



Understanding Patient Perspectives of Dual Antiplatelet Therapy: A Sentiment and Emotion Analysis of Twitter Posts From the General Public.

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Background

- Non-adherence to dual antiplatelet therapy (DAPT) remains as high as 20-40% leading to stent thrombosis, death, and hospital readmissions.
- Prior efforts to address adherence have poorly understood factors that contribute to intention and non-intention non-adherence to DAPT.
- The widespread use of social media platforms and application of sentiment and emotional analysis provide an opportunity to better understand these factors in a real-world population.

Objective

- Categorize Twitter posts written by patients (and caregivers) who take P2Y12 inhibitors into constructs of intentional and non-intentional medication concordance using conventional content analysis to identify strategies to improve adherence.
- Measure Social Sentiment and Emotion in the context of the DAPT Concordance Construct to better understand patient attitudes and opinions of taking DAPT.

Methods

- We searched public Twitter posts from Jan 01, 2016 to Dec 31, 2019 using the search terms of both generic and brand names of P2Y12 inhibitors including “Clopidogrel or Plavix,” “Ticagrelor or Brilinta,” and “Prasugrel or Effient.” Aspirin was excluded from analysis.
- Posts were excluded if they were non-English, duplicates (retweets), medical media (posts with weblinks), or included usernames with clinical titles.
- Each post was then manually reviewed for screening and analysis. Eligible posts had to include text from the perspective of an individual personally affected by issues related to taking DAPT.
- Using conventional content analysis eligible posts were categorized into themes of DAPT concordance and further classified by sentiment and emotion using Plutchik’s eight basic emotional classifications.

Figure 1: Flow Diagram

Inclusion and Exclusion of Twitter Posts

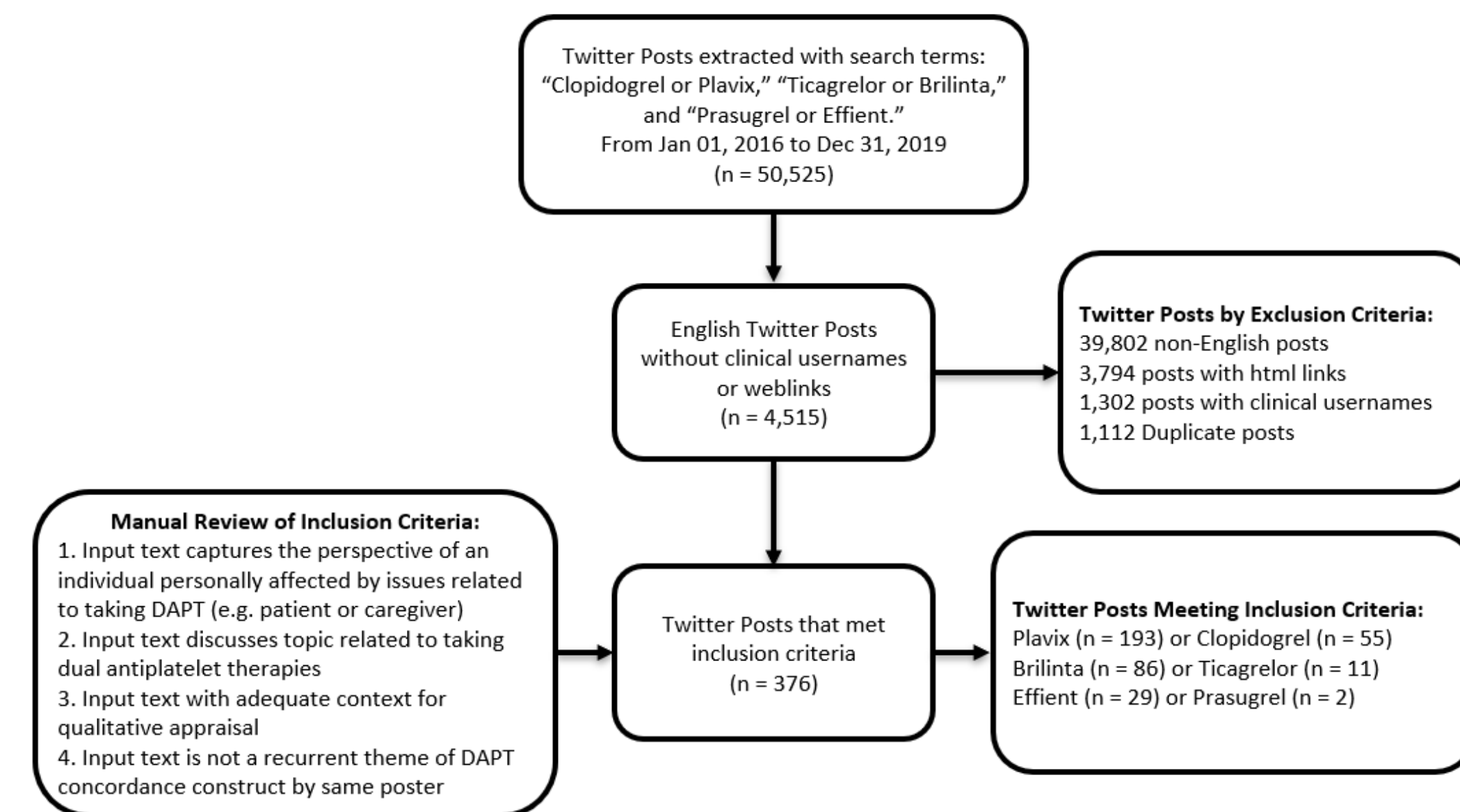


Figure 2: Dual Antiplatelet Therapy Concordance Model

Categories of Intentional and Nonintentional factors of medication adherence to DAPT

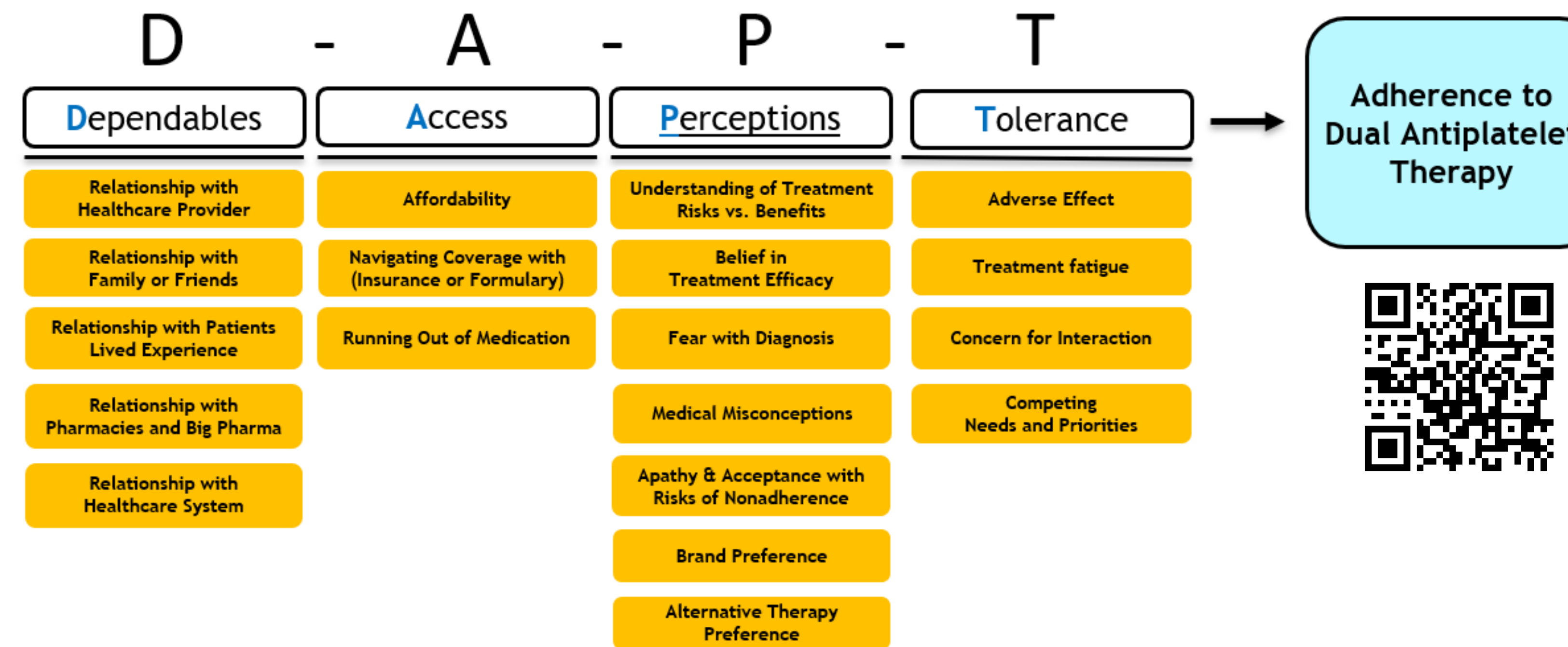


Figure 3: Distribution of Sentiments of Tweets Related to Taking DAPT

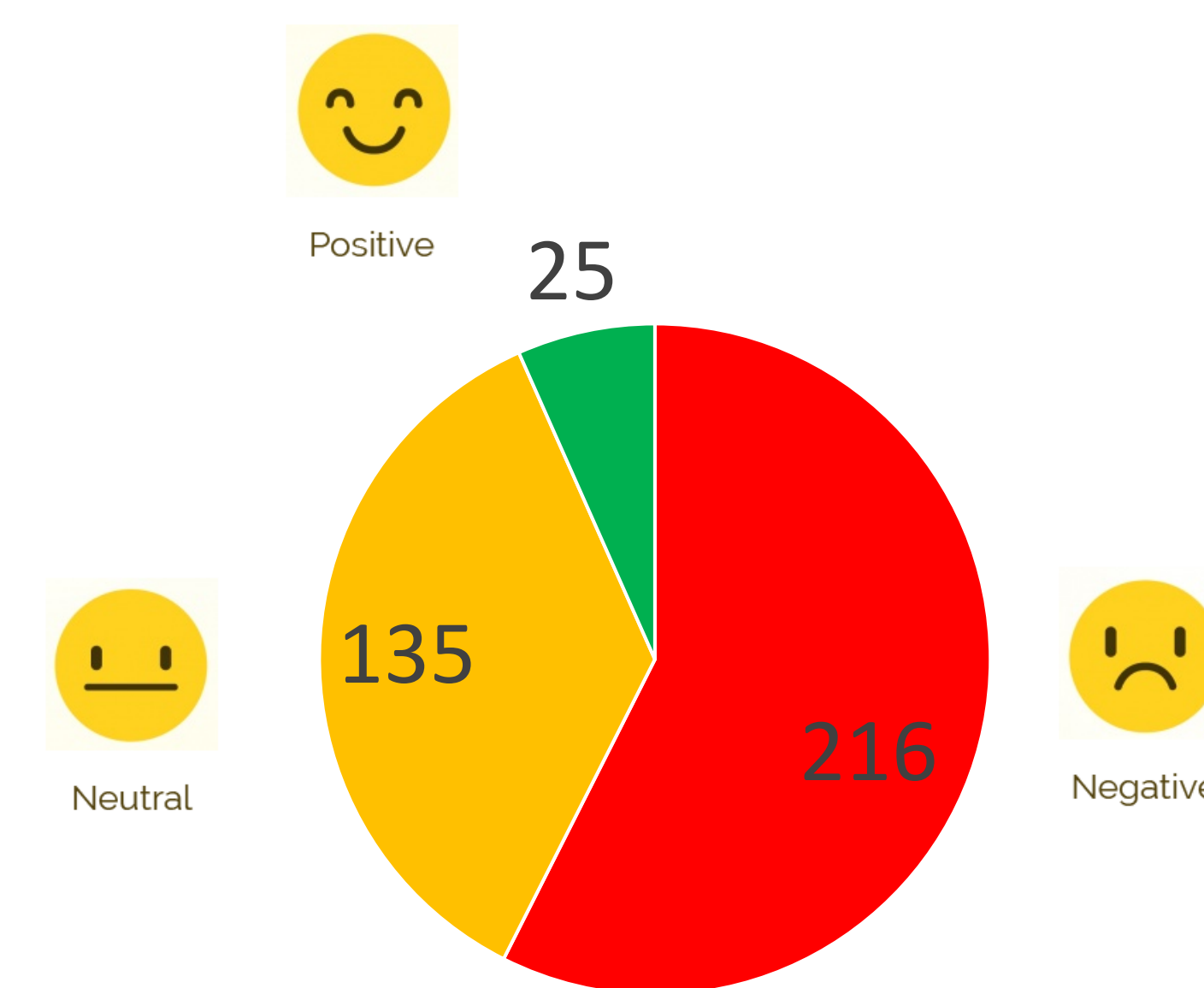


Figure 4 : Top 12 Categories by Negative Sentiment

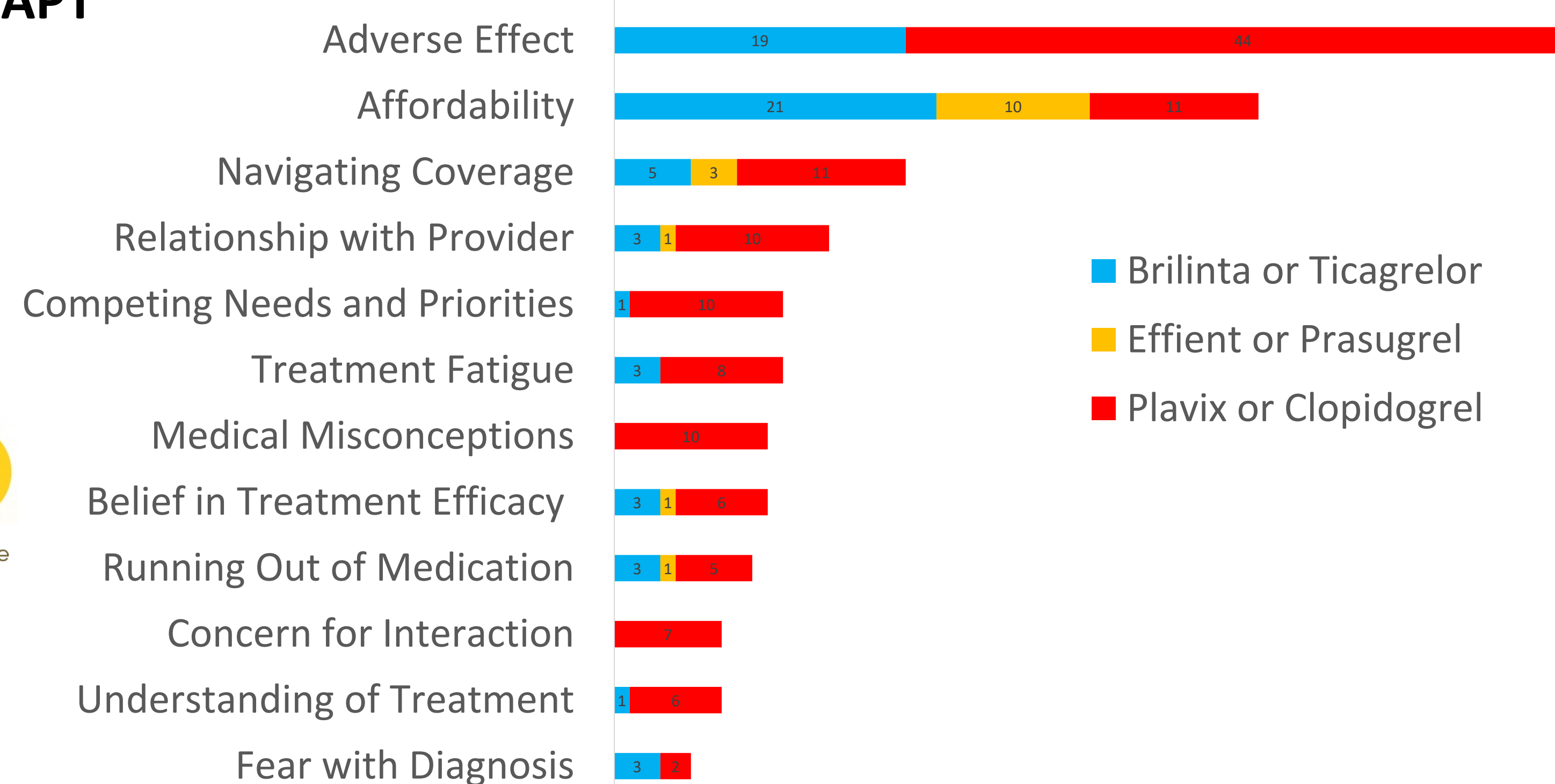


Figure 5: Top 3 Emotions in Tweets Plutchik’s Emotional Wheel

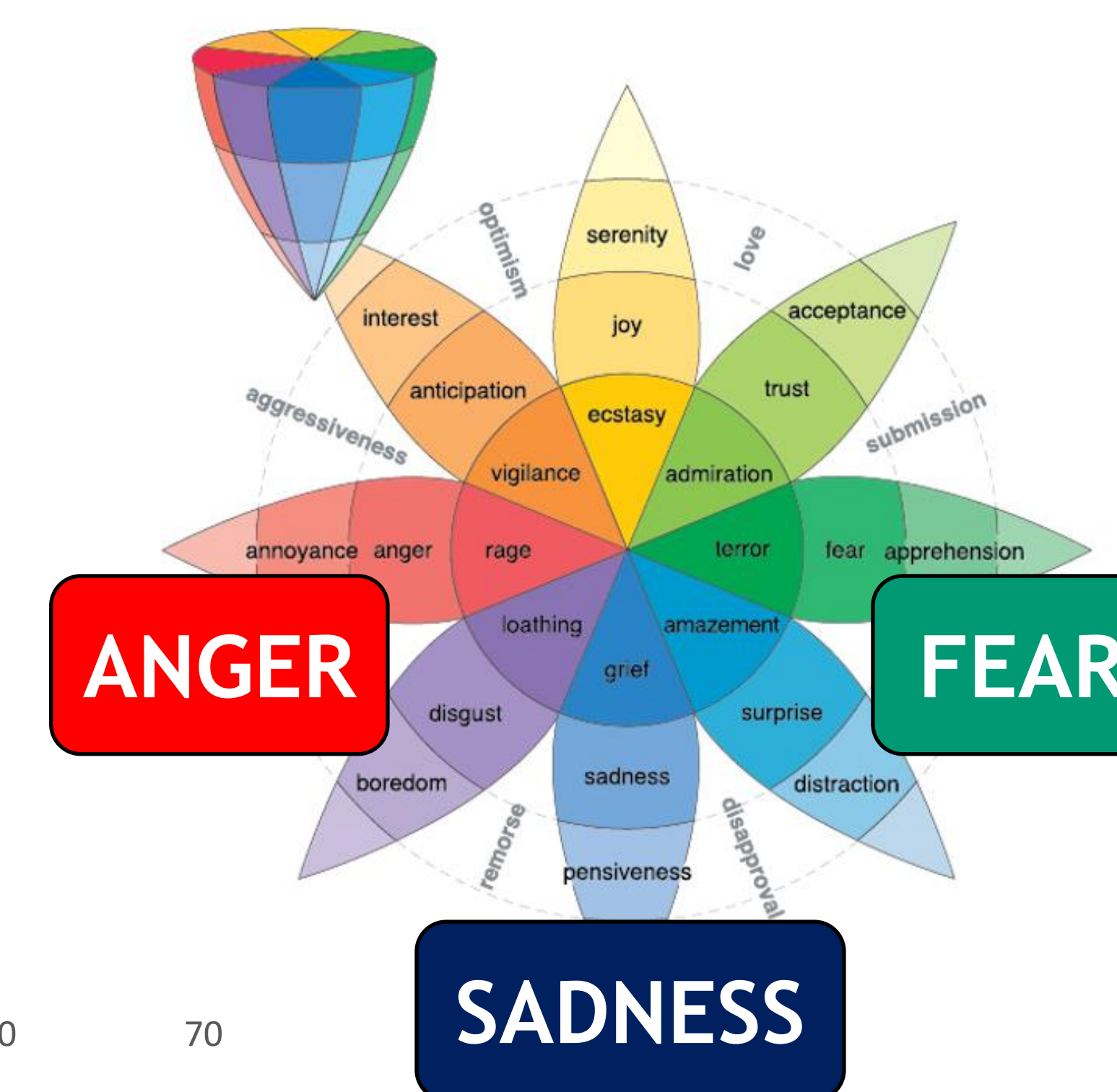


Table 1: Example Tweets Categorized by Plutchik’s 8 Basic Emotions

Emotions by Sentiment	Emotion	Example Tweet
Negative	Anger	I take <u>Brilinta</u> for the rest of my life it cost \$350.00 a month and that's just 1 medication out of 6 if I didn't have insurance it would be real bad 😞 still that's f-ING absurd \$350.00 🙄🙄🙄
	Disgust	my doc told me I would die if I missed ONE <u>plavix</u> dose... don't blame the patient... doctors are educated for medicine while patients are not... don't blame the patient... EVERYONE, thinks I'm nuts for not following my doctors advise and you want to blame the patient... get a life
Positive	Fear	One of the meds they have my dad on is <u>brilinta</u> . Its side effects are chronic nose bleeds and shortness of breathe . So when you wake up from a nap or overnight it feel like your being suffocated. But if you can ignore that it really helps your #heart. 😞😞😞 #awful
	Sadness	And I just found out by blood thinner for heart stents has increased from \$90 to \$324 with insurance. I can't afford that cost so I won't be taking it. Hopefully I can find a less expensive drug than generic <u>Effient</u> or I'll pray I don't have a heart attack. Sad situation here
Positive	Anticipation	Dr. told me I may be able to come off the <u>Brilinta</u> soon! Please let it be so! The side effects are brutal.
	Joy	Just been to hospital for heart check up all is good off my <u>ticagrelor</u> pills now so only 4 pills to take in mornings happy with that...but chest Infection confirmed so steroids & antibiotics for next 10days for me 😊 — feeling thankful
	Surprise	I visited the Uk two years ago, lost my <u>plavix</u> (a big deal for a heart patient). Stopped at a small village drugstore, they told me to how to get to the clinic (which had an MD on staff) she was great, wrote a script which was filled. Total cost was, 20 pounds. Was impressed
	Trust	I'm on <u>Toprol</u> for the tachycardia. And also <u>Brilinta</u> to keep the stent stable! ...Yes we can! it'll be okay. At the least there's answers and treatments to get better!

Results

We identified 50,525 Twitter posts about DAPT of which 376 met inclusion criteria. The following DAPT concordance construct was developed using conventional content analysis (Figure 2). Of the total number of Twitter posts, the top 3 concerns identified were adverse effects, affordability, and navigating coverage. Majority of the posts (57%) were negative sentiments with the following top 3 emotional classifications of anger, sadness, and fear using Plutchik’s Emotional Wheel. Posts with neutral sentiment were initiated to inquire or share patient experiences with taking DAPT.

Conclusion

- This is the first study that highlights patient perspectives of DAPT in the form of free expression in a real-world setting to identify patient beliefs about their prescription in the categories of intentional and non-intentional adherence.
- We found that patient attitudes towards taking P2Y12 inhibitors is largely negative in the context of accessing medications indicating patients need more support with navigating coverage.
- Furthermore, having a strong relationship with the healthcare provider is the most crucial dependable factor that functions as a facilitator into the other concordance constructs via education, patient advocacy, emotional reassurance, and maybe even some myth busting.

Limitations

- The primary limitation is its limited generalizability as a result of the characteristics of typical Twitter users (typically young adults) and the exclusion of non-English posts (removing cultural barriers to adherence).