



A Tale of Two Cities: COVID-19 and the Emotional Well-Being of Student-Athletes Using Natural Language Processing

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[Hyperlink](#) to a five-minute maximum video summarizing the results of the project

Abstract

Using data collected from players from four major ACC sports, we analyzed the user-generated content posted on Twitter of student-athletes to study changes in their sentiment as it relates to the COVID-19 crisis, major societal events, and policy decisions. The results indicated that positive sentiment slightly outweighed negative sentiment overall, but that there was a noticeable uptick in negative sentiment in May and June 2020 in conjunction with the Black Lives Matter protests. The most commonly expressed emotions by these athletes were joy, trust, anticipation, and fear, suggesting that student-athletes used social media as an outlet to share primarily optimistic sentiments, while still publicly expressing strong negative sentiments like fear and trepidation about the pandemic and other important contemporary events. Athletic administrators, ACC coaches, support staff, and other professionals can use findings like these to guide sound, evidence-based decision-making and to better track and promote the emotional wellness of student-athletes.

Introduction

Over the year 2020, many challenges and stressors, such as the public health crisis of COVID-19, nationwide racial justice protests in response to acts of police violence and brutality, and psychosocial isolation imposed by mandatory public health restrictions have emerged that could have a severe negative impact on the psychological well-being of collegiate student-athletes. These challenges and stressors can lead to heightened feelings of anger, anxiety, or fear (McGuine et al., 2021; Shepherd et al., 2021). Athletes who express a lack of support have demonstrated heightened academic anxiety (Li et al., 2021) and degradation of athletic identity, or the “strength with which people identify with and embrace their role as an athlete” (Graupensperger et al., 2020).

Additionally, research has found links between heightened feelings of anxiety and decreased athletic performance (Khan et al., 2017), so it is vital from both an ethical and a business standpoint that collegiate athletic organizations fully understand the sentiments of their constituent athletes. Although the current body of research has adeptly determined the connection between feelings of social support and academic and athletic outcomes for student-



athletes, thus far no researchers have proposed a methodological approach that can assess such feelings for thousands of student-athletes in real-time. While limited in scope, this work offers a methodological foundation that could be expanded to assess fluctuations and trends in the sentiment of the athlete.

Method

The Twitter accounts of ACC student-athletes playing in four different sports, including football, women's volleyball, and men's and women's basketball from four different ACC institutions were selected to scrape social media data (i.e., tweets) during the defined timeframe. The collected raw tweets originated from a period starting at the beginning of the COVID 19 pandemic and ending in February of 2021 to investigate the change in sentiment and emotions for ACC student-athletes throughout the unprecedented trying times.

Through standardized data preprocessing process including stemming and lemmatization, a document-term matrix was generated to complete the text mining. Next, a machine learning-based tripartite sentiment analysis was conducted to produce a score representing each tweet's sentiment on a scale from -5 (indicating extremely negative sentiment) to 5 (indicating extremely positive sentiment), with 0 indicating a neutral sentiment. The dataset was then subjected to a decomposition-based machine learning approach and a trend analysis, allowing to leverage the text's lexicon to measure the strength of eight different emotional themes (i.e., anger, anticipation, disgust, fear, joy, sadness, surprise, and trust) extracted from the tweets over the designated time framework.

Results

After performing the tripartite sentiment analysis, the model classified more than half of the tweets as neutral. In contrast, positive and negative sentiments were attributed to 31.1% and 13.98% of the text data. Moreover, the overall accuracy of the natural language processing model was verified using a confusion matrix, revealing 89.38% correctness in the predictions and where positive (88.29%) and negative sentiments (90.47%) followed an adequate machine learning prediction accuracy according to the previous literature.

Our findings indicated that sentiment and the emotions conveyed in the student-athletes' tweets were closely related to the context and period examined in this study. Indeed, positive sentiments were linked to months associated with positive news (i.e., the start of the COVID-19 vaccination and the football season's commencement). In contrast, negative ones could be connected to nationwide protests in relation to social justice issues.



Discussions and Implications

Despite the numerous physiological and psychosocial challenges that student-athletes were presented within 2020, big data sentiment analysis found that their social media posts displayed a nearly even mix of positive and negative sentiments, with the four most commonly expressed emotions on Twitter being joy, trust, anticipation, and fear. Analyzing these sentiment trends against a timeline of major events for the sample of student-athletes, we determined that the decreasing intensity of negative emotions might be connected with the resumption of normally scheduled athletic activity. It could also relate to the increased focus of ACC on speaking out against racial injustice and expanding structural and social support resources for its Black athletes during the 2020–2021 athletic calendar year.

In sum, the present study helped shed light on the emotional well-being of student-athletes during the challenging times of the COVID-19 pandemic, indicating through social media tweets that many different emotions were brought up considering the unstable climate of the past year and a half. Furthermore, it is safe to say that these results offer critical insights for intercollegiate athletics administrators on their student-athletes' mental health and allow them to set up preventative actions according to these findings. That is, using big data to craft policy would allow ACC to tune its policy decisions more accurately and expediently to the needs of its constituents.