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Resources for Teaching Research and Statistics in Psychology

- Title of Resource** Activity: Threats to Internal Validity: Smarties vs. Dum Dums
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- Brief Description:** This activity helps students remember potential sources of threats to internal validity, through an in-class activity where students engage in an “experiment” where several threats to internal validity are present.
- Keywords:** Internal Validity
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- Additional Information:** Lewandowski, G. W., Jr. (2003, March). *Classroom demonstration for teaching threats to internal validity*. Poster presented at 17<sup>th</sup> Annual Meeting on Undergraduate Teaching of Psychology Ideas and Innovations, Ellenville, NY.

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**Instructors:**

*This activity is a intentionally poorly done mixed design where students complete a pretest of intelligence (a trivia quiz), select their between-subjects experimental group (type of candy), and then complete a posttest of intelligence (a memory quiz about 20 pictures). Steps of the activity appear below. Using the MRS SMITH Threats to Validity, have students identify how each of these were a potential problem in the Smarties vs. Dum Dums study. [Note: Please see the activity “Identifying Potential Threats to Interval Validity Using MRS SMITH” by David Strohmets for information on these threats that generally follow the threats outlined by Campbell and Stanley (1966)]*

## **Pretest “Intelligence” Test**

1. Is there a Fourth of July in England?
2. How many birthdays does the average man have?
3. Some months have 31 days; how many have 28?
4. How many outs are there in an inning?
5. Is it legal for a man in California to marry his widow's sister?
6. Divide 30 by  $1/2$  and add 10. What is the answer?
7. If there are 3 apples and you take away 2, how many do you have?
8. A farmer has 17 sheep, and all but 9 die. How many are left?
9. How many animals of each sex did Moses take on the ark?
10. How many two cent stamps are there in a dozen?

### **Answers**

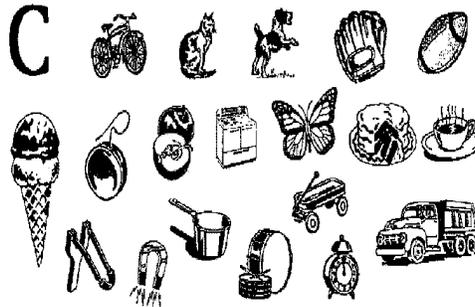
1. Yes, right after the 3rd.
2. 1 (you can only be born once)
3. All of them.
4. 6 (3 in top half and 3 in the bottom)
5. No... he's dead.
6. 70
7. 2... you took them
8. 9
9. zero (the ark was Noah's)
10. 12

## **Candy Selection**

- 1) Set up a bag (or several for larger classes) of candy so that you have equal amounts of Smarties (<http://www.smarties.com/>) and Dum Dum Brand (<http://www.dumdumps.com/>) lollipops for the number of students in the class. Provide some sort of cover story for why you have this type of candy (leftovers from Halloween or a kid's birthday party) and mention that you have just enough for everyone. Ask them to help you out by taking one so that you won't have any leftover.
- 2) Once everyone has picked their candy, proceed to the posttest.

## **Posttest "Intelligence" Test**

- 1) Show an array of 20 pictures. Give them 2 minutes to memorize the pictures.



- 2) Give them a distraction task ("Please count backwards from 873 by 7's.") for a minute.
- 3) Have them write down as many pictures as they remember.

## **Debrief**

- 1) Let students know about the true purpose of the activity and the reasons for the candy selection. (Students have always been very amused by the cover story and the potential hypothesis "you are what you eat" underlying the activity)

## **Calculating Scores**

- 2) For the Trivia Quiz, have students add up the number they got correct, and multiply by 2. (this is done so that the pre & post scores have a max of 20)
- 3)  $\text{Score} = \text{Posttest (\# of Pictures Recalled)} - \text{Pretest (Trivia Score)}$ 
  - Scores can range from +20 through -20, with positive scores indicating improvement from pre to posttest

## **Results**

- 1) If possible, students enjoy seeing the data. Have them state their candy selection and score.
- 2) This is great opportunity to ask them to identify IVs & DV, the formal hypothesis, and the need for deception.
- 3) Proceed with talking about threats to internal validity with students identifying each threat in the context of the activity.