What every teacher should know about cognitive research

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EXERCISE A: Clown "invention" activity
From Daniel Schwartz, Stanford University

An **index** is a number that helps people compare things.

Miles per gallon is an index of how well a car uses gas.
Batting average is an index of how well a baseball player hits.
Grades are an index of how well you are doing in school.
Star rating is an index of how efficient an electrical appliance is.

We want you to invent a procedure for computing one kind of index.

THE CROWDED CLOWNS INDEX

Companies send clowns to parties, circuses, amusement parks, sporting events, and so on.

To get the clowns to the event, each company packs the clowns into a bus.
Some companies make the clowns more crowded than other companies.

The more crowded the clowns are, the grumpier they will be.

People who order clowns want to know a company's crowded clown index.

Invent a procedure for computing a crowded clown index for each company

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RULES FOR THE INDEX

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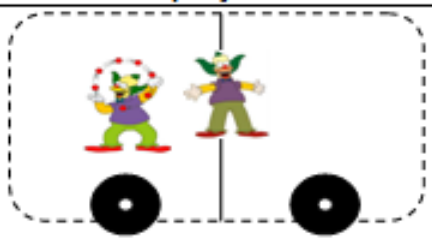
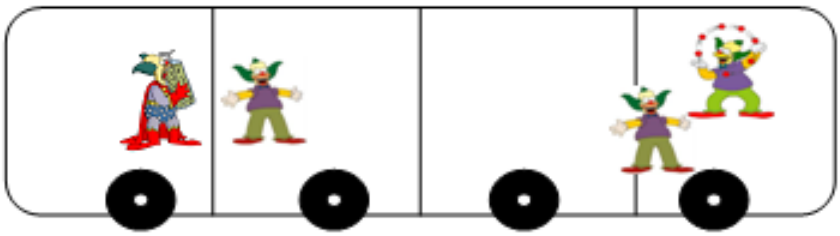
1. The same company always crowds the clowns the same amount, no matter how many clowns get ordered. So a company only gets a single crowded clown index.

2. You have to use the exact same procedure for each company to find its index.

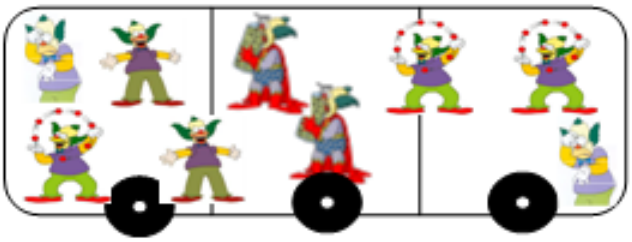
3. A big index value should mean that the clowns are more crowded. A small index number should mean that the clowns are less crowded.

Clowns 'r Us: Index = _____





Bargain Basement Clowns: Index = _____



Krusty Clowns: Index = _____

EXERCISE B: Popping Corn Index / Fastness Index

Andrew Boudreaux, Western Washington U.; Suzanna Brahmia, Rutgers; Stephen Kanim, New Mexico State; AJ Richards, Rutgers; Josh Smith, Rutgers

Invention Sequence: *Popcorn popping*, *Fastness*, and *Speeding Up*

An *index* is a number that helps people compare things.

- *Miles per gallon* is an index of how well a car uses gas.
- *Batting average* is an index of how well a baseball player hits.
- *Grades* are an index of how well students perform on a test.

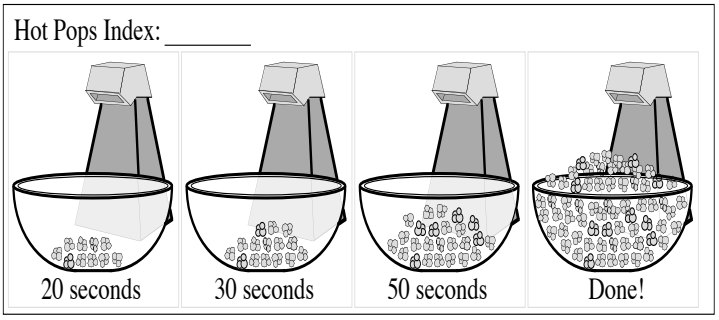
We want you to invent a procedure for computing an index that helps make comparisons.

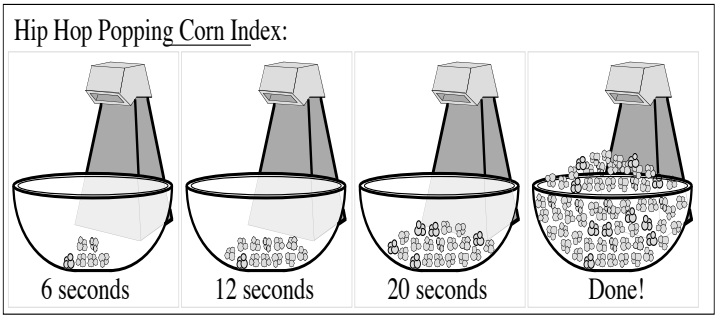
A. Popping Index

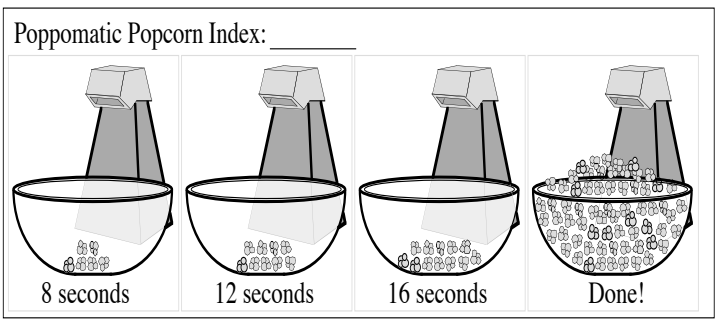
Three companies make popcorn. They use different types of corn so the popping is fast or slow. Invent a procedure for computing a "popping index" to let consumers know how fast each brand pops.

Rules for the Index:

1. The same brand of popcorn pops at the same speed. So a brand of popcorn only gets a single popping index.
2. You have to use the same procedure for each brand to find its index.
3. A big index value should mean that the popcorn pops faster. A small index value should mean that the popcorn pops slower.

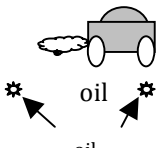






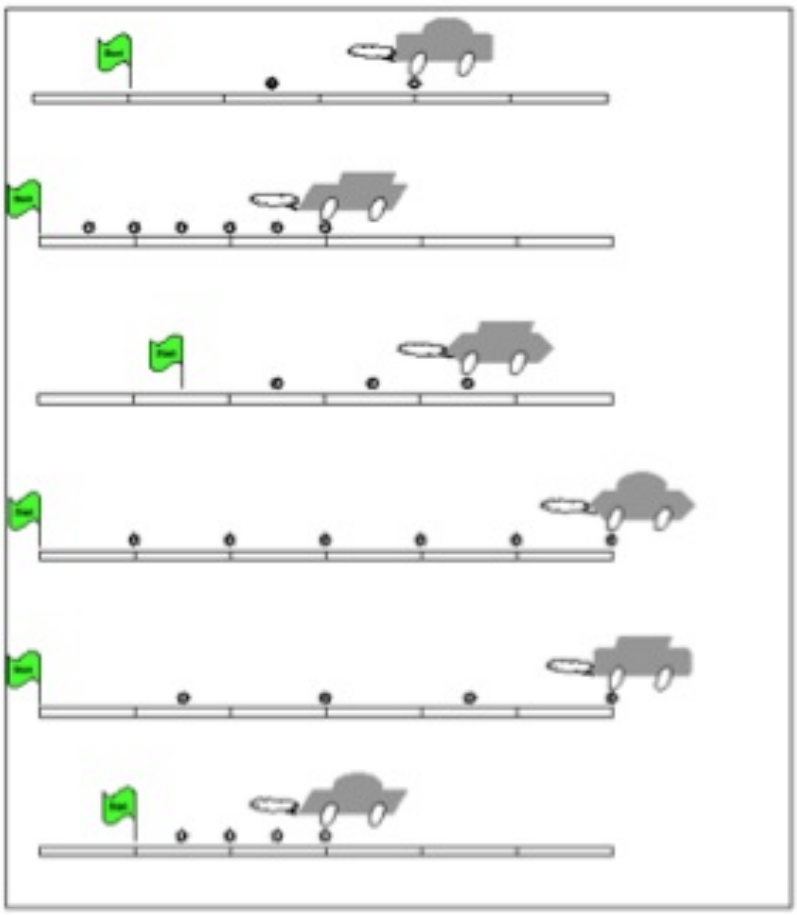
B. Fastness Index

Let's look at another kind of index. Your task this time is to come up with a *fastness index* for cars with dripping oil. You will see several cars, and will need to come up with one number to stand for each car's "fastness." There is no watch or clock to tell you how long each car has been traveling. However, all the cars drip oil once every second. (They are not very good cars!)



Some relevant information:

- A company makes cars that all have the same fastness.
- We will not tell you how many companies there are.
- You have to decide which cars are from the same company. They may look different! To show cars that are from the same company, draw a line connecting them.



C. Follow up questions

1. Which popcorn is fastest? Which car is fastest? Explain.

2. For each question below, explain your reasoning:
   - A full bowl of popcorn has 60 popped corns in it. Determine the amount of time for the fastest popcorn to fill a bowl.
   - Write an expression for the time required for the fastest car to travel *B* blocks.