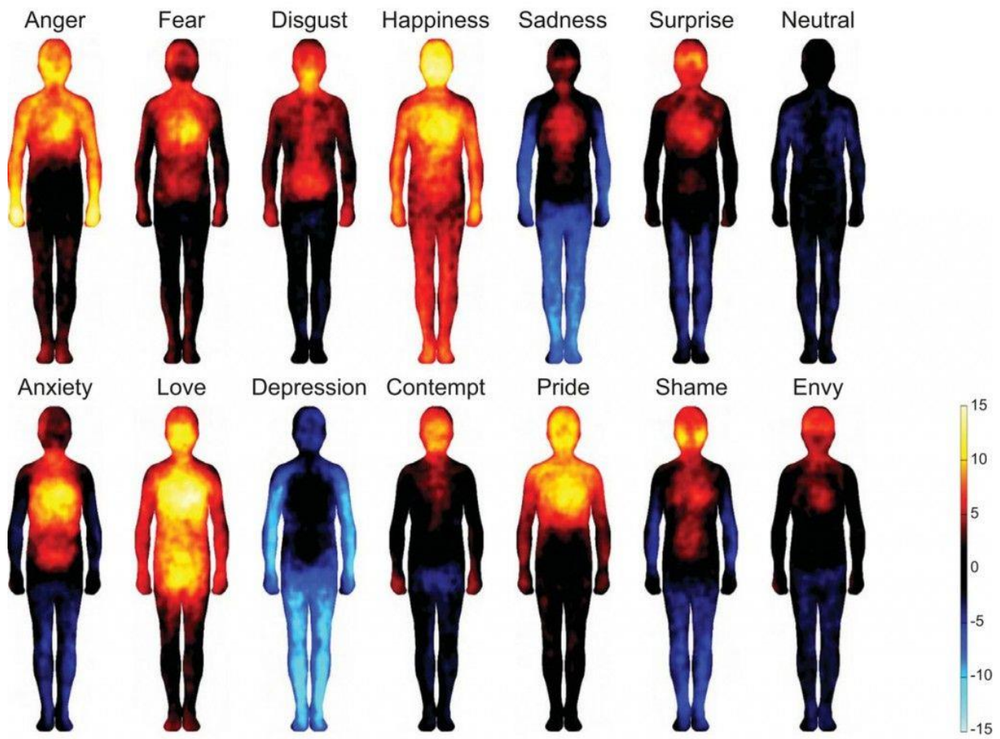
AK
Assignment II

14th April, 2014
HCDE 511

Static Visualization

Heat Map Shows Where You Feel Emotions in Your Body



Yellow shows regions of increased sensation while blue areas represent decreased feeling in these composite images. *Image courtesy of Lauri Nummenmaa, Enrico Glerean, Riitta Hari, and Jari Hietanen.*

1. **List the source of the visualization (a bibliographic citation is preferred, including the date if you can determine it). Include the creator and what you know of their background.**

   http://blogs.discovermagazine.com/d-brief/2013/12/30/body-atlas-reveals-where-we-feel-happiness-and-shame/#.U02RX_ldUgt/
   Bibliographic citation: "Body Atlas Reveals Where We Feel Happiness and Shame - D-brief | DiscoverMagazine.com." Dbrief. N.p., n.d. Web. 14 Apr. 2014.(Date Accessed)
   Date Created: December 30, 2013 2:00 PM

   Source: http://randommization.com/2014/01/01/heat-map-shows-feel-emotions-body/heat-map-shows-where-you-feel-emotions-in-your-body/
   Bibliographic citation: "Heat Maps Reveal Where You Feel Emotions in Your Body." Io9, Discover. N.p., n.d. Web. 14 Apr. 2014.
   Date Created: December 30, 2013 4:00 PM

   According to Gemma Tarlach, writing in Discover:

More than 700 participants in Finland, Sweden and Taiwan participated in experiments aimed at mapping their bodily sensations in connection with specific emotions. Participants viewed emotion-laden words, videos, facial expressions and stories. They then self-reported areas of their bodies that felt different than before they'd viewed the material. By coloring in two computer-generated silhouettes — one to note areas of increased bodily sensation and the second to mark areas of decreased sensation — participants were able to provide researchers with a broad base of data showing both positive and negative bodily responses to different emotions.

2. **Who is the intended audience? What is its intended goal or purpose?**

Intended Audience seems to be the general public - anyone with the understanding of temperature and its relationship with color (though this is explained in the article), and familiar with the meanings of the different emotions mentioned here.
The intended goal seems to be to portray to the audience the rise or fall in sensation throughout the human body with respect to different emotions (and the neutral emotional state of the body).

3. **What information does this visualization represent?**

This visualization represents the broad locations in the human body where some of the emotions that are experienced by humans are felt in terms of increase or decrease in sensitivity and self-perceived body heat, relative to how (these) humans feel in a (their) neutral emotional state.

4. **How many data dimensions does it encode? Are the encoding mappings appropriate?**

This visualizations encodes 3 dimensions: sensitivity or bodily sensation (in terms of amount of heat or activity (vigor) felt), its strength, and emotion.

I think that the encoding mappings are appropriate in terms of the data represented (and not data collected). The colors, along with the scale, give a good understanding of the parts that are effected, and the strength of the effect in a not too quantitative sense (though the scale has numbers, there are no units mentioned in the visualization). However, to the general public, the intended information that would be useful to them is almost instantaneously conveyed, which is a great positive point.

5. **List several tasks, comparisons or evaluations it enables.**

It helps you to see which parts of the body react the most (and to what degree) to which emotions. Helps in perceiving the strength of the effect (sensation) in terms of the color with respect to how the human body is at its neutral emotional state. Further, this can be used in studies to understand in greater detail which type of emotions affect specific organs in positive/ negative ways for improving medication and medical care for the relevant patients.

6. **What principles of excellence best describe why it is good?**

The principles of excellence that describe this as a good visualization are as follows:

i. Well-designed presentation of interesting data (in terms of design)
ii. Consists of complex ideas with extremely high data points, which are communicated with clarity
iii. It is multivariate
iv. It tells the truth (there's no lie factor in terms of representing the collected data)

7. **List at least three strengths and three weaknesses of the visualization.**

Strengths vs Weakness

a. Strengths:

i. Negligible distracting data-points/areas
ii. Very easy to see the parts of the body being affected on a broad level – perfect for the general public
iii. The humanoid image used is very non- specific (to any individual, race, gender), and therefore allows the user to interpret this as "general" or common for all humans, making it ubiquitous (might be a weakness if this wasn't intended).

iv. Minimal and very legible – all parts of the body are covered.
v. This visualization is very vivid and memorable, as these are emotions that almost all the audience have experienced, and have also experienced the bodily feelings they are accompanied with (E.g. In case of shame, most people feel their ears burning, which is accurately shown here. This helps the audience in relating and connecting with this visualization on a deeper level, thereby increasing its effectiveness.)
vi. Multivariate data represented well. Also, a great example of showing data variation, and not design variation (Tufte).

b. Weakness
   i. Though the visualization of the data itself seems to be sound, the data collected is not empirical, which introduces inaccuracies. Though these could be mostly offset by the large sample size, there could still be very-important-but-not as-dense data points which the participants might not have felt, or might not have thought of mentioning to the researcher. Also, there are many parts inside the human body where there is no sensory or thermal perception, so increase or decrease in activity/ heat there would have gone unnoticed.
   ii. Takes time to see the trend – should have been arranged in an order (positive emotion and negative emotions)
   iii. The numeric values on scale are ambiguous – unclear what the numbers mean, and what their units are.
   iv. Difficult to calculate the measures of variation (Spread, standard deviation), and also "mean" emotional values (the neutral emotional value may not be the mean, median, or mode). Even if the values of the temperature corresponding to the colors were present, it would be difficult to estimate these and other statistical values. (Though, as per the topic, this might not be needed if we wish to stick strictly to it).
   v. The emotion list is not exhaustive, and doesn't provide ease in comparing successive/ progressive emotions of a particular type. (E.g. unhappy, sad, very sad, morose)

8. Does the visualization serve its intended purpose, in your opinion?

Yes, as the topic is merely where you (humans) feel emotions in their bodies. Though some more clarity about the usage of the word "feel" would be helpful in making things even more clear.

9. Can you suggest any improvements?

Yes. (Attached Visualization at the end of doc)

a. Group the emotions as positive or negative in a very broad and general sense (segmentation). This will enable in seeing trends in data, and make cognition easier.
b. -> Rearrange them this way:
   i. Happiness -> Love -> Pride ->Surprise -> Neutral ->
   ii. Anger
   iii. Anxiety -> Fear
   iv. Envy -> Contempt-> Disgust
   v. Shame
   vi. Sadness -> Depression

c. Would include greater context (titles, captions, units, commentary) (Mackinlay) so that the visualization is able to tell a cogent and engaging story. For example, in this case, one could also focus on which type of emotions make which parts of the body feel more "vigorous" and might make predictions for the effect these respective emotions would have on the health of those (and other) areas of your body.
d. Could assign the color spectrum a continuous numerical value, so that a numerical value can be calculated (by Integral Calculus)) for each emotion (and in each part of the body – depending on how we choose to segment the data further as per need. These values will improve cognition, and enable us to understand the distribution, and the "heat distance" of the various emotions from each other.)
e. Might want to include lesser or higher emotional states of a particular emotion for better comparison of that emotion across its various states. This might also help in deducing the origin of emotions.
f. Presenting a brief outline of core organs would help in signifying which organs are effected / affected by different emotions.
g. Indicating the unit on the scale would increase comprehension. It would also help in accurately understanding the difference in the illuminated body parts' temperature from the neutral temperature.
h. Would also make this interactive and dynamic to aid comprehension and cognition further, and also to facilitate the aforementioned points effectively (by employing things like aggregation, filtering, interactive links, brushing, etc.).

10. Why do you like this visualization?

I like this visualization because it has a very strong appeal that hooks most of the audience, even if they might not be able to extract too many tangible things out of it. This is based on health, something that relates to every single audience, and is presented with vivid colors, which makes it both engaging and memorable. Further, it greatly enhances engagement and cognition in terms of the different emotions and their effects on the body (and their comparison

with each other), especially because of all the background information that the people have been exposed to in the recent past (and also present) (eg. Articles on reasons to be happy, stress management, why is anger bad for the body, etc.). On the same note, this visualization has the ability to induce a lot of speculation and thinking among the audience about this topic, and in a very qualitative sense, which also creates a strong emotional response.

Following approach enables in easier comparisons, and might help in generating more insights. The Y- axis refers to the sensitivity felt, while the X axis buckets the emotions as positive, neutral and negative.