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Taste and Memory

OPERATIONAL DEFINITIONS

Number of questions student got right on chapter quiz (taste stimulus or NO stimulus)/total questions asked (taste stimulus or NO stimulus)

Taste stimulus= colorless jolly rancher flavor

Idea: Taste and smell are strongly connected. Smell is one of the strongest senses and is often heavily associated with memory. Being subjected to different flavors while studying different subject areas may improve recollection later when tasting the same flavor during a test in that subject area.

Participants:

Stimulus: each student will be given the same flavor of jolly rancher during class to suck on, but it will be colorless. Not allowed to chew, because gum studies show chewing has some effect. Students will be resupplied with colorless candy at same time as other students in other classes

Teachers: established teachers who have been using the same teaching methods for years and do not switch up their curriculum plan

Students: cannot have special circumstances that could clearly affect a student's learning ability. Students would have to get consent forms signed by parents and be proven to not have any mental problems, sugar problems, above average IQ, etc. Students will also be the same age. I want to see if age contributes to this theory. Theoretically, I would like at least three different age groups studied each year at the same time. Possibly 5th graders (because they are the upper level of elementary school and are comfortable where they are at, less social pressure to affect them. Also because their cognitive levels have averaged out more as they matured than if we used younger kids), 8th graders (top of the food chain in their school and less social pressure), and 11th graders (at the point where they still try to get into college but are upper classmen and by now adjusted to social setting). I don't intend to use seniors because they are high levels of "senioritis" and slacking.

Tests: each school has their own standardized tests to give students to make sure everyone in the study gets fairly quizzed. Different states may use different tests because different states will teach different topics in different grade levels. Note: each chapter quiz should have the same amount of questions across all subject areas to make comparisons easier. Teachers can test students as they regularly would by giving their own accumulated tests of their own making whenever they choose. Teachers can omit chapter quizzes from student's actual grade if they are not satisfied with only giving quizzes, but every teacher would still have to give the standardized quizzes after learning each chapter.

Schools: Undecided on this, perhaps one school from each district or randomly selects a few school districts throughout state. Pick a certain percent of school districts in each state? Or a set amount from

each state (like 5)? This seems unreliable because of population difference, so most likely random school districts throughout the state and determine number of school districts on state population.

Subjects: this study should be done on different subject areas because different parts of the brain are worked and because students respond differently in different subject areas.

****potentially different flavors are used in different subject areas****

How I plan to measure:

I do not intend to measure certain individuals specifically and study their personal effects; I am looking at an overall average

To prevent cheating, a teacher cannot let students keep their tests after receiving their grade. This is a multiple year study.

Now, I am aware that different states have different school curriculum requirements. For instance, Michigan teaches geometry in middle school but Virginia does not. If every location selected through the U.S. uses the same tests, it would fail because what is taught throughout the country is not standard. This is why multiple classes need to be studied and compare a schools average over multiple years. One year would not give clear answers. Each school would be permitted to design their own tests, but they would need to be tests that have been established and used for a few years to determine student averages without taste stimulus.

The point in this is to see how people the same age react to taste as a memory enhancer in a subject area throughout the U.S., and to see how other generations of students react (having one class that's exceptional at school and another year that tends to slack more often than not would skew the results)

Let's get started . . .

For the students in each class who are permitted to participate (show steady GPA, no mental problems, signs of heightened IQ, etc.) Established teachers (who have been teaching for a while and are using a steady curriculum plan – not switching up each year testing new methods) would report their records of how students averaged on each test over the years to find the mean. Once that has been determined, alternating using a taste stimulus between chapters (ex: ch 1 uses no flavor, ch 2 uses flavor, ch 3 no flavor, ch 5 use flavor) Different classes within a school will use the taste stimulus at different chapters (ex: ch 1 uses flavor, ch 2 uses no flavor, etc) After each standardized quiz, record how each student does. Compare the differences between classes within a school (see if the classes using a flavor while learning does better than classes that did not) This shows comparison within students who are exposed to a similar social setting within a school and geographic area. Compare how a student did overall throughout the year and see if they seemed to do better on tests that used a taste stimulus. It may be hard to notice much within one year at one school, so this study would need to have more locations using the same process. Randomly select a few schools throughout each state in the United States. This will be done for at least three years because different class years may be subjected to different social circumstances.

I am essentially basing my conclusion on how effective flavor was. Half the tests a student takes will be with a taste stimulus, and half would be without a stimulus. So, I would split the two categories up (taste and no taste stimulus). For each category, add up the total questions one got right throughout the semester and divide that by the total number of questions one was asked under the specified condition

Number of questions student got right on chapter quiz (taste stimulus or NO stimulus)/total questions asked (taste stimulus or NO stimulus)

EXAMPLE SETUP:

DAKOTA HIGH SCHOOL – HISTORY QUIZ COMPARISON

CLASS 1 (WALKER) CH QUIZ RESULTS

	1, none	2, stim.	3, none	4, stim	5, none	6, stim	total	Stimulus total	None total
Anne	7/10	8/10	6/10	8/10	7/10	9/10	45/60	25/30	20/30
Mark	4/10	6/10	6/10	8/10	7/10	10/10	41/60	24/30	17/30
Aaron	5/10	6/10	5/10	6/10	7/10	6/10	35/60	18/30	17/30
Hailey	6/10	9/10	7/10	7/10	7/10	9/10	45/60	25/30	20/30
total							166/240	92/120	74/120

CLASS 2 (MILLS) RESULTS

	1, stim	2, none	3, stim	4,none	5,stim	6,none	Total	Stim total	None total
Bob	9	8	10	8	9	9		28/30	25/30
Bill	8	8	8	7	8	8		24/30	23/30
Mary	10	9	9	9	10	8		29/30	26/30
Sarah	8	7	8	8	9	8		25/30	23/30
total								106/120	97/120

Pretend I did the rest of the classes already....

Dakota High School History comparison – stimulus appears to make a difference

CLASS/TEACHER	TASTE STIMULUS	NO STIMULUS
Class one (Walker)	92/120	74/120
Class 2 (Mills)	106/120	97/120
Class 3 (Tempio)	100/120	100/120
Class 4 (Davis)	112/120	98/120
Class 5 (Nash)	92/120	90/120
TOTAL	502/600 = 84%	459/600 = 77%

This will be done for each subject area for all the teachers who are participating in this study for each school.

Dakota High School Overall Results

	Taste stimulus	No stimulus
History totals	502/600	459/600
Math totals	500/600	502/600
English totals	525/600	520/600
Science totals	516/600	497/600
Total	2043/2400 = 85%	1978/2400=82%

Time to compare to the rest of Michigan...

Michigan History results

	Stimulus	No Stimulus

Dakota High School	2043/2400	1978/2400
Henry Ford High School	2002/2400	1899/2400
Muskegon High School	2169/2400	1989/2400
Total	6214/7200=86%	5866/7200=81%

Let's now compare all subjects tested in Michigan....

Michigan overall results

	Stimulus	No Stimulus
History	6214/7200	5866/7200
Math	6007/7200	6002/7200
English	7001/7200	6893/7200
Science	8778/7200	8674/7200
Total	28000/28800=97%	27435/28800=95%

This is where we can see if flavor seems to have any real effect. Is it in only certain subject areas?

Also need to look at the results overall throughout the country

Things to consider:

Age: different developmental stages may respond differently. Use set grade levels. Too hard to use college students because circumstances vary too much

Flavor of jolly rancher

Generation: different class years. Graduates of 2012 vs 2013 may have responded differently

Sugar levels: use a sugar-based flavor vs sugar free flavor

Color: color can lead to biasness, use clear candy

Diet: how kids eat may affect brain activity. Need consistent diet for this experiment

Genetics: some people seem naturally smarter than others

Time of day study is conducted. Student's grades are often affected by tom of day their class is. May effect performance and data