This lab exercise appeared in Section VII: Learning, developed by Garth Neufeld, Kiersten Baughman, Stephanie P. da Silva, & Elyse Hall, in Promoting psychological science: A Compendium of laboratory exercises for teachers of high school psychology (Miller, 2018). This exercise is provided here with permission from the editor.

Lab Title: Operant Conditioning

Section 1: Performance Expectations

What will the student be asked to do?

- Students will *plan and carry out a scientific investigation* about operant conditioning.
- Students will analyze data to draw conclusions about their own behavior and use this analysis to develop a model to improve their daily behavior.
- Students will communicate information about their findings.

After concluding this lab, students understand:

- Law of Effect
- Principles of operant conditioning
- Types of punishment and reinforcement
- Clinical and experimental examples of operant conditioning

After concluding this lab, students are able to (performance standards):

- Explain the principles of operant conditioning
- Apply operant conditioning to their everyday lives
- Analyze the effect of learning theories on their behavior
- Develop systems of operant conditioning that modify and improve behavior

Main Idea/Concept Demonstrated or Taught by Lab:

This lab allows students to analyze how operant conditioning principles affect their everyday lives. They will plan and carry out an observational study on their own behavior on popular cell phone applications.

Key Terms and Psychologists Associated with Main Idea/Concept:

operant conditioning, B.F. Skinner, emitted behavior, positive reinforcement, negative reinforcement, positive punishment, negative punishment, schedules of reinforcement, discriminative stimulus

Materials:

Students will use their personal smartphones for this lab (or any other electronic device they use for games, online shopping, and/or social media). They will also need a notebook, phone, or laptop to record their observations.

Instructions:

Prior to this lab, students should be familiar with basic concepts of operant conditioning and types of consequences. Videos are provided under “Follow Up and Discussion” that may help explain these concepts.

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Students will work with a partner (or group of three) and to complete the following steps:

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1. First, choose one smartphone application (app) or online activity to analyze. Select an app that you are both familiar with *and* spend a lot of time using daily. You may select any appropriate online activity that you can do in class, such as a social media app, game, or online shopping.
2. Next, discuss how you use this app, making a list of your emitted behaviors and the responses you receive in the following categories: positive reinforcement, negative reinforcement, positive punishment, and negative punishment.
    a. This can be done in a chart, or simply four separate lists for each of the categories. Each addition to the list must include a behavior and response.
    b. It may be helpful to discuss a few examples as a whole class before students begin their lists. You may ask them to choose an app, and list at least one example under each category. Here are a few examples you may use for Snapchat:
        i. Positive Reinforcement: Clicking through a friend's story on Snapchat (emitted behavior) - seeing a funny picture (response)
        ii. Negative Reinforcement: Clicking on a Snapchat picture (emitted behavior) - the notification goes away (response)
        iii. Positive Punishment: Ignoring Snapchat during the school day (emitted behavior) - your friend is mad at you because you didn't respond to them (response)
        iv. Negative Punishment: Ignoring Snapchat during the school day (emitted behavior) - you miss out on an inside joke sent among your friends (response)
3. Choose one or two behaviors and responses from each category to observe in your lab.
4. With your partner, take turns using this application for 5 minutes or less, with your partner observing and recording your behavior.
    a. Make a tally next to each behavior-response pair when it occurs.
    b. Keep in mind that--though you are trying to simulate natural, unobserved behavior--it will likely be necessary to communicate with your partner while you are using the app. For example, you would need to tell them if you find a specific tweet funny (and therefore positive reinforcement), as you are scrolling through your feed.
5. Compile and analyze your data.

Follow-up and Discussion:

- As a class, discuss how operant conditioning principles are integrated into smartphone apps. What patterns are there across applications? How does operant conditioning contribute to making smartphones so addicting?
- Using these findings, each pair of students should devise a new system that will reduce use of this app. Their goal is to make the app less addicting by changing its structure or creating a new smartphone program. Some things to consider:
    - How can you extinguish your trained responses?
    - How can you alter notifications (discriminative stimuli)?
    - How can the schedules of reinforcement be altered to decrease responsiveness?

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- These new systems can be integrated into students' lab report or communicated in a separate format. Students may extend this project by writing out formal business proposals or letters, intended for the designers of their chosen app. These letters would need to correctly explain psychological terms, while still presenting a clear argument to the designers. Students will need to defend why these changes are in the best interests of the users and/or will not make the app any less fun and popular.

What are some commonly held student ideas (both troublesome and helpful) about this topic? How could instruction build on them?

- The difference between types of consequences (specifically, the use of 'positive' and 'negative' in these terms)
- Students likely already know that smartphones are addicting, and this activity may help them explain this previous knowledge. Students may explore research on this topic before or after completing their labs. The following articles may be utilized as resources:
    - The Binge Breaker (Bosker 2016)
    - Smartphone Addiction (Archer 2013)
    - Internet Addiction (Beato 2010)
    - Relationship between Psychological Well-Being and Smartphone Addiction of University Students (Kumcagiz, H., & Gündüz, Y. 2016)

What prior concepts do students need to learn to understand the core ideas? What level of abstraction is expected of them?

- Students will need to have a fundamental understanding of processes and procedures of scientific inquiry.
- Law of effect and principles of operant conditioning
- Types of consequences in operant conditioning (reinforcement and punishment)
- Schedules of reinforcement

What representations or media help students make sense of core ideas?

- Crash Course Psychology #11: How to Train a Brain
- Operant Conditioning (interview with Skinner; discusses research with pigeons, schedules of reinforcement, and Behaviorist views of free will)

What practices could students engage in to explore phenomena and/or representations of this concept?

- Students could watch the videos linked above to better understand the basic principles of operant conditioning.
- Students could apply operant conditioning terminology to other areas of their lives.
    - Rewards and punishments they receive from their parents
    - Training their own pets
- Students could expand this lab to include classical conditioning examples (to better explain the difference between the two types of learning).

Section 2: Crosscutting Concepts

- Students will observe and identify *patterns* in their use of smartphone applications.
- Students will analyze and develop new *systems* that can impact and improve their behavior.

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Section 3: Lab Report (written, verbal, or recorded)

Suggested Content to be Included in Student Report:

- Background information (principles of operant conditioning, discussion of use of this app)
- Objectives
- Questions and hypothesis
- Materials used
- Procedure described in detail (for replication)
- Collected data and observations
- Findings
    - Was hypothesis supported or not supported? Explain.
    - What do the findings mean? (use appropriate terminology related to concept)
    - How could the research be improved, if replicated?
- Recommendations
    - In this section, students should describe a new system they have designed that will reduce use of this app. Their goal is to make the app less addicting by changing its structure or creating a new smartphone program.

References:

Archer, D. (2013, July 25). Smartphone Addiction. Retrieved from https://www.psychologytoday.com/blog/reading-between-the-headlines/201307/smartphone- addiction

Beato, G. (2010). Internet Addiction. *Reason*, *42*(4), 16-17.

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Additional Recommendations:

This lab is designed to focus on basic operant conditioning principles. However, it can easily be adapted to include other terminology and examples. Students may take note of the schedules of reinforcement on each app, or they may analyze the ways that that have been classically conditioned to feel towards and respond to the app they have chosen to study (notification sounds/icons, logos, etc.).

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