Careful What You Post: Pronoun Choice Can Mirror Emotions in Tweets About Terrorism
Eliza Barach, Samira Shaikh*, Yousri Marzouki**, & Laurie Beth Feldman
Department of Psychology, SUNY Albany, Albany, NY, *University of North Carolina at Charlotte, **Aix-Marseille Université, Marseille & Qatar University
46th Annual Meeting of the Society for Computers in Psychology

Introduction
- People’s-word choices reflect who they are & what they are thinking (Chung & Pennebaker 2007).
- Personal pronoun choice has been revealing about how people relate to others and about their collectivist/individualist psychological states.
- New methodologies make online communication a popular behavior to investigate.
- Tweets that are produced by a massive-scale network can be analyzed for emotional indicators such as valence, arousal, and concreteness (Shaikh et al. 2017).
- **GOAL:** Describe the development of two different online communities from naturally occurring social media data (tweets) by analyzing patterns of word choice in twitter messages surrounding the Charlie Hebdo Attack (January 2015) and the 2015 November Paris attacks.

Methods: Data collection
- Data consisted of all the tweets that contained at least one of 14 hashtags pertaining to the Charlie Hebdo attacks (January-February 2015) and the November 2015 Paris attacks collected via Twitter streaming API
- Final data set was filtered to always contain hashtags from a category of hashtags that pertained to Paris
- Some examples:
  - #franceattack #ISupportWithFrance #Paris #paristerrorattacks
  - #franceshooting #ISupportWithParis #ParisAttacks #PrayForParis

Methods: Tweet Analysis
- Tweets for each Terrorist attack were analyzed by:
  - Classifying tweets into set by which pronoun they included
    - First Person Singular (I)
    - First Person Plural (We)
    - No Pronoun (Baseline)
  - Tracking Valence and Arousal: for 25% most negatively valenced and 25% most positively valenced words in each set
  - Calculating weighted Valence and Arousal Means (x frequency)
  - Determining NRC classification across 8 categories of affect as well positive and negative sentiment for each word and computed proportion
  - Computing Entropy
    \[ H = - \sum p(x) \log p(x) \]

Results

Figure 1: February Valence and Arousal Means
- Negative words are associated with greater arousal than positive words.
- First person pronouns exhibit lower arousal than baseline.
- Tweets with first person plural pronouns (WE) exhibit negative words that are higher in arousal than those with first person singular pronouns (I).
- First person plural pronouns exhibit positive words choices that are lower in arousal compared to first person singular.
- Thus, negative word valence and the absence of pronouns characterize tweets with greater arousal.

Figure 2: Tweets with First Person Pronouns (I and WE) have more Positive words, more words characteristics of TRUST compared to baseline.
- Tweets with first person pronouns (I and WE) exhibit more FEAR words and fewer ANGER words than baseline.
- In general there more instances of FEAR words than anger words.
- Consistent with previous literature, there were more negative words that co-occurred with I when compared to WE.
- Baseline tweets exhibit more DISGUST and SADNESS words than pronoun tweets.

Figure 3: Overall, tweets exhibit more NEGATIVE words than POSITIVE words and more FEAR words than ANGER words.
- Tweets with WE include more word characteristic of ANGER when compared to I and Baseline tweets.
- Tweets with first person pronouns (I and WE) exhibit a greater proportion of DISGUST and SADNESS words than baseline tweets.

Conclusions
- People responding to terrorist attacks using first person pronouns, exhibited negative word choices that were greater in arousal (evoking more intense emotions) than when responding without pronouns.
- When people respond to terrorist attacks using tweets with negative words, their word choice tends to be higher in arousal and exhibits less variation, when compared to positive word choices.
- In general, when people respond using I, they tend to choose the same negative words (lower entropy), whereas WE tends to exhibit greater variation in negative word choices.
- People tend to respond with words that reveal fear more so than anger.
- Thus, pronoun use in conjunction with negatively/positively valenced word choices influences uniformity and degree of arousal, as well as the particular emotions of anger, disgust, fear, and sadness.