Gender-based Analysis of Communication Pattern and Emotion Expression: A Case-study of Soccer

Communication Patterns, Homophily, Structural Bias, Inequalities, Emotion Analysis

Extended Abstract

Fans, sports organizations, and players utilize social media platforms such as Twitter to establish and uphold their identity and sense of community, according to various sources [5, 6]. It has been observed that Twitter sometimes serves as the primary source of breaking news about soccer, even before traditional media outlets, providing instantaneous information access from official and unofficial sources [6].Soccer has more than 3.5 billion fans worldwide, and it is estimated that 1.3 billion of them are females (around 38%) [3]. Our work examines whether, in a male-dominated environment, women and men differ in communication patterns. Women soccer fans tend to experience biases and prejudices, and our question relies on how this is translated to online spaces [4, 1]. The study focuses on analyzing the interaction patterns between men and women, and how communication evolves over a three-month period (March 7 to June 6, 2022) in English and Portuguese languages. After our data pre-processing, we have 7,676,624 tweets in English (6,365,239 are from males and 1,313,731 are from females) and 2,958,443 tweets in Portuguese (2,312,415 are from males and 648,395 from females). The highest women rate in our data reaches 28%, i.e., close to the overall Twitter ratio (29.6%).

We first study both the networks and observe that the Portuguese network has a higher women ratio in interactions (Figure 1.A) and a lower homophily (Figure 1.B) than the English network. One of the reasons might be that in Portuguese, people belong to specific places, mostly from Brazil and Portugal, where soccer is more popular. The network structure from women's tweets tends to be denser, with higher average clustering and lower assortativity than men's one, aligned to previous research in other types of communication such as research collaborations [2]. We further analyze the 100-core of the networks in Portuguese (74 people) and English (177 people), and we found a woman ratio of 16% and 12%, respectively. Therefore, even though women have a higher ratio of most active users in Portuguese than in English, the difference between the women ratio of the overall network and the core is decreased by 9.5% and 6.5%, respectively, indicating that women are not as influential as men in both languages.

We further analyzed whether men and women express emotions differently in soccer, and plot the results in Figure 1.C. We found that, in soccer, women tend to express higher levels of joy and anticipation than men in both languages, and disgust tends to be more gender-neutral with slightly higher levels for males. Interestingly, we did not find any qualitative difference in relation to the gender differences in emotion between the English and Portuguese collected tweets. We thus found that the emotional response across genders seems independent of the overall network structure.

Our work takes a step further to understand gender differences in communication patterns exposing possible misleading perceptions of free speech in social media. Regardless of soccer being more popular for Portuguese speakers, the overall communication patterns vary across languages, but still, gender differences seem to be focused on women being more positive and less active than men. In the future, we plan to investigate further the explainability of patterns extracted from the networks and their communities, and compare them with a female-dominated sport.
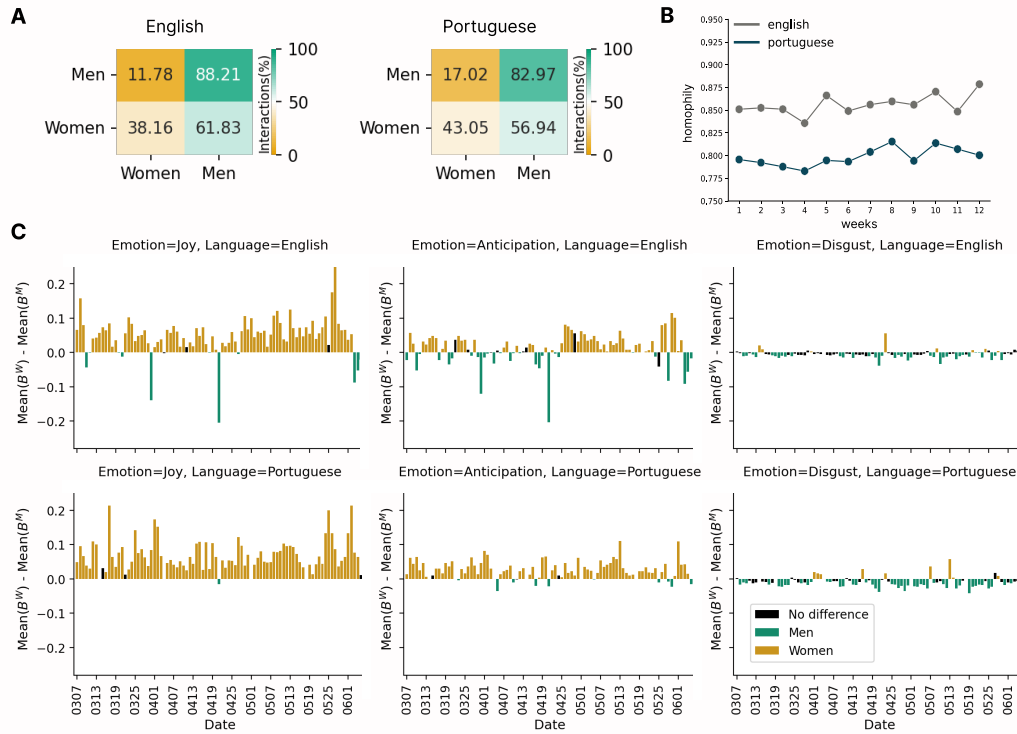
Figure 1: Gender differences of the communication patterns on Twitter. **A.** Percentage of interactions between Women and Men. In Portuguese, the interactions between women and men are more gender-neutral than in English. **B.** Homophily values per week. English network shows higher homophily rates than in Portuguese regardless of the week. **C.** Gender differences between the emotion levels (Joy, Anticipation and Digust). Women have higher levels of joy and anticipation (lower levels of disgust) than men.

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