Using Machine Learning to Uncover Hidden Linguistic Differences within Online Mental Health Disclosures between Men and Women

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Abstract

Introduction: According to the National Institute for Mental Health, women experience mental illness more commonly than men. Simultaneously, the number of suicides and instances of mental health struggles among people have dramatically increased worldwide, calling the attention of researchers to current mental health support mechanisms. The identities of those struggling with mental health are starting to be explored by researchers. Findings indicate that identity, such as gender and culture, largely shapes how people who experience mental health issues talk about their mental well-being. However, the known differences in disclosures between men and women are limited in scope. A better understanding of these variations can inform mental health professionals to develop gender-aware treatments. Thus, our study strives to elucidate unknown differences between the posts of self-identifying men and women who disclose their mental struggles online. This was carried out by applying natural language processing techniques on a Reddit dataset.

Objectives: This study set out to create a gender-segregated dataset of online mental health disclosures and to understand both the topical and linguistic differences between men and women when discussing their mental health on peer-to-peer support groups on Reddit.

Methods: The publicly available Reddit application programming interface, regular expressions, and manual inspection were utilized to develop a gender-stratified dataset of online mental health declarations. Thirty-eight latent Dirichlet allocation topic models were developed from the two groups of data, followed by a Linguistic Inquiry and Word Count analysis designed to understand the linguistic differences.

Results: After manual inspection, the dataset had n=332 posts with explicit self-declarations of gender. From topic modeling, it was shown that men tended to discuss loneliness and advice-seeking regarding mental health treatments. At the same time, women most often disclosed their endured abuse and romantic relationship issues/anxiety. Linguistically, men used significantly more analytical language ($p < 0.003$), implying objective, third-person views of events impacting their mental health. On the other hand, women used significantly more narrative language ($p < 0.003$), indicating more emotional, first-person accounts of how their mental health has been impacted.

Conclusions & Implications: These novel findings on gender differences in online mental health disclosures have substantial implications for how gender- and identity-aware approaches to care can be implemented. Mental health professionals can utilize our findings on linguistic differences to improve their linguistic accommodation, which is linked to better outcomes. With the topical variations between men and women, future research should investigate how to account for individualized experiences. Investigations using our findings are essential to address critical issues plaguing society today. Ultimately,

with prospective research, mental health professionals' interactions with patients may become gender-aware, and precision medicine may be augmented with identity to better help those struggling.