# Cross-Cultural Differences in Responses to News Videos

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## 1. INTRODUCTION

Continuous globalization makes it so that any event might be reported by multiple news sources. These sources range across different affinity groups in the world and are spread over diverse types of media, and each affinity group might have different opinions on the same topic or piece of news. We are studying the differences and similarities in the portrayals of and reactions to the same event across different affinity groups, specifically through video.

In this report, we wanted to expand the news sources that we were looking at into broader and more current topics that could yield more discussions and differences between affinity groups. Specifically, we studied the potential similarities and differences in COVID-19 news in the U.S. versus in China, especially during the initial outbreak of the disease. Our goal was to explore ways to understand and analyze the different comments and reactions that people of different affinity groups might have when consuming similar pieces of news stories.

## 2. PREVIOUS STUDIES

### 2.1 Exploring Separate Topic: COVID-19

In previous semesters, we focused on news stories and topics around AlphaGo, because it was an attention-grabbing topic that would interest both a Chinese and American audience. Because of the recent COVID-19 news and its large impact on a global audience, we thought it would be interesting to see how different affinity groups might have portrayed and responded to the same event. We specifically focused on the initial outbreak of the virus in the respective groups (around January-February for China and around March-April for the U.S.), because it provides a point of comparison - both groups are in similar situations for the pandemic during the initial outbreak.

### 2.2 Focus on Comments & Reactions

Most of the previous research focused on understanding and comparing the news sources themselves; for example, exploring English and Chinese keyword selection using a TF-IDF approach in order to understand and summarize the respective news sources, which in turn helps us to better understand the similarities and differences between the two news portrayals. While this allows us to more effectively compare the information presented to the separate affinity groups, we thought it would also be valuable to find a way to quantify and analyze the emotions that different affinity groups were experiencing and expressing online in response to the news that they consumed. Therefore, in this report we will focus on classifying and quantifying the comments and reactions of those who commented under the respective news sources.

## 3. INITIAL EXPLORATIONS

### 3.1 Vocabulary Choice

One of the first things that we were interested in was regarding emotionally charged vocabulary in different affinity groups, and specifically if they would indicate a cultural difference in audience response. For example, an emotionally charged English word such as “claim” implies that there is doubt cast upon the actual “claim” being made. We thought it would be meaningful to analyze these emotionally charged responses that could have different subtle implications from affinity group to affinity group. This led us to wonder if there was a way to compare the emotions and responses that audiences across affinity groups may have to the same piece of news. In order to be able to definitively make this comparison, we needed to find a way to quantify and measure the emotionally charged responses that audiences have and pinpoint specific emotions. Beyond just classifying a comment as a “positive sentiment” or a “negative sentiment”, we also wanted to see if there was a way we could measure the nuance in emotional words and quantify emotions beyond just using a one dimensional scale.

### 3.2 Comparison of English and Chinese Emotive Language

We were also interested to see if there are certain words that one affinity group tends to use often that are independent of the other group. Some studies have shown that when describing an emotional experience, the Chinese language is very different from the English language in that it tends to use more somatic or social words to make comparisons (Tsai, Simenova, & Watanabe, 2004 [14]; Ning, 1995 [7]). We know that there are many Chinese words or sentiments that are unique to Mandarin, and also English words unique to English. However, while there are some terms that are more difficult to directly translate from one language to the other, studies have shown that there are reliable correlations between English and Chinese dictionaries, showing that they can largely be classified very similarly (Bond, 2010 [1]; Huang, Chung, Hui, Lin, Seih, Lam, Chen, Bond, & Pennebaker, 2012 [5]). Classifications are often made with circumplex models for both languages, especially in the field of psychology, although there have not been many studies that dive into such classifications cross-culturally.

## 4. MODELS FOR CLASSIFYING EMOTIONS

### 4.1 Overview of Different Emotion Models

#### *4.1.1 Circumplex Model*

Russell’s circumplex model (Russell, 1980 [9]) seems to be the most simple and promising way of quantifying and analyzing emotion, and is what we ended up using in our preliminary tests.

Essentially, this model classifies a word or emotion on a two-dimensional scale, with one axis representing valence (whether there is a positive or negative sentiment) and the other axis representing arousal (a scale of how “calm” or “arousing” an emotion is). See Fig. 1 for a visual representation of the model.

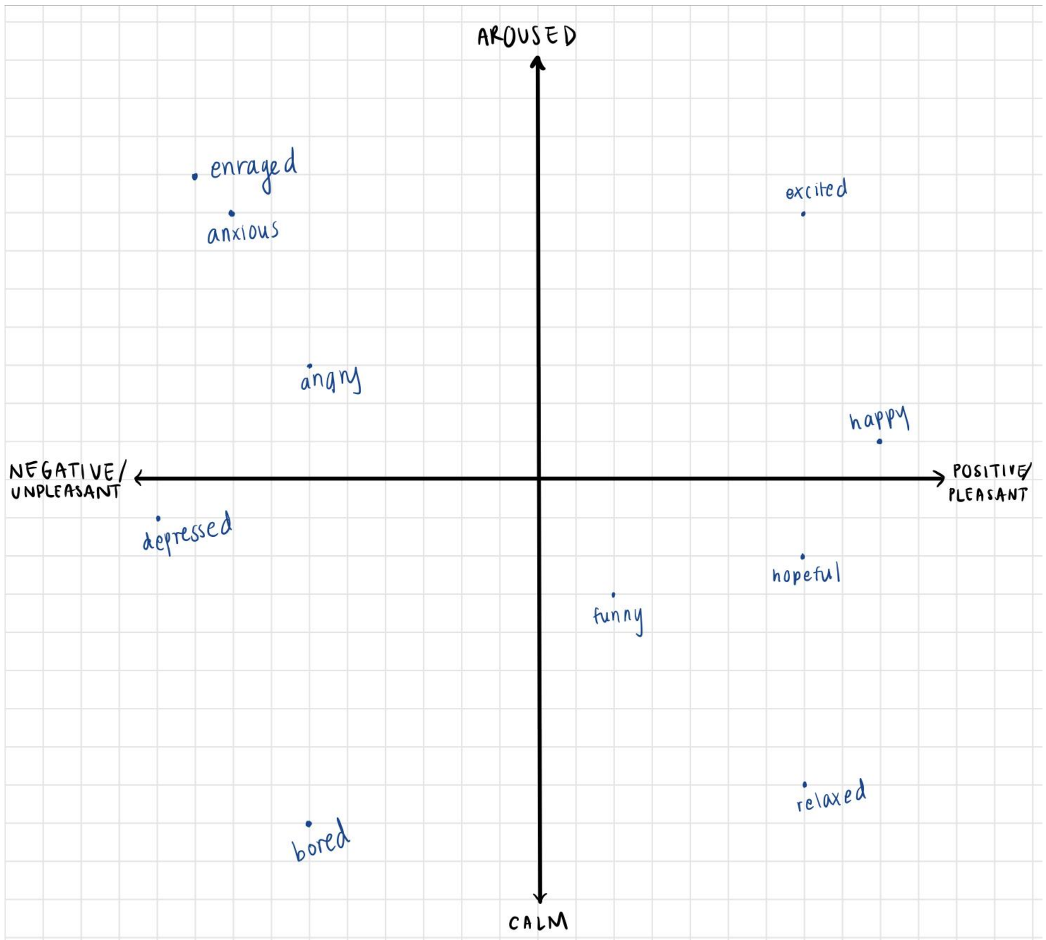


*Fig. 1. Russell's circumplex model. The horizontal axis represents a valence scale and the vertical axis represents an arousal or intensity scale*

In general, by arranging emotions on a two dimensional axis and in a circular fashion, it's easier to understand where different emotions lie relative to one another. For example, when two emotions are in the same section of the circle, they are similar in terms of valence and arousal and are generally evoking similar emotions. This would be a very straightforward way to understand the differences between an emotion on a Chinese versus English scale, and simplifies our graph to a very straightforward two dimensional numerical scale.

### *4.1.2 Plutchik's Model*

Another model that we have found to be often used in research to depict emotions is Plutchik's model (Plutchik, 1980 [6]), which takes a more “evolutionary” approach to analyzing emotions.

This model depicts emotions based on 8 basic emotions or categories (see Fig. 2), which are technically composed of 4 pairs of "opposite" emotions (usually some variation of joy-sorrow, acceptance-disgust, fear-anger, anticipation-surprise). Combinations of activating basic emotions would result in primary, secondary, and tertiary levels of emotions depending on how often the emotions are felt, with primary being more common and tertiary less common (see Fig. 3).

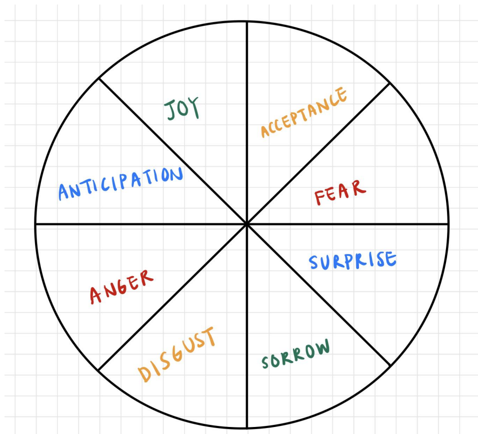


*Fig. 2. Plutchik's model of emotion (Plutchik, 1980 [6]), showing the 8 basic emotions. Pairs of opposite emotions lie opposite each other on the circular graph and are in the same color*

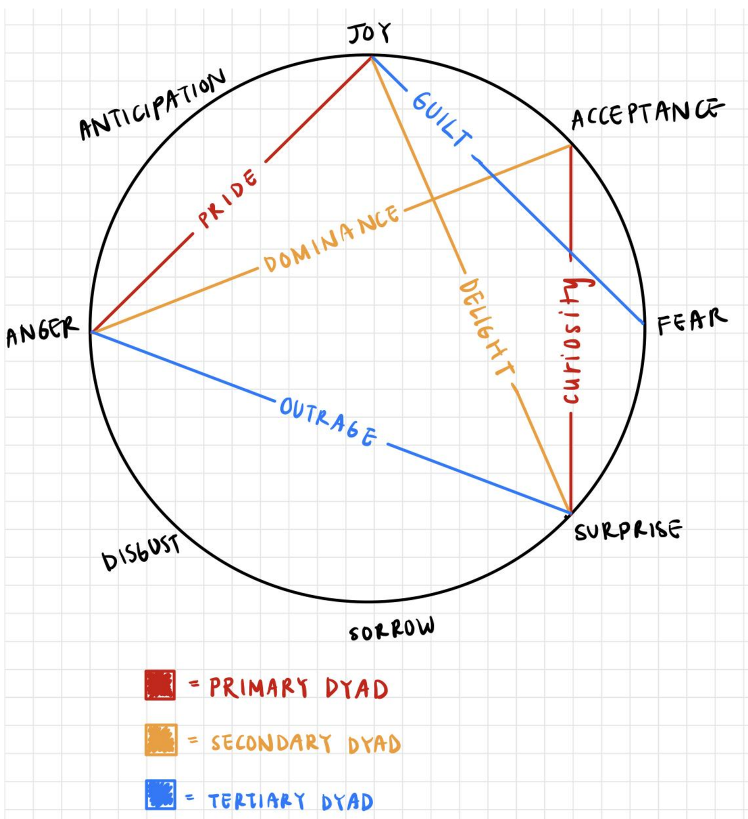


*Fig. 3. Combinations of the 8 basic emotions in Plutchik's model in order to form dyads. Examples of primary dyads are shown in red, secondary in orange, and tertiary in blue. Dyad emotion combinations are taken from Turner's analysis (Turner, 2000 [13]).*

This model is helpful in understanding how emotions are interrelated, and introduces a concept of frequency of emotions into classification. Because this model bases combinations of emotions based on specific emotional stimuli, it would be useful especially for understanding the specific emotions felt by different affinity groups during a comparison, as Plutchik's model theoretically links a specific pattern or combination of emotions to certain emotion stimuli. By going down to the root of the emotion that is felt, we could potentially create more interesting comparisons between comments made by different affinity groups.

*4.1.3 PANA Model & Vector Model*

The PANA (Watson & Tellegen, 1985 [15]; Watson & Tellegen, 1999 [16]), or positive activation - negative activation, and vector models (Bradley & Lang, 1999 [2]) are somewhat similar to Russell's circumplex model in that they both focus on valence and arousal as well. However, the structures are slightly modified in these two models. In the vector models specifically, arousal is first taken into consideration - low to neutral levels of arousal are not identified with their valence levels or are considered to be neutral (Rubin & Talarico, 2009 [8]). Only when levels of arousal are high would the valence come into play: in this case, the valence would act as a guide for the "direction" of the graph (see Fig. 4). For PANA models, we perform a 45 degree rotation of the axes in a circumplex model in order to more accurately capture emotions (see Fig. 5). Similar to the vector model, this would basically allow us to identify emotions by their high arousal and high valence states - we generally understand emotions more as "aroused positive" or "aroused negative", rather than "aroused" but with neutral valence.

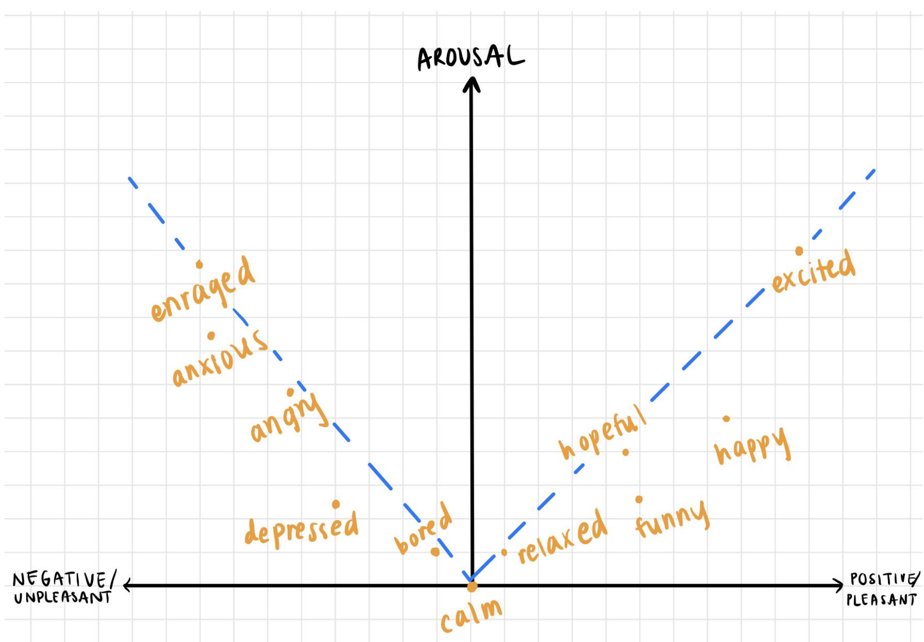


*Fig. 4. Vector model (Bradley & Lang). While the circumplex model is distributed all along the graph, the vector model primarily distributes emotions along the dotted blue lines shown above.*

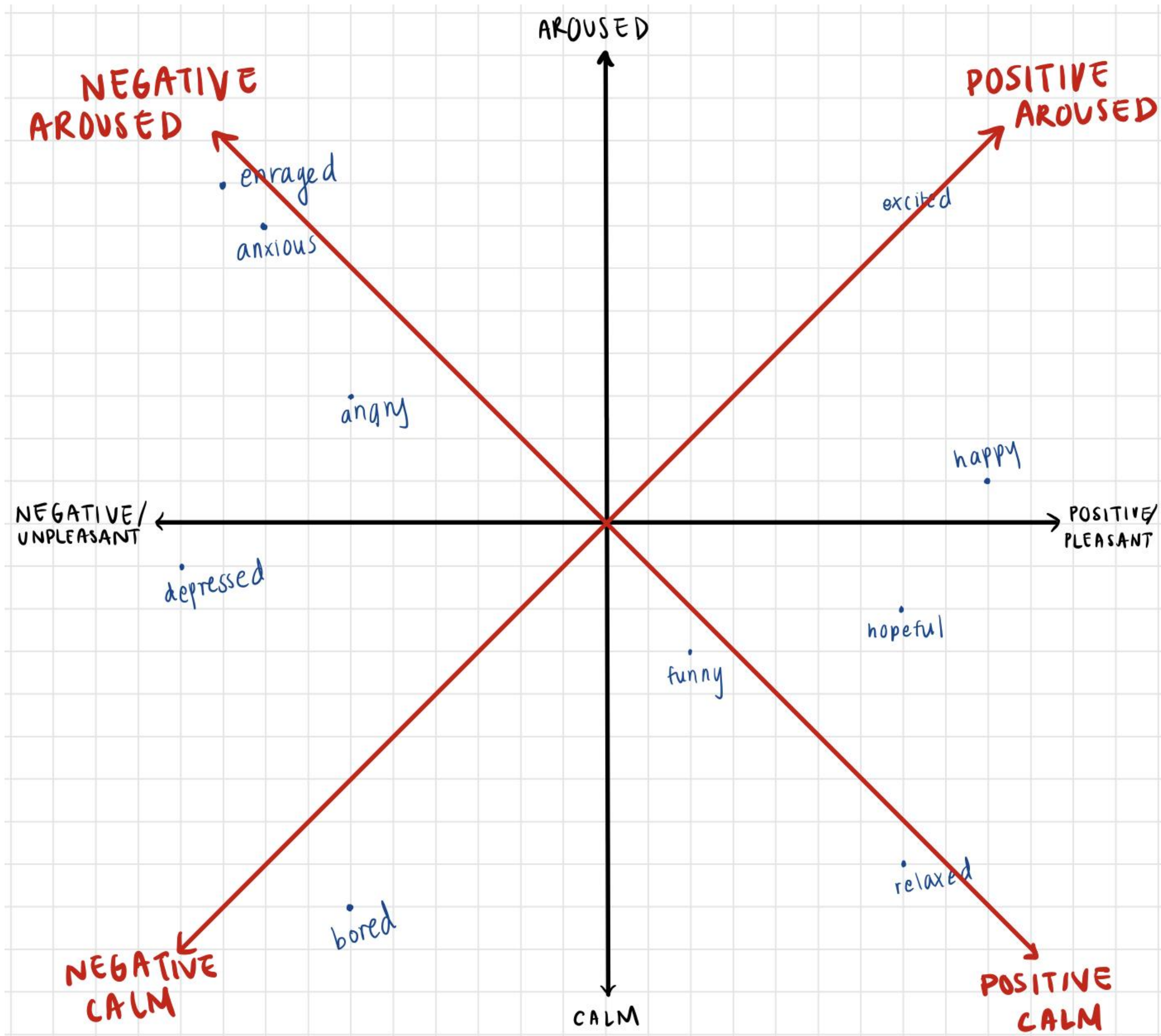


*Fig. 5. PANA model (Watson & Tellegen) displayed on top of a regular circumplex model - essentially rotates the axes by 45 degrees in order to more accurately identify and capture emotions.*

These models are useful in the context that they recognize more nuance within emotions - they understand that most intense emotions are associated with either a positive or negative connotation, while emotions that are very low arousal would be almost entirely neutral. This could add value to classifications by reducing confusion when classifying emotions, especially because we are looking at different emotions through a cross-cultural lens.

### 4.2 Comparisons of Different Models - Strengths and Shortcomings

The advantage of the circumplex model is that it is very simple and straightforward to use, which would prove to be really useful when we are comparing multiple emotion plots for different affinity groups. However, the downside is that there are sections of the graph that are essentially meaningless, which could be addressed using the vector and PANA models. The main part of the circumplex model that wouldn't add as much information would be high arousal and neutral valence. The vector model also implies that emotions with very low intensity are also generally not associated with a strong valence, which, if true, would render additional parts of the circumplex model less meaningful (however, I personally believe that an emotion can be calm and yet have positive or negative implications).

While the vector model would address these issues, the drawback of the vector model would be that this might make one too many generalizations, especially when we are trying to understand the nuances of emotion between multiple affinity groups. For example, an emotion such as “bored” would be considered both low arousal/intensity with quite a negative connotation - however, the vector model would not be well suited to capture both aspects of the emotion. The PANA model would also fix this same issue, but we believe that it is less clear about what each point means on the graph than a simple circumplex model.

Plutchik’s model captures interesting aspects of emotion with its structure that the other models do not touch upon; however, it is less of a quantifiable way of representing emotion, and seems more to mix and match some basic emotions to get more complex nuances of the emotions. When introducing this to different affinity groups and translating it to different languages, we are unsure if it would be as effective in helping us understand the nuances between the groups - rather, it seems as if we must first deeply understand the nuances between the groups itself before being able to implement the model, as we might not know how to mix and match the basic emotions and apply them to different affinity groups.

From these considerations, we ultimately decided to proceed with the circumplex model despite its minor drawbacks, because especially at a preliminary stage of understanding differences in emotions within comments, simplicity and clarity in what is being expressed would be the most valuable advantage in understanding the differences between affinity groups.

**4.3 Optimal Dimensions**

The circumplex model is generally expressed using two dimensions (valence and arousal), as we explained above. However, studies have been conducted to try and understand the optimal number of dimensions for emotion classification, and have tested anywhere between one to four dimensions of a circumplex model to understand the optimal number of dimensions for defining emotion. In cases where a third dimension is used, the additional dimension is usually either level of aggression (Bush, 1973 [4]) or attention/rejection (Schlosberg, 1954 [11]).

There is a general consensus that the accuracy of classification substantially increases with a second dimension of level of arousal in addition to valence (Shaver, Schwartz, Kirson, & O’Connor, 1987 [12]; Russell, Lewicka, & Niit, 1989 [10]). The increase in accuracy from thereon out has been shown to be less significant, as seen in Russell et al’s study (Russell, Lewicka, & Niit, 1989 [10]). However, there are still multiple cases in which a third dimension has been used to slightly bolster overall accuracy, as seen in some examples including (Bush, 1973 [5]; Schlosberg, 1954 [11]; Shaver, Schwartz, Kirson, & O'Connor, 1987 [12]). As can be seen in the analysis done by Shaver, et al., there was improvement seen in separating clusters of emotion when introducing a third dimension to classifying emotion, and dimensions beyond 3 have not shown any additional improvements. However, although there is improvement seen in adding a third dimension to the analysis, some sources have shown that the value added by a third dimension is less significant. Moreover, there are multiple potential third dimensions that have been used by different pieces of research, which raises questions about consistency and which would be the most appropriate choice for different affinity groups. Because of these questions, we have decided to use only two dimensions for our report.

## 5. DICTIONARY

### 5.1 Comparing Emotions Between Affinity Groups

There are a couple of dictionary sources that we found to be promising in terms of having a large number of terms for us to reference and using a circumplex model or scale to measure each word.

#### *5.1.1 Shaver et al.'s Dictionary and Models*

Shaver, et al. performs a cursory analysis of 135 terms with both a 2-dimensional and 3-dimensional circumplex model (Shaver, Schwartz, Kirson, & O'Connor, 1987 [12]). For each word, the study provides coordinates for the term based on valence and arousal for a 2-dimensional circumplex model. In the 3-dimensional model, the study breaks apart arousal into potency and activity (which is used in order to allow more nuance to be introduced into high arousal emotions). Their dictionary and preliminary analysis, especially in 2 dimensions, seem to be a promising starting point for our next step of understanding emotions within commentary and making comparisons between different affinity groups.

#### *5.1.2 Bush II's Dictionary*

Bush II created a dictionary of 264 adjectives that acceptably denoted feelings according to "consensus scores" in her research performed in 1971 (Bush, 1971 [3]). This dictionary could be helpful as a dictionary source - future work could include implementing a more algorithmic version of the dictionary into a circumplex model that Bush herself also mentions.

#### *5.1.3 Other Potential Sources*

Huang, Pennebaker et al. developed and used both an English and Chinese dictionary with approximately 6,800 words in each (Huang, Chung, Hui, Lin, Seih, Lam, Chen, Bond, & Pennebaker, 2012 [5]). Their report describes that they included words that were unique to each language, as well as words that were translated from English to Chinese. Although there is less specificity in this dictionary, they included multiple psychological categories as well as a broad range of words between the two languages, which could be helpful in sourcing differences in emotion words and expressions between two different languages.

Russell, Lewicka, et al. also did a simple study comparing 28 words across multiple different languages on a circumplex model (Russell, Lewicka, & Niit, 1989 [10]). Although this isn't as helpful as a dictionary, it is interesting to see how different cultures perceive the same translated emotion words or facial expressions slightly differently. A cross cultural comparison of emotion words is somewhat similar to what we are trying to explore, although in our study, we are not necessarily as focused on how different cultures perceive the same words, but rather what words, emotions, and associations are made by different affinity groups for the same news event.

## 6. PRELIMINARY USER TEST ON COVID-OUTBREAK RELATED NEWS

We wanted to do a preliminary user test with a 2-dimensional circumplex model on comments under videos reporting initial COVID-19 outbreaks in China and the U.S. respectively, and compare the results for both.

### 6.1 User Test Method

In order to do this, we manually compiled comments under a video posted in late March to early April reporting the COVID-19 outbreak in the U.S. and comments under a video posted in late January to early February reporting the COVID-19 outbreak in China for our corpus. We chose an earlier time period for the videos of news reports in China as opposed to those in the U.S. because they were in similar places in terms of number of daily cases during these time frames. The videos used for the U.S. were taken from ABC News' official YouTube account and the videos used for China were taken from iQiyi's official Youtube account.

We then sent the corpus and two blank circumplex graphs (with valence on the x-axis and arousal on the y-axis on both) to 6 Chinese-American college students. They were instructed to plot all English and Chinese words or phrases from the corpus that they believed to be emotionally charged on the two separate circumplex graphs.

Here are a few snippets of the English and Chinese corpuses:

| |
|---|
| <u>English Corpus:</u><br>I want to know WHY THE HELL have airlines allowed people off the plane before being checked.<br>We could only hope that this ends very soon.<br>Unbelievable what's happened.<br>This sounds serious, I hope they get that under control.<br>When they start telling the people not to panic, panic<br>when the guy died about 10 miles from where you live: chuckles we're in danger |

this is sad

<u>Chinese Corpus:</u>
为什么我的眼中常含泪水，因为我对这土地爱得深沉。加油武汉，加油中国！
加油武汉，加油湖北，加油中国，一起度过难关。
我是英国人但是我的亲戚在中国，中国也是我的家我在英国为你武汉，湖北加油！希望你们度过难关，还有希望大家健健康康！
我都哭死了
中国加油! 海外华人为中国、湖北、武汉祈福, 众志成城、中国必胜.
您们会通过这个...让大家在一起解决问题！！！

### 6.2 Averaged Results

After receiving their results, we took all the phrases that at least 2 students plotted and averaged the coordinates that were recorded, and plotted them once again on circumplex graphs to understand the similarities and differences in reactions of the two affinity groups to the news of the COVID-19 outbreak. The results are shown in Fig. 6 and 7.

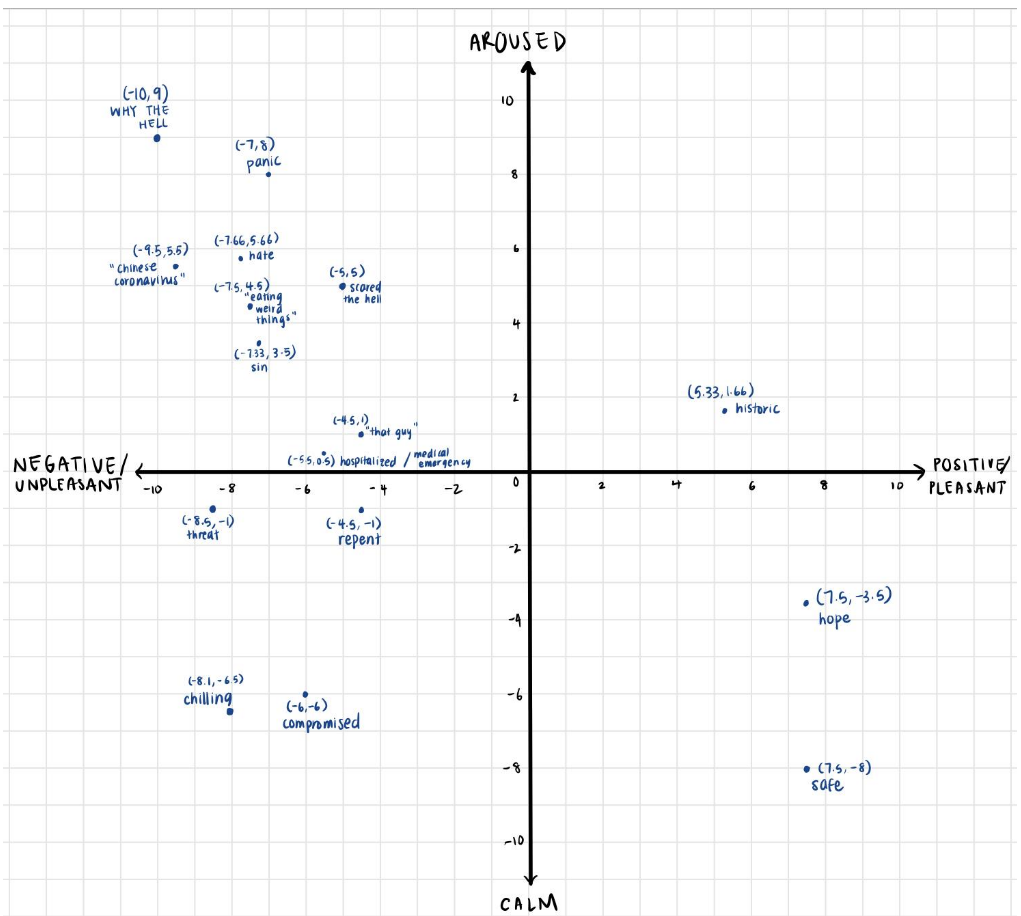


*Fig. 6. U.S. Averaged Emotion Plot.*

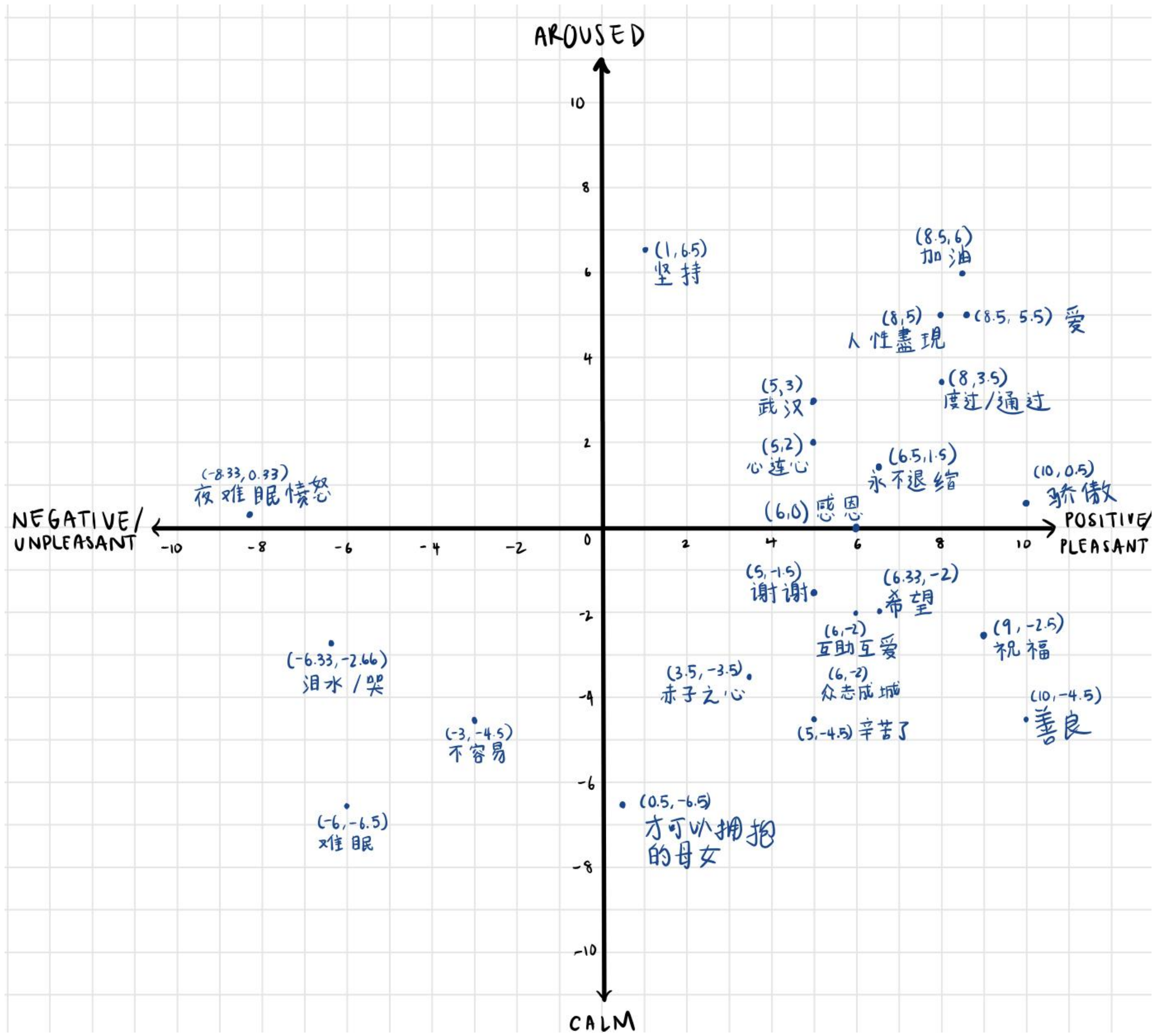

*Fig. 7. China Averaged Emotion Plot.*

From these results, we can clearly see that American audiences tended to express emotions that fell on the negative side of the valence scale in response to the outbreak news, while Chinese audiences tended to express words that lean towards the positive side of the valence scale. It is also worth noting that the Chinese emotion phrases that users wrote were generally longer than the English emotion words. Although we are not sure why this might be, we theorize that this could be because emotions are often expressed in idioms in the Chinese language than in the English language. However, it would require more research for us to be certain about this claim.

The American comments also brought up religion more often than the Chinese comments, in both a negative and positive context. On the other hand, in Chinese comments, we saw that the phrase “加油” was in almost every single comment, which can be loosely interpreted express “come on, you got this.” There were also many comments mentioning their love for China and their country in Chinese comments, which was not seen as often in American comments.

### 6.3 Considerations

There are a couple of external factors that need to be considered when viewing the data. Primarily, one user brought up the fact that the Chinese corpus was sourced from YouTube. Although iQiyi is a popular video viewing source in China, the user believed that most Chinese people would not be sourcing their news from YouTube. However, we had trouble finding popular Chinese news sources, and many of the videos or articles we did find from the right time frame did not have comments under them. However, with a bit more searching, we believe that we should be able to generate a more reliable and accurate Chinese corpus based on Chinese comments.

## 7. FUTURE WORK

### 7.1 Implementing Emotion Classification Model

Due to the limited amount of time, we were not able to start computationally implementing the emotion classification model. It also seems as though there has not been much prior work regarding implementing this model, and would likely be the next step we take. Shaver et al.'s dictionary seems like a promising starting point, as their paper seems to have implemented a circumplex model similar to one that we would like to apply towards analyzing COVID-19 comments. Other dictionaries have also been listed in previous sections in case Shaver's is not comprehensive enough.

### 7.2 Understanding Cultural Sentiment

Our goal is to be able to better understand cross cultural sentiment when reacting to the same event, and perhaps understand if there might be a different way of looking at things depending on the affinity group that someone is part of, or how people from different affinity groups might express emotion differently. From our preliminary user test, we could see that people from different affinity groups expressed emotions that, on average, fell on very opposite sides of the valence scale. We also noticed that Chinese comments seemed to use longer phrases than English comments, which could potentially be significant in terms of how each affinity group expresses emotion. It would be interesting to dig deeper into why these results occurred.

### 7.3 Expand and Use Reliable Corpus

The corpuses used for both English and Chinese comments were relatively small, and it has been pointed out that our Chinese corpus is sourced from a site that most Chinese people might not frequent to watch news reports. In the future, it would be beneficial to find a reliable Chinese source for news that is often frequented by Chinese people and also has many comments underneath. User tests were also taken from a small group of people and should be expanded in the future.

## 8. REFERENCES

[1] Bond, M. H. (Ed.). (2010). *Oxford library of psychology.The Oxford handbook of Chinese psychology.* Oxford University Press.

[2] Bradley MM, Lang PJ. (1999). *Affective norms for English words (ANEW): Instruction manual and affective ratings (Technical Report No. C-1)* Gainsville, FL: University of Florida, The Center for Research in Psychophysiology.

[3] Bush, Lynn Ellison II. (1971). "Empirical Selection and Individual Differences Multidimensional Scaling of Adjectives Denoting Feelings." LSU Historical Dissertations and Theses. 2032.

[4] Bush, Lynn Ellison II. (1973). Individual differences multidimensional scaling of adjectives denoting feelings. *Journal of Personality and Social Psychology, 25*(1), 50–57. https://doi.org/10.1037/h0034274

[5] Huang, C.-L., Chung, C. K., Hui, N., Lin, Y.-C., Seih, Y.-T., Lam, B. C. P., Chen, W.-C., Bond, M. H., & Pennebaker, J. W. (2012). The development of the Chinese linguistic inquiry and word count dictionary. *Chinese Journal of Psychology, 54*(2), 185–201.

[6] Plutchik, Robert. (1980). *Emotion: A Psychoevolutionary Synthesis*. Harper & Row, Publishers.

[7] Ning Yu. (1995). Metaphorical Expressions of Anger and Happiness in English and Chinese, Metaphor and Symbolic Activity, 10:2, 59-92, DOI: 10.1207/s15327868ms1002_1

[8] Rubin, D. C., & Talarico, J. M. (2009). A comparison of dimensional models of emotion: evidence from emotions, prototypical events, autobiographical memories, and words. *Memory (Hove, England)*, *17*(8), 802–808. https://doi.org/10.1080/09658210903130764

[9] Russell, J.A. (1980). A Circumplex Model of Affect. Journal of Personality and Social Psychology, 39, 1161-1178.

[10] Russell, J. A., Lewicka, M., & Niit, T. (1989). A cross-cultural study of a circumplex model of affect. *Journal of Personality and Social Psychology, 57*(5), 848–856. https://doi.org/10.1037/0022-3514.57.5.848

[11] Schlosberg, H. (1954). Three dimensions of emotion. *Psychological Review, 61*(2), 81–88. https://doi.org/10.1037/h0054570

[12] Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology, 52*(6), 1061–1086. https://doi.org/10.1037/0022-3514.52.6.1061

[13] Turner, Jonathan H. (2000). *On the Origins of Human Emotions: A Sociological Inquiry into the Evolution of Human Emotions.* Stanford University Press, California.

[14] Tsai JL, Simeonova DI, Watanabe JT. Somatic and social: Chinese Americans talk about emotion. Pers Soc Psychol Bull. (2004). doi: 10.1177/0146167204264014. PMID: 15359024.

[15] Watson D, Tellegen A. (1985). Toward a consensual structure of mood *Psychological Bulletin* 98219-235

[16] Watson D, Wiese D, Vaidya J, Tellegen A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence *Journal of Personality and Social Psychology* 76820-838