

MAXIMIZING THE POSITIVE EFFECT OF ACCELERATED PROGRAMS:

AN INTRODUCTION TO SOME BEST TEACHING PRACTICES
SUPPORTED BY BEHAVIORAL PRINCIPLES

Mari Watanabe-Rose

(CUNY Central Office of Academic Affairs)

G. Michael Guy

(CUNY Central and Queensborough Community College)

Presentation at the Conference on Acceleration in
Developmental Education, Baltimore, MD. June 2016



Acknowledgement

- **My Math GPS** is joint work with Queensborough CC mathematics professors:
 - ✓ Jonathan Cornick
 - ✓ Karan Puri

Guy, G. M., Cornick, J., & Puri, K. (2016). Contextualizing Arithmetic into Developmental Elementary Algebra Using Guided Problem Solving. PRIMUS, 26(5), 437-452.
doi:10.1080/10511970.2015.1104767

- Organizers and participants of the **CADE Conference**

Let's talk about behavior



A screenshot of a Facebook post. At the top left is a profile picture of a man and the name "Tom" in blue. Below the name is "2 hrs · 🌐". To the right is a small downward arrow icon. The main text of the post is: "The problem with people who are in shape telling the rest of us that all you have to do is start working out is that those people either don't remember or never knew in the first place HOW LONG IT TAKES TO START SEEING RESULTS. I know because 7 years ago I dropped 35 pounds (200 to 165). And it took a really long time to get that going. Since dropping to 165 I'm now back up to 230 or so. And the memory of how hard it was to get that weight loss going before is really freaking demoralizing." Below the text is a horizontal line, followed by a share icon and the word "Share". Below that is a blue thumbs-up icon and the text "G. Michael Guy and 2 others". At the very bottom, there is a partially visible comment starting with "Dana Costello: Not sure if you were eating clean but I've seen people..."

Tom
2 hrs · 🌐

The problem with people who are in shape telling the rest of us that all you have to do is start working out is that those people either don't remember or never knew in the first place HOW LONG IT TAKES TO START SEEING RESULTS. I know because 7 years ago I dropped 35 pounds (200 to 165). And it took a really long time to get that going. Since dropping to 165 I'm now back up to 230 or so. And the memory of how hard it was to get that weight loss going before is really freaking demoralizing.

👉 Share

👍 G. Michael Guy and 2 others

👤 Dana Costello: Not sure if you were eating clean but I've seen people...

Principles of increasing behavior

Target behavior → Consequence

(if the behavior increases in the future,)

Consequence = Positive⁺ reinforcer

The more immediately the consequence is delivered after the target behavior, the more likely the behavior will increase in the future.

Exercise → Weight loss

Target behavior

Consequence

(Weight loss doesn't happen immediately after exercise;
that is why weight loss cannot be a positive reinforcer for many people.)

Positive reinforcement in classroom

- **Desirable student behavior**
 - Come to every class meeting, on time
 - Complete homework
 - Study for quizzes and exams
 - Take all quizzes and exams

What could be positive reinforcers for these behaviors?

My Math GPS (Elementary Algebra)

My Homepage | Help | My Math GPS (Student) | Logout



MyMathGPS: Elementary Algebra Guided Problem Solving

Class Homepage Gradebook ▾

Class Homepage

Assignments

Assignment Name	Availability	Attempts	Best Score
Before Quiz 1	Unlimited	1 / Unlimited	16.0 / 41.0 (39.0%)
Before Quiz 2	Unlimited	0 / Unlimited	Not yet completed

My Homepage | Help | My Math GPS (Student) | Logout



MyMathGPS: Elementary Algebra Guided Problem Solving

Class Homepage Gradebook ▾

Class Homepage

Class Details

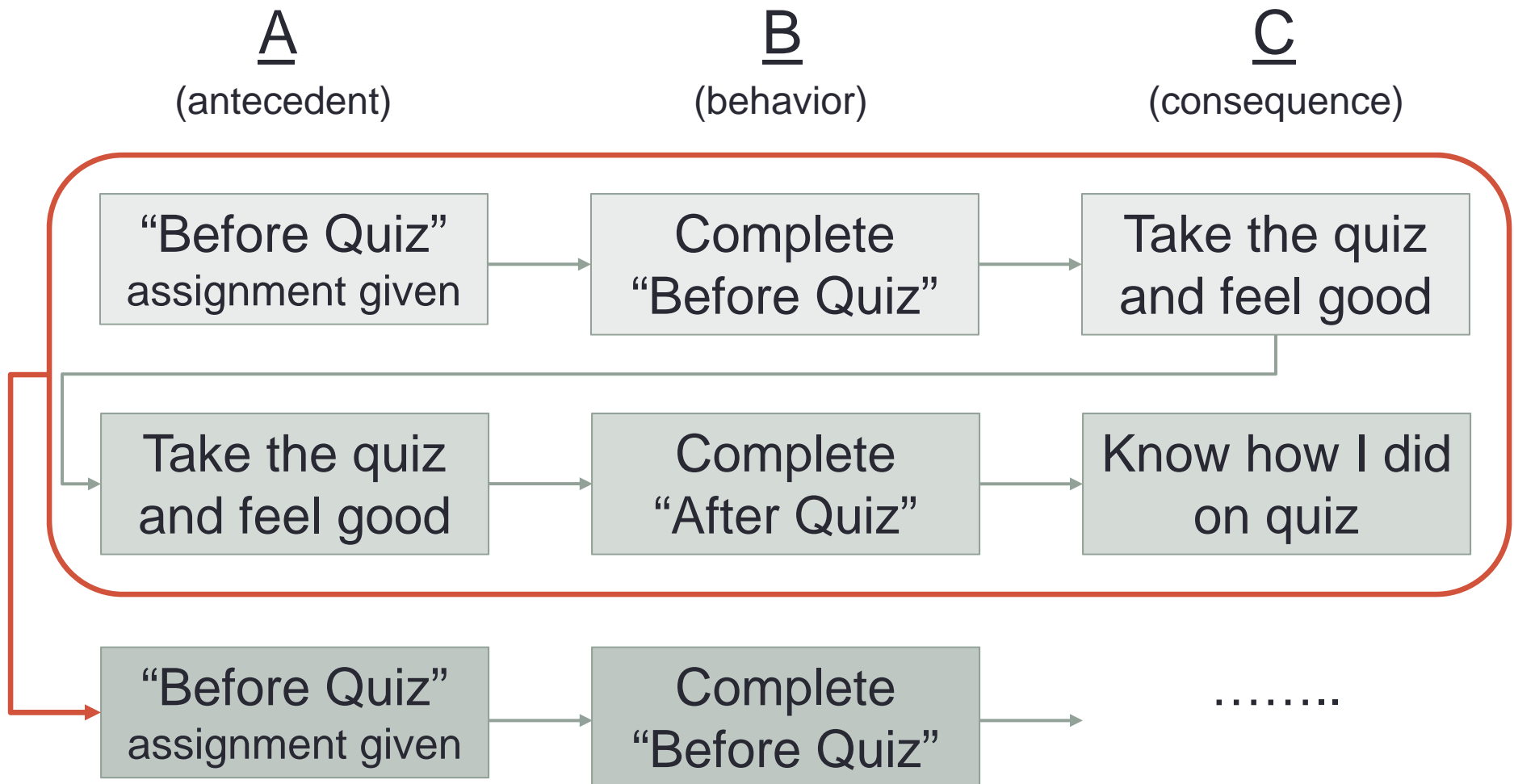
Assignments

Assignment Name	Availability	Attempts	Best Score
Practice taking the Final Exam (CEAFE)	Unlimited	0 / Unlimited	Not yet completed
After Quiz 8	Unlimited	0 / Unlimited	Not yet completed
After Quiz 7	Unlimited	0 / Unlimited	Not yet completed
After Test 3	Unlimited	0 / Unlimited	Not yet completed
After Quiz 6	Unlimited	0 / Unlimited	Not yet completed

My Math GPS (Elementary Algebra)

- **Compared to control Elementary Algebra students, GPS students:**
 - were more than twice as likely to take the CUNY Elementary Algebra Final Exam (CEAFE),
 - scored more than 10 points higher on the CEAFE, and
 - were almost three times more likely to pass the course.

What happens in GPS classroom?



Factors affecting reinforcement

- **Immediacy of consequence (contiguity, timing)**
- Contingency of consequence (consistency)
- Magnitude of consequence (amount)
- Response effort
- Individual differences

It's your turn!

Audience members:

Do you have any examples from your classes?

Target behavior → **Consequence**
to be increased **to be delivered**

Four types of operations

Operation	Consequence	Target Behavior in the Future (Goal)
Positive Reinforcement	delivered (+)	to be increased (↑)
Negative Reinforcement	eliminated (-)	to be increased (↑)
Positive Punishment	delivered (+)	to be decreased (↓)
Negative Punishment	eliminated (-)	to be decreased (↓)

Four types of operations

Operation	Consequence	Behavior (Goal)	Example
Positive Reinforcement	+	↑	Students do homework (B); you give extra points for their efforts (C) regardless of their performance; as a result, students are more likely to do their homework
Negative Reinforcement	-	↑	Students individually work on exercises at the end of class meeting (B); They are allowed to go home (C) if their answers are all correct; as a result, students try to work hard and fast
Positive Punishment	+	↓	Students chat about their weekend plans (B) during your lecture; you yell at them (C); as a result, students do not chat during lectures
Negative Punishment	-	↓	When a student texts (B); you come very close to the student's desk and silently stare at her/him (C); as a result, students do not text in class

How to decrease undesirable behavior

- Find incompatible behavior to increase

- e.g., what desirable behavior could be incompatible with texting?

- Antecedent control (i.e., prevention)

- Use a syllabus to clearly lay out all the rules, instructions, warnings, and expectations so that students won't have to learn by experiencing unpleasant consequences.

Takeaways

- **Behavioral principles can be helpful in designing effective deliveries of course materials and feedback.**
 - When trying to change students' behavior, first identify specific target behaviors (to increase).
 - Then, make a list of consequences that may change (or become positive reinforcers for) the behaviors.
 - Design preventive procedures as well.
- **The effectiveness of one design may be course- and/or student-specific.**

Thank You and Questions?

Mari Watanabe-Rose

Director of Undergraduate Education Initiatives and Research

CUNY Central Office of Academic Affairs

mari.watanabe@cuny.edu

G. Michael Guy

University Leadership Fellow for Undergraduate Studies

CUNY Central Office of Academic Affairs

Associate Professor of Mathematics

Queensborough Community College

michael.guy@cuny.edu

Accepted proposal

Accelerated programs for students needing remediation in mathematics and/or English have been increasing student success nationally. Even though the aggregated outcomes are positive, a close examination of data may reveal some variabilities among students and instructors. To reduce such variabilities and maximize the positive effects of accelerated programs, the authors recommend evidence-based best teaching practices be embedded in the programs. In the presentation, several examples and resources for increasing student engagement and performance, supported by behavioral principles, are first introduced. For example, behavioral research has repeatedly shown that, to increase a target behavior, a desirable consequence (or positive reinforcer) should immediately follow the behavior. One accelerated remedial course was designed to follow the principle of immediate positive reinforcers, in terms of the delivery of assessments (i.e., quizzes and exams) and feedback by the instructors. The pass rate for this course was significantly higher than a traditional remedial course without such pedagogical considerations. In the latter half of the session, the audience members share information and ideas regarding current and future teaching practices, based on the introduced principles. The presentation and discussion are relevant for a wide variety of subjects, levels, and disciplines; all conference attendees are welcomed to participate.