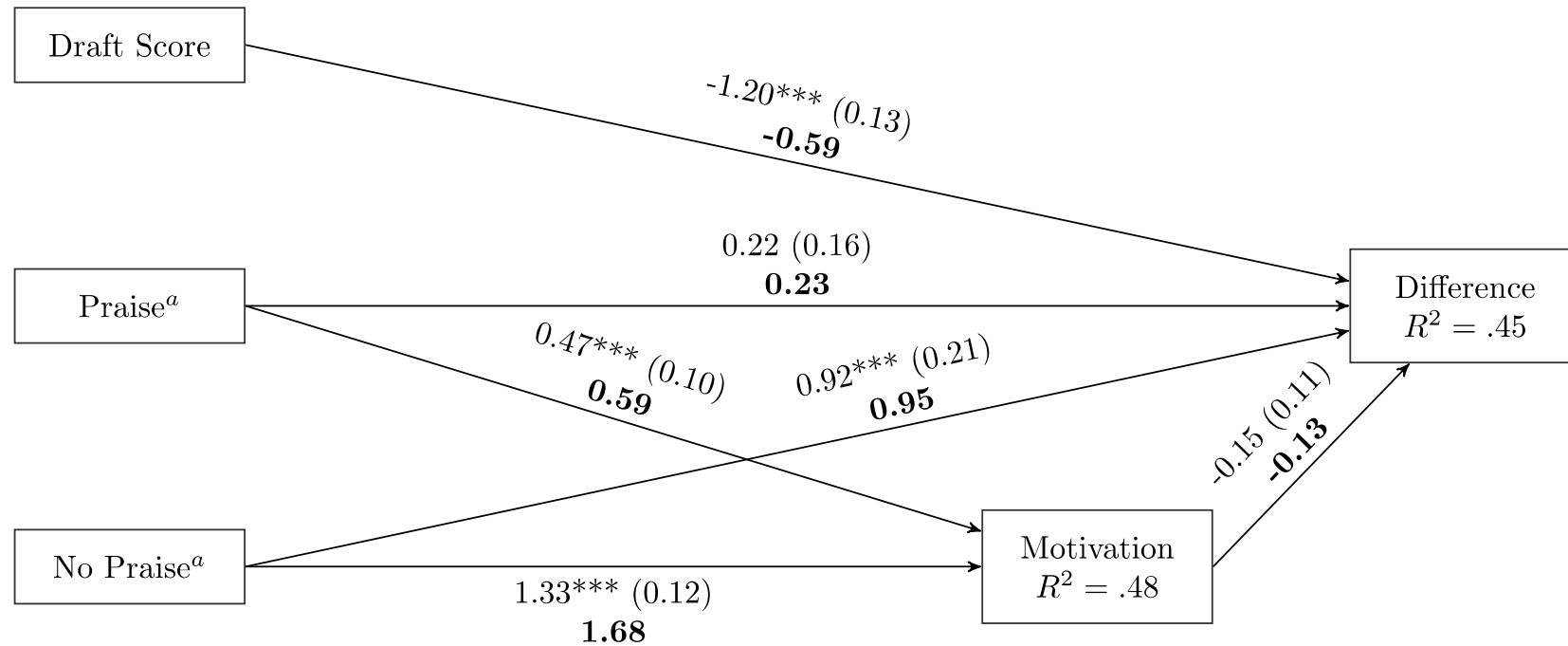

Figure 1. *Negative Affect as a Mediator of Feedback Condition and Improvement in Essay Scores from Time 1 to Time 2*

Lipnevich et al. (2021)

Study 7: Cognitive Processing: Biases

Note. Values represent estimates, standard errors (in parentheses), and standardized estimates (in bold). * p < .05, ** p < .01, *** p < .001. N = 144. Three outliers that received the highest possible final score were excluded. χ 2 (1) = 1.63, p = .202, CFI = .996, RMSEA = .066, 90% CI [.000, .241], SRMR = 0.02.

a) Dichotomous items. The reference group is the control group. Respective standardized estimates (in bold) are partially standardized estimates with standardized endogenous variable.

Lipnevich et al. (in preparation)

Draft Score

Praise^a

No Praise^a

Difference
$R^2 = .45$

Motivation
$R^2 = .48$

-1.20*** (0.13)
-0.59

0.22 (0.16)
0.23

0.47*** (0.10)
0.59

0.92*** (0.21)
0.95

-0.15 (0.11)
-0.13

1.33*** (0.12)
1.68

Questions

What does it mean for educators?

What kind of feedback should we provide?

Is it realistic?

What is the very minimum?

Is there a way to give excellent feedback AND stay sane?

Study 8: How can teachers manage?

Can a typical teacher deliver the feedback that we found to be most effective?

"I have 120 papers to grade. If I try to provide detailed feedback on an on-going basis, I will lose my mind." (A teacher at a workshop)

Lipnevich, A. A., McCallen, L., Pace Miles, K. (2015). Show Me!: Students' Use of Exemplars and Detailed Rubrics as Formative Assessment on a Writing Task. Instructional Science.
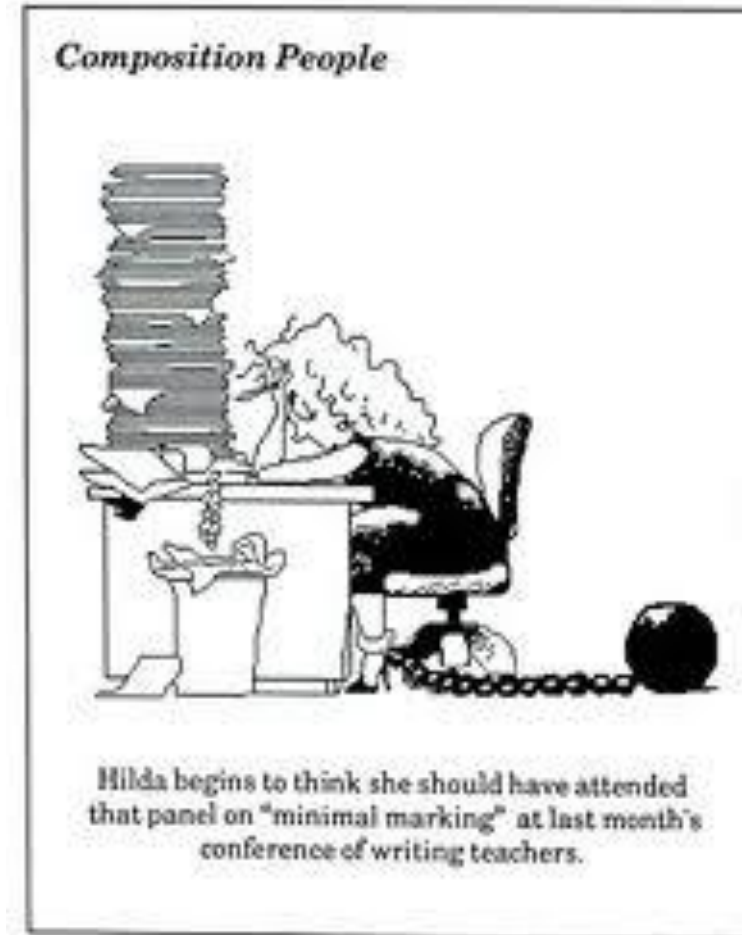
Experimental Conditions
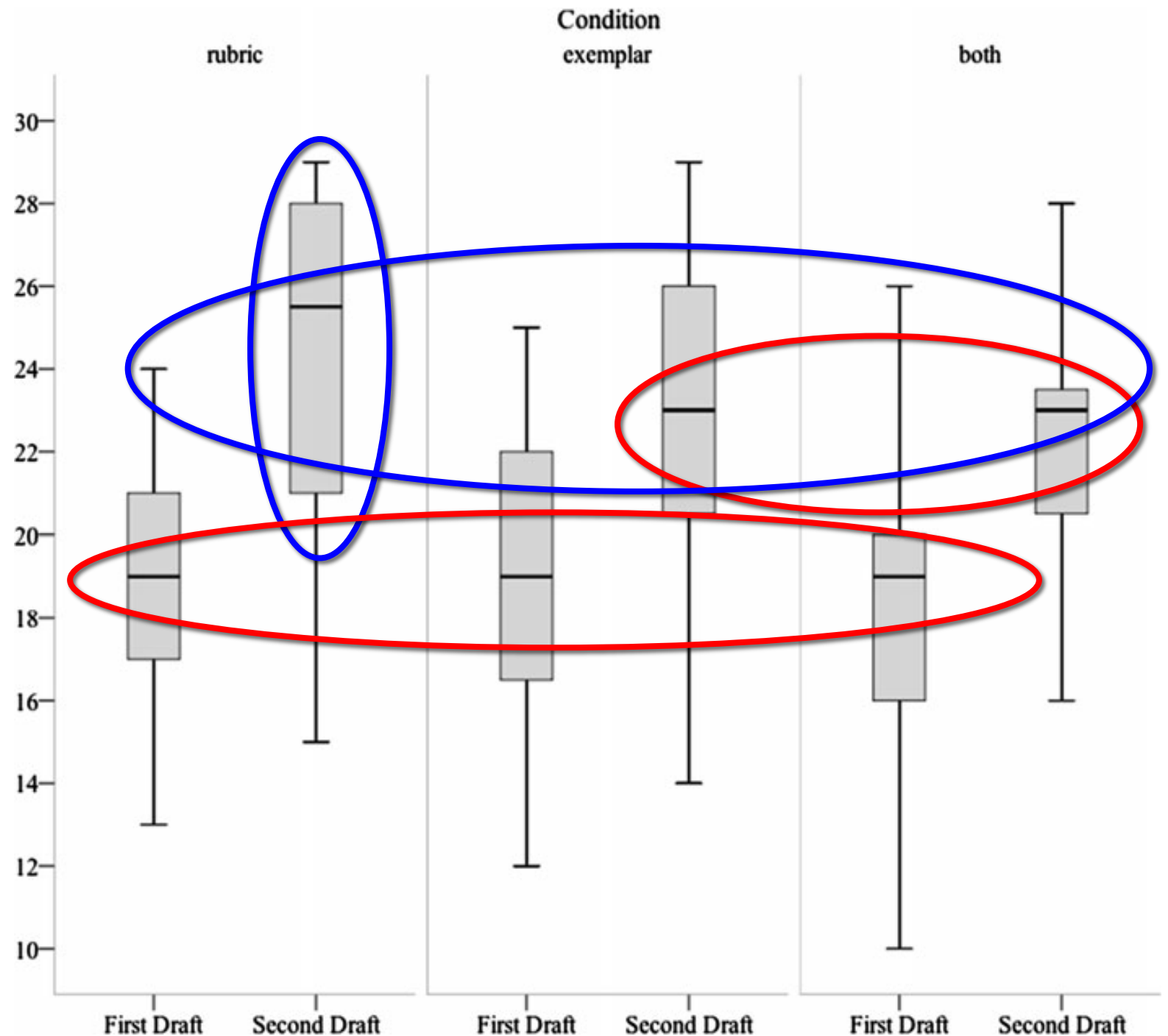
Students were randomly assigned to one of three conditions after they submitted rough drafts
- Rubric
- Exemplars (3: Poor, Average, Excellent)
- Rubric and Exemplars

ANCOVA was significant (($F_{(2, 96)}$ = 4.0, $p < 0.01$).

Post-hoc analyses

Rubric condition did significantly better ($p < 0.05$) than Exemplar and Rubric and Exemplar condition ($p < 0.05$)

Summary

All three conditions led to improvement in college students' written work

Rubric condition outperformed the other two conditions
- Students focused only on the "best" exemplar when it was available

Rubric condition facilitated better quality self-feedback and, possibly, reduced cognitive load

Familiarity?

Study 9: What if we train students to use rubrics and exemplars for feedback generation?
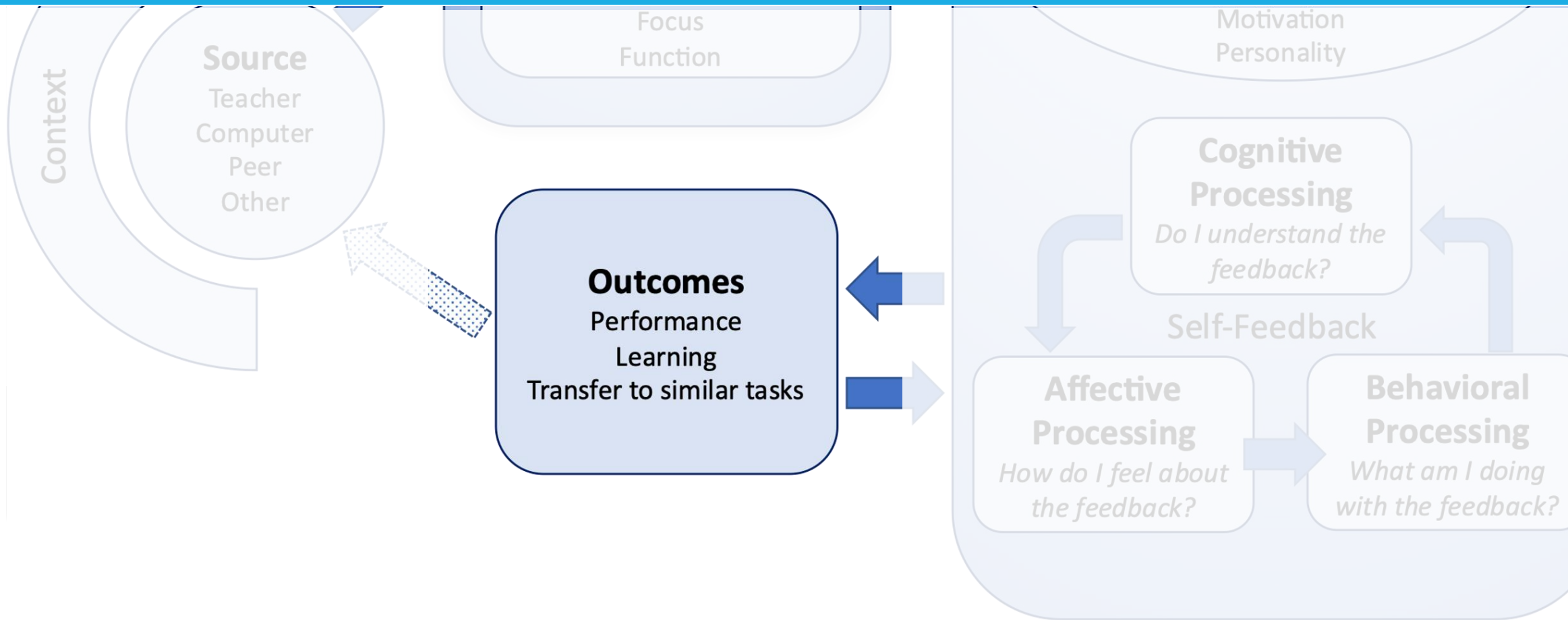
Two tasks

Two rounds of revise-resubmit

Rubrics, Exemplars, Rubrics + Exemplars, Control

Training on how to use these tools before the second task

Outcomes

Students do improve when asked to generate self-feedback
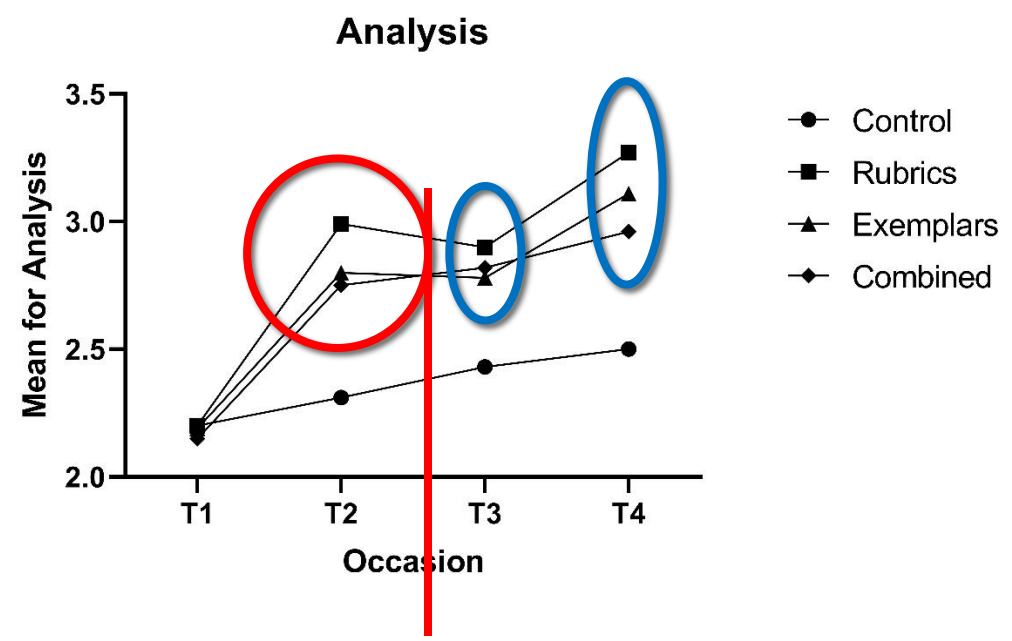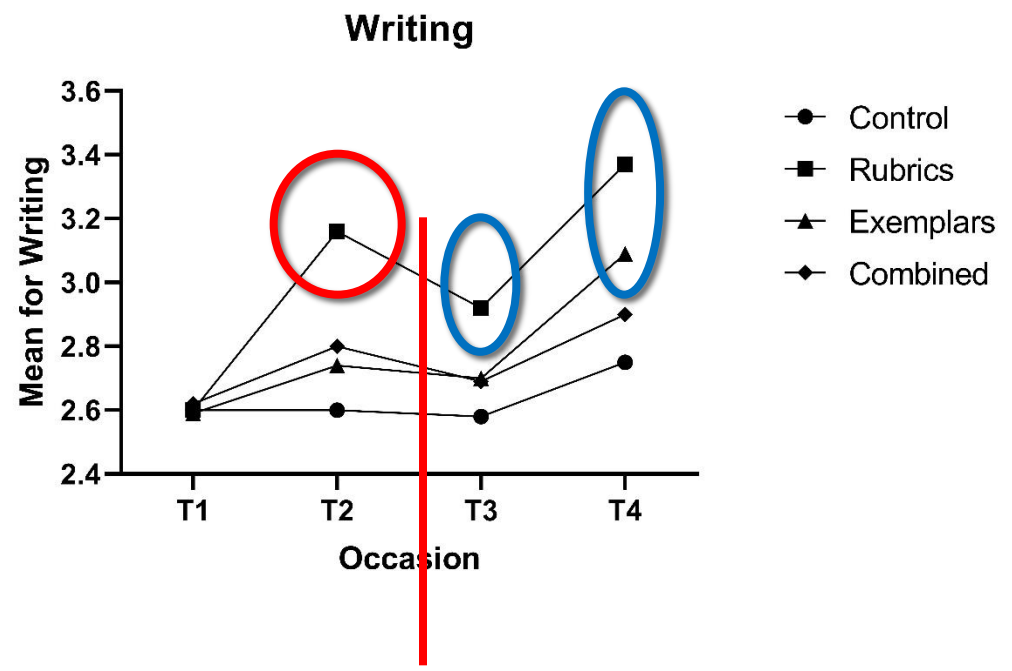
So what does this all mean?

- Encouraging students to generate self-feedback using various instructional tools is a viable strategy

- Explicit instruction should be provided on how to use these tools

- There is evidence of transfer to a new task, so learning is taking place

- Exemplars, rubrics and other tools that encourage students' self-feedback generation work as well AND save time

Takeaways

- Context Matters

- Teachers are not the only source of feedback

- Receptivity, gender and other individual characteristics affect the way feedback is processed

- Any feedback that students receive and even minimally process, gets converted into self (directed) feedback

- Our role is to structure environment and conditions that help with most effective self-feedback generation

- …at the same time taking responsibility for the type of feedback we provide

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THANK YOU!

@ALIPNEVICH

WWW.ANASTASIYALIPNEVICH.COM

A.LIPNEVICH@GMAIL.COM

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Janelli, M., & Lipnevich, A. A. (2021). Effects of pre-tests and feedback on performance outcomes and persistence in Massive Open Online Courses. *Computers & Education, 161*, 104076.

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Lipnevich, A. A. & Smith, J. K. (2009). The effects of feedback on student examination performance. *Journal of Experimental Psychology: Applied, 15*, 319-333.

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Janelli, M. & Lipnevich, A. A. (2020). The peril and promise of pre-tests in informal Massive Open Online Courses. In Glick, D., Cohen, A., & Chang, C. (Eds.) *Early Warning Systems and Targeted Interventions for Student Success in Online Courses*. IGI Global.

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