

Emotional Response to Photo vs Weave

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Lia Cook (<http://www.liacook.com>) performed experiments where subjects compared their emotional reaction to the same photograph rendered as a wall-sized print versus the a similar size woven tapestry.

Experimental Procedure

Side by Side Comparisons of Photo vs Weave

Each subject was randomly assigned to look first at the photo, or the weave. After viewing, a survey was taken to capture emotional response in a paragraph, a single word, emotional intensity on a 0-10 scale and emotional positive (10) vs negative (0) on a 0-10 scale. Once both images were viewed and emotional response was captured, the subject added information about age, gender, education and previous experience with scientific experiments, photography, weaving and art.

Pittsburgh vs Houston studies

The experiment was done twice, in two different cities. While the methodology was the same and instructions very similar, the photos were different and the mix of participants was also different.

Data Cleansing

Data was converted into a common format for analysis, and along the way minor errors in transcription appeared. The original paper copies were available to check. When the subject did not enter any information for a given category, it was not considered in a comparison of that category.

Statistical Inference

Sample Populations

There were 428 subjects in Houston, 396 subjects in Pittsburgh, people willing to both attend an art exhibit and participate in an experiment. When gender was indicated, both samples were a bit over 70% female.

The Houston sample showed an older population than the Pittsburgh sample. Both had similar numbers for education, accounting for age.

Age	child	teen	20s	30s	40s	50s	60s	70s	80s	90+
Pittsburgh	21	34	79	42	44	80	51	13	1	0
Houston	13	20	52	50	38	80	89	28	4	1

Reproducing the Research

Github repository including raw data, R code and survey methodology can be found here: (start with README.Md) <https://github.com/BShanrockSolberg/liacookDV>



Exact survey questions and instructions are found in the github "directions" folder.

Survey results were copied into Excel or Text files. These files can be found in the github "rawdata" folder.

The entire data cleansing process is shown in this file: https://github.com/BShanrockSolberg/liacookDV/blob/master/lc_clean.md

The github repository contains all the files needed to generate the cleansing, statistics and visualization results shown in .md files.

The entire statistical analysis is shown in this file: https://github.com/BShanrockSolberg/liacookDV/blob/master/lc_stats.m

These subjects represent a fairly normal mix for a Lia Cook exhibit.

Education	AA/less	BS/BA	MS/PhD
Pittsburgh	113	107	151
Houston	93	107	155

Statistically Significant Results

The initial approach to analysis was to compare emotional intensity and positive/negative response with populations with different gender, art/science/weave/photo experience, age or education. Insight from the initial comparisons narrowed down the possible factors, and more advanced techniques were used to determine which of the remaining choices were most important, and which could be safely ignored (see **confounding variables** sidebar).

No significant difference was discovered in emotional intensity, but emotional Negative/Positive response was different in both.

The first important result was that response was consistently biased based on whether the Photo or the Weave was viewed first.

After correcting for this bias, both Pittsburgh and Houston also showed an age-based difference in response, but the threshold was different for the two studies. It is not possible from the data to determine the cause of the threshold difference.

Visualizing the Emotional Response

Statistically significant differences can be subtle. Color and size help.

Colors

Blue indicates **More Positive Weave Response**.

Red indicates **More Positive Photo Response**.

Purple indicates **Response is the Same**. In larger tapestries blue and red threads can be woven together instead to give a similar effect.

Line Thickness or Spot Size

Thicker lines or larger spots indicate more people who had exactly the same emotional reaction.

When sample sizes are different but results are being compared, the numbers are normalized, so relative line thickness or spot size is similar.

Wordclouds

Beyond the intensity or the positive/negative reaction, the actual emotion is also interesting. The surveys captured free-form one word emotions. Similar words were consolidated to make the clouds less cluttered and easier to understand.

Confounding Variables

Confounding variables are best described with an example.

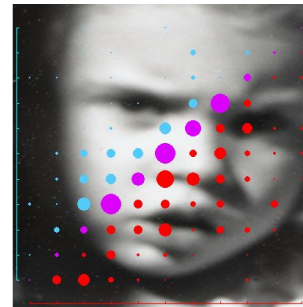
More smokers use breath mints than nonsmokers. Breath mint use might be statistically correlated with lung cancer because of this. If you don't know who in your sample smoked you might decide that breath mints cause lung cancer.

In this study, education looked like it might be significant, but when age was accounted for, age + education did not prove a better predictor than age alone. Other possible variables were checked in a similar fashion.

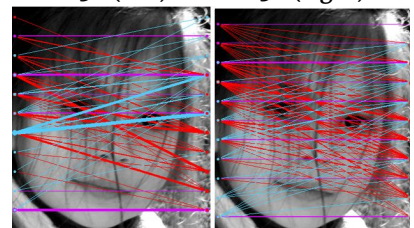
Early visualization efforts are shown in this file:

https://github.com/BShanrockSolberg/liacookDV/blob/master/lc_viz.md

Spot graph Pittsburgh Neg/Pos



Matplot, Houston, Neg/Pos under 30 (left) vs over 30 (right)



Wordcloud, Pittsburg

