



**Regression Discontinuity Design in *The Impact of
Precalculus on Student Success at Florida Polytechnic
University: A Study of the Initial Academic Year (2017-2018)***

By: Gus and Hail
Moral Support: Hail

**What was the
design?**



Two Paths Into Calculus

1. Come in with college Calculus 1 credit
 1. Take the ALEKS test
 - a. Score ≥ 71 and take Calculus 1
 - b. Score < 71 and take Pre-calculus
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Two Paths Through First Year

1. Take Pre-calculus
2. Pass/Fail
 - a. Pass: Take Calculus 1
 - b. Fail: Take Pre-calc again

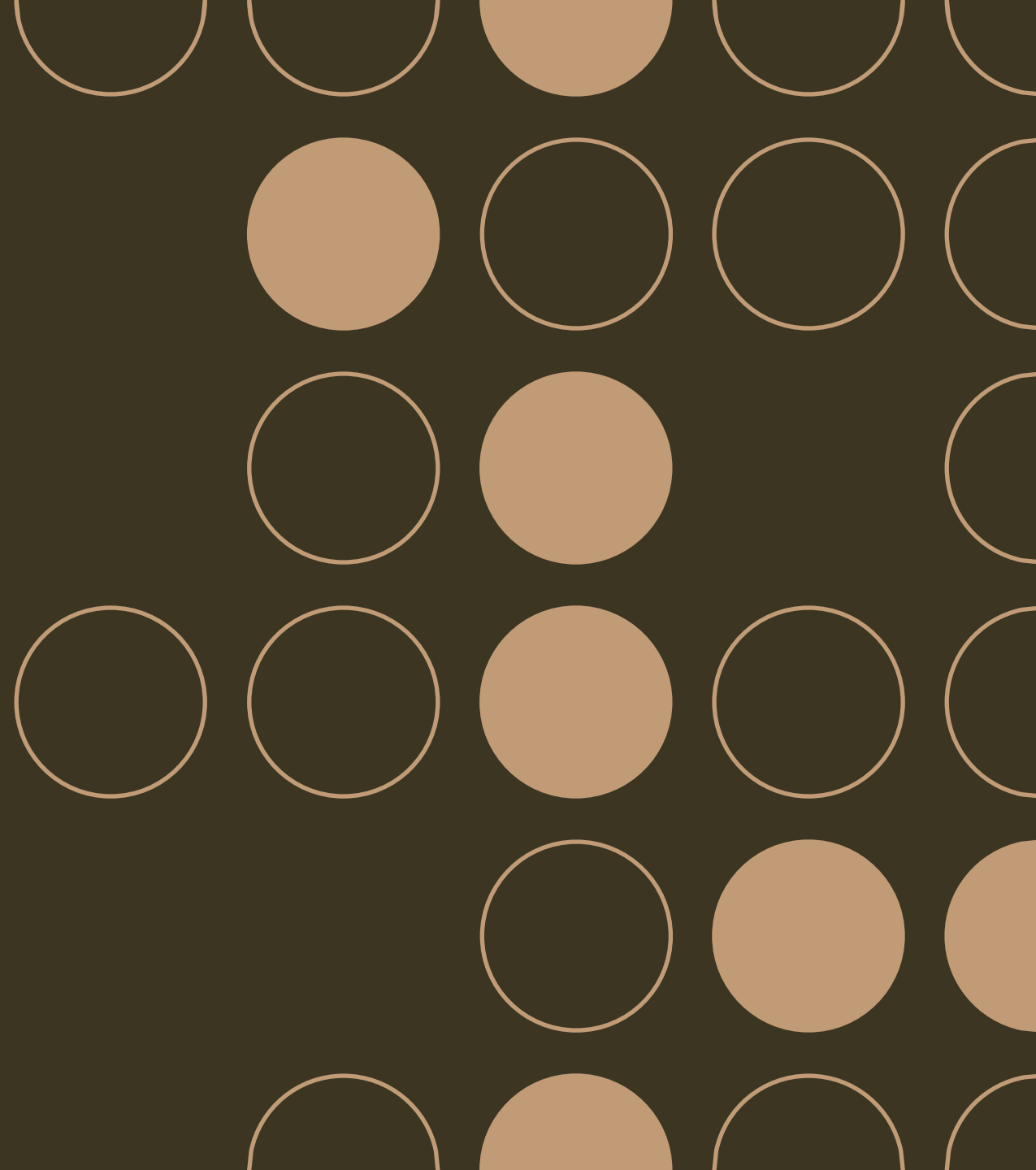
Worst case 2nd year in pre-calc for a 3rd time. 1.5yrs behind in progression.

1. Calculus 1
2. Pass/Fail
 - a. Pass: Take subsequent courses
 - b. Fail: Take Calc 1 again

Worst case 2nd year in calc 1 for a 3rd time. 1 year behind in progression.

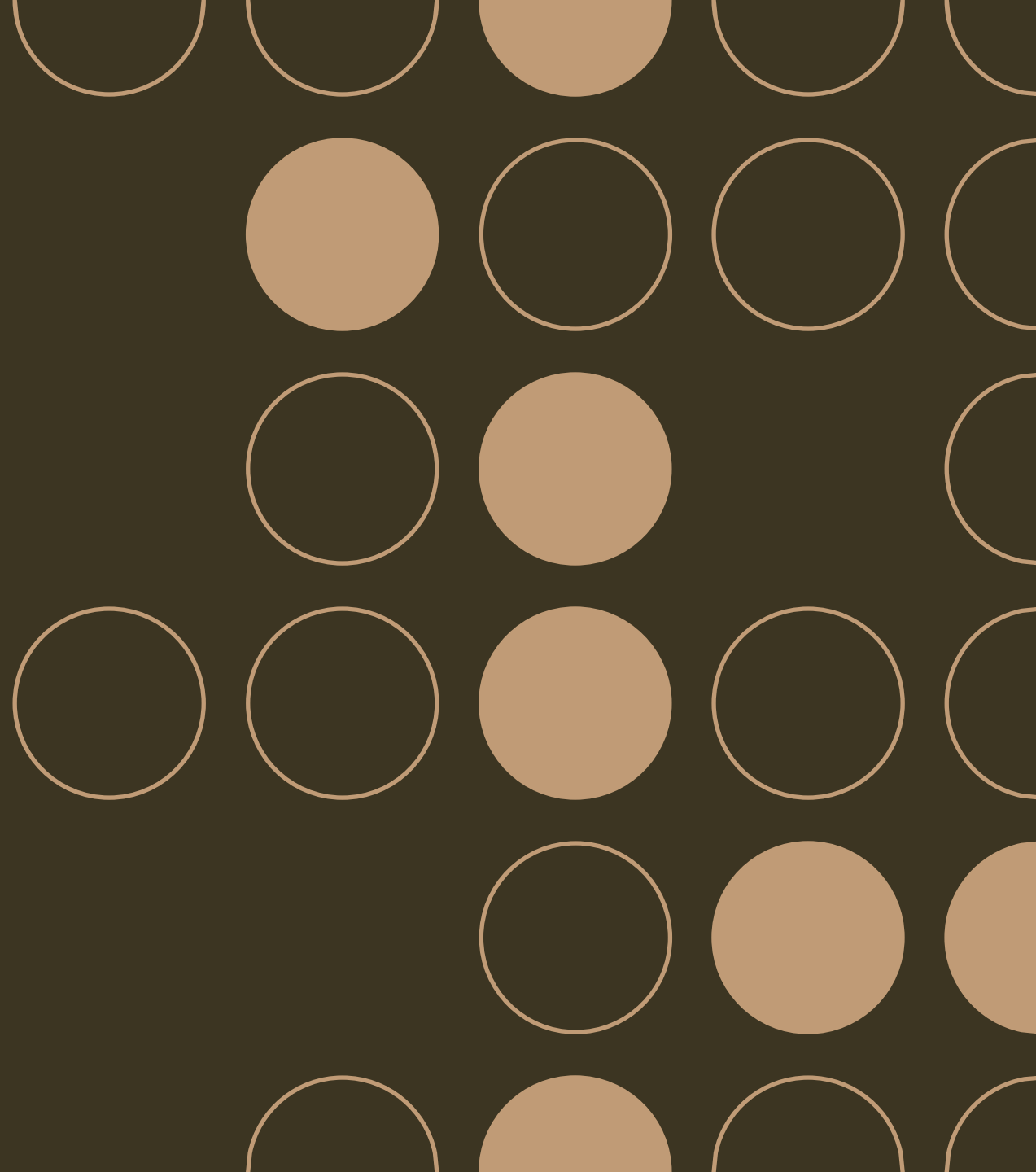
Regression Discontinuity Design (RDD)

- RDD is used to determine the causal effects of a treatment by assigning a cutoff above or below the assigned treatment or intervention.



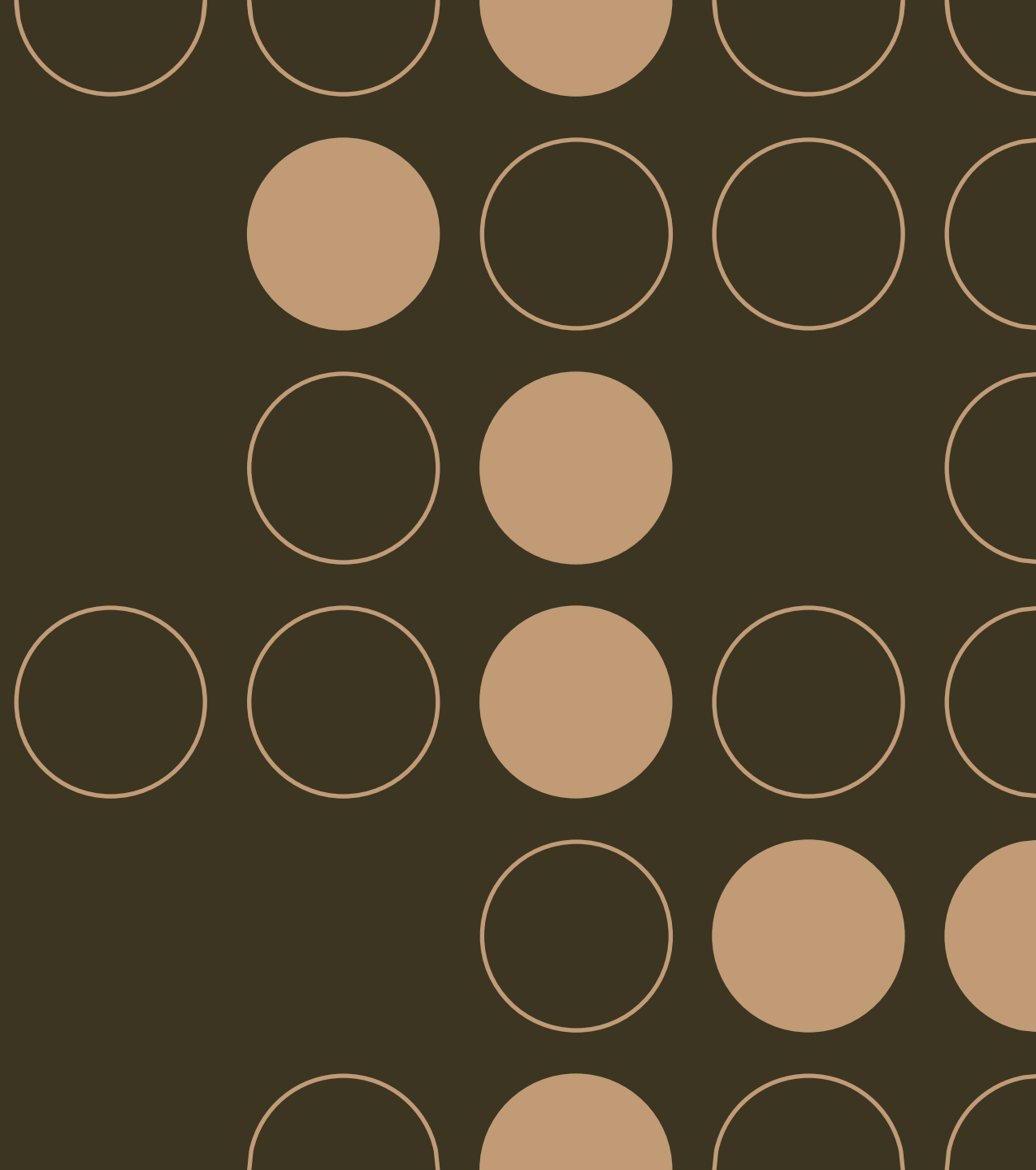
Average Treatment Effect (ATE)

- Compares treatments in randomized experiments
 - Comparing the observations that are really close to either side of the cutoff point can allow us to estimate the difference in the average outcomes between the treated and the control groups.
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Intention to Treat

- The internal validity of the RDD is compromised when there is noncompliance with treatment assignment based on the pretest.
 - This can be addressed by using intention to treat rather than just treatment and control.
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Intermission

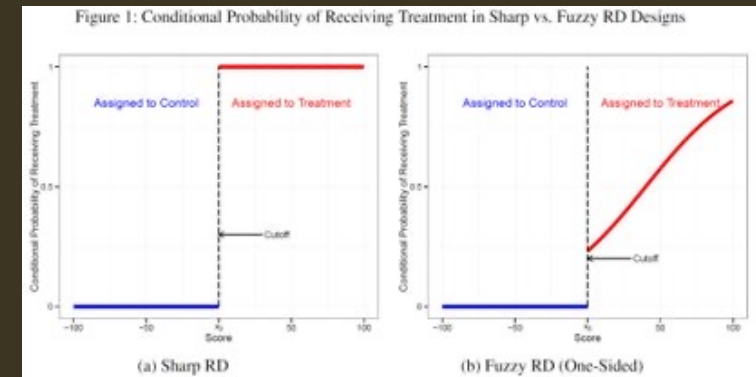
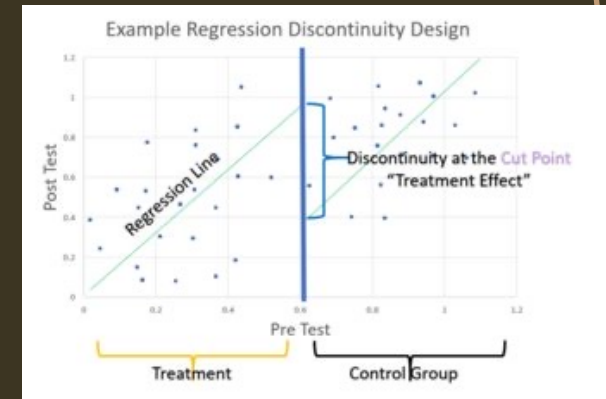




Was it fuzzy?



“This study uses a fuzzy regression discontinuity design”



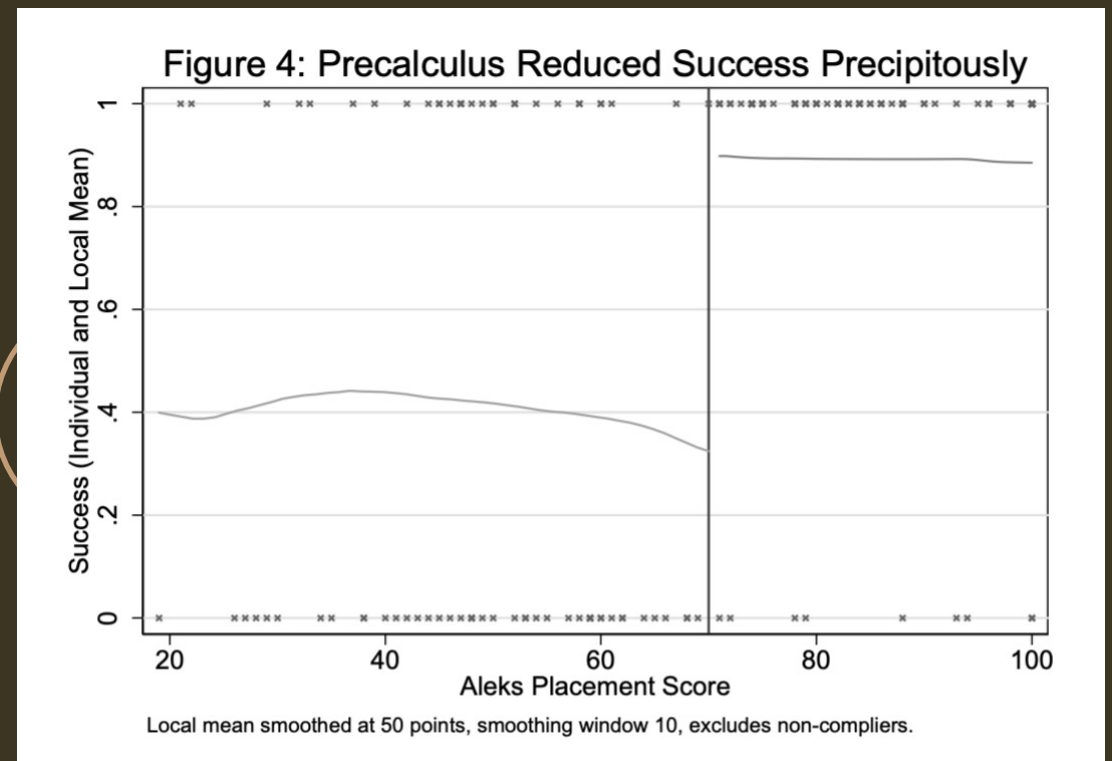
Powell, M. (2020). *The Impact of Precalculus on Student Success at Florida Polytechnic University: A Study of the Initial Academic Year (2017-2018)* (thesis).

**What is the
result?**



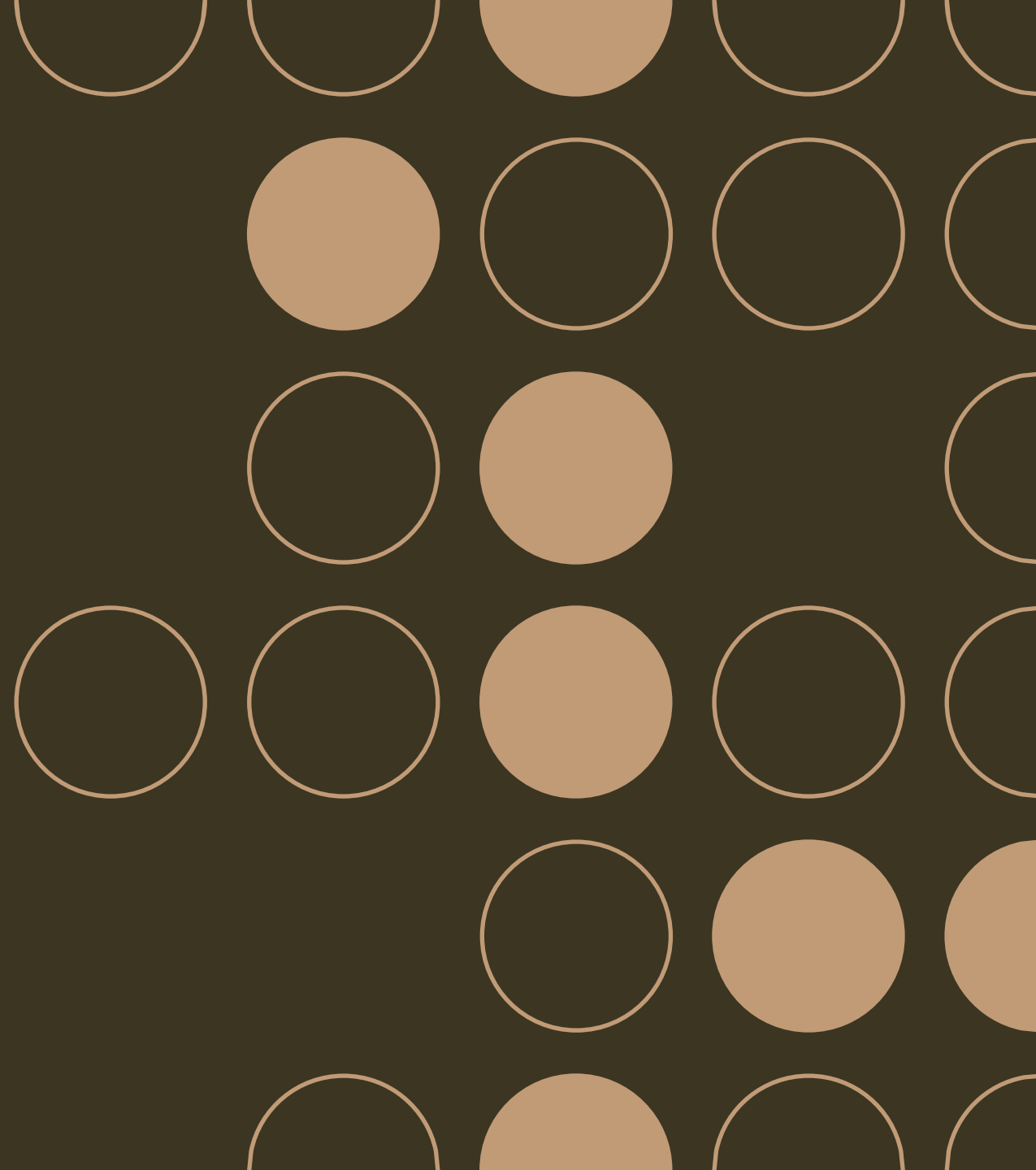
Primary Analysis

- Precalculus Reduced Success
- If a student was placed in pre-calc based off their ALEKS score, their probability of completing Calc 1 by the end of 1st year was reduced by 0.5 with a standard error of 0.145



Secondary Analysis

- Quantify the potential role of peer effects
 - This impact can be largely accounted for by two mechanisms:
 - Peer effects
 - Adding Precalculus poses more hurdles prior to Calculus and reduces the number of chances to pass Calculus.
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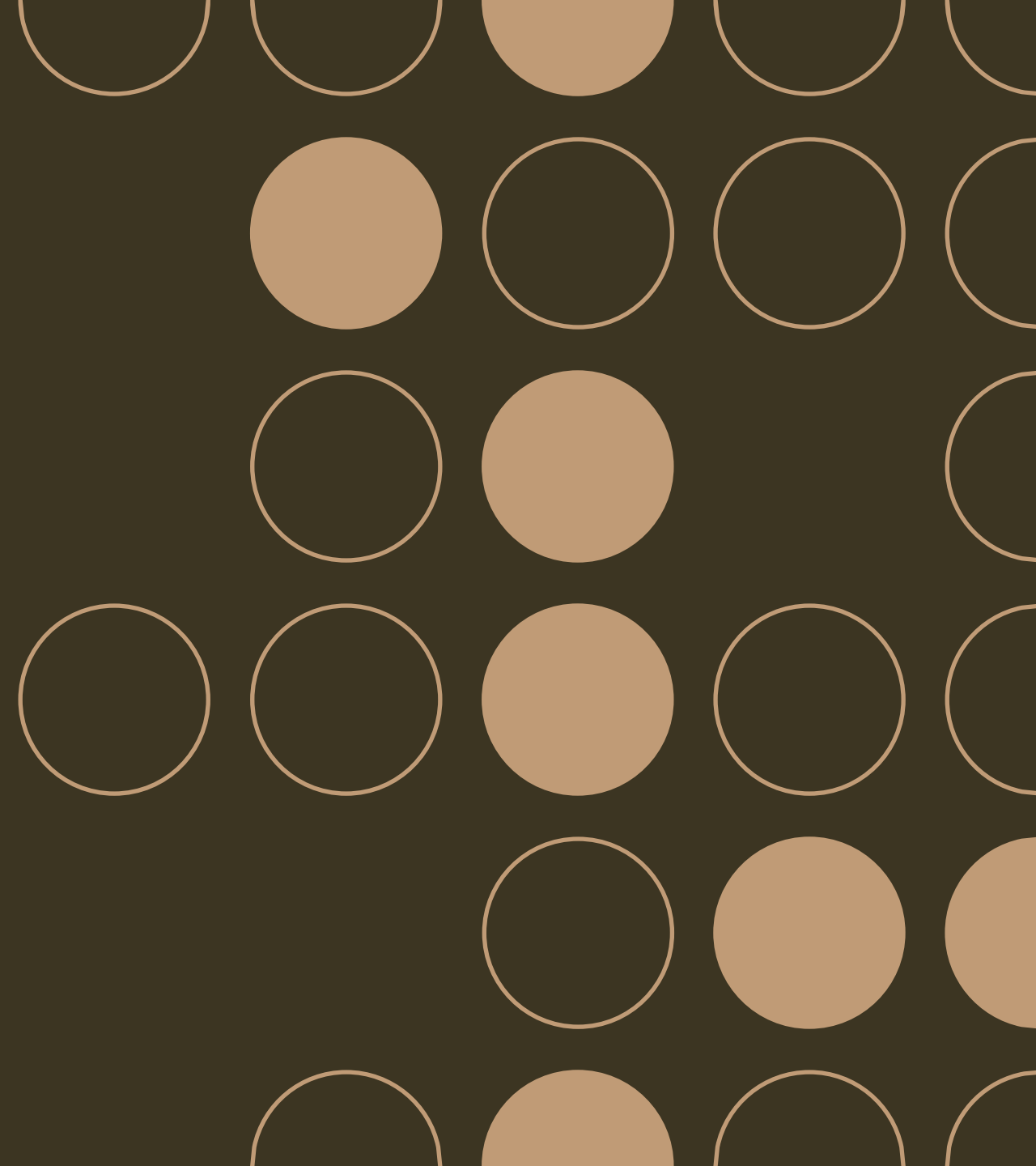


Q&A

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Answers

- **Jake:** A new wardrobe brings great joy and change to your life
 - **Maverick:** Do not upset the penguin today
 - **Kori:** If you feel you are right, stand by your convictions
 - **Graham:** You learn from your mistakes... You will learn a lot today
-



Answers

- **Logan:** It never pays to kick a skunk
 - **Nicole:** Move quickly, now is the time to make progress
 - **Hail:** Eat more vegetables to stay healthy
 - **Dr Dewey:** Nothing astonishes men so much as common sense and plain dealing.
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