

Psychological Distress in Preoperative Bariatric Patients is Associated with Motivational Language

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Introduction & Background

Depression and anxiety are common and well-established obesity-related **comorbidities** which may contribute to postoperative healthcare utilization and satisfaction with surgical results

These conditions have known **emotional and physical manifestations** that may impact **motivation** and **language use**, including the use of self-referential words such as “me”, “myself”, and “I”

This study (n=105) tests the hypothesis that preoperative bariatric surgery candidates with clinically significant anxiety and depressive symptoms exhibit different language and emotional content patterns when describing their motivation to undergo surgery

Using **text mining techniques** applied to motivational statements collected in our routine clinical practice, we quantified these language trends based on preoperative **psychological testing** completed as **standard-of-care** for patients undergoing bariatric surgery at our institution

By understanding trends identified from **patients’ own words**, obesity clinicians may continue to **adapt pre and postoperative care** to **better support patients** with depression and anxiety

Methods

TEXT PREPROCESSING:

- Patient hand-written **personal statements** were transcribed for analysis
- We then formulated the text in industry-standard fashion (**normalization**)

SENTIMENT ANALYSIS:

- We compared tokenized statement words to **standardized sentiment lexicon** (NRC), which assigned **emotional valence** and **positivity/negativity**
- Matched sentiments were then evaluated and filtered for context
- We then used R’s RadarChart package to generate visualizations comparing relative **sentiment expression**

POLARITY:

- The **net polarity** from each statement was calculated as the sum of positive words minus negative (assigned by sentiment lexicon)

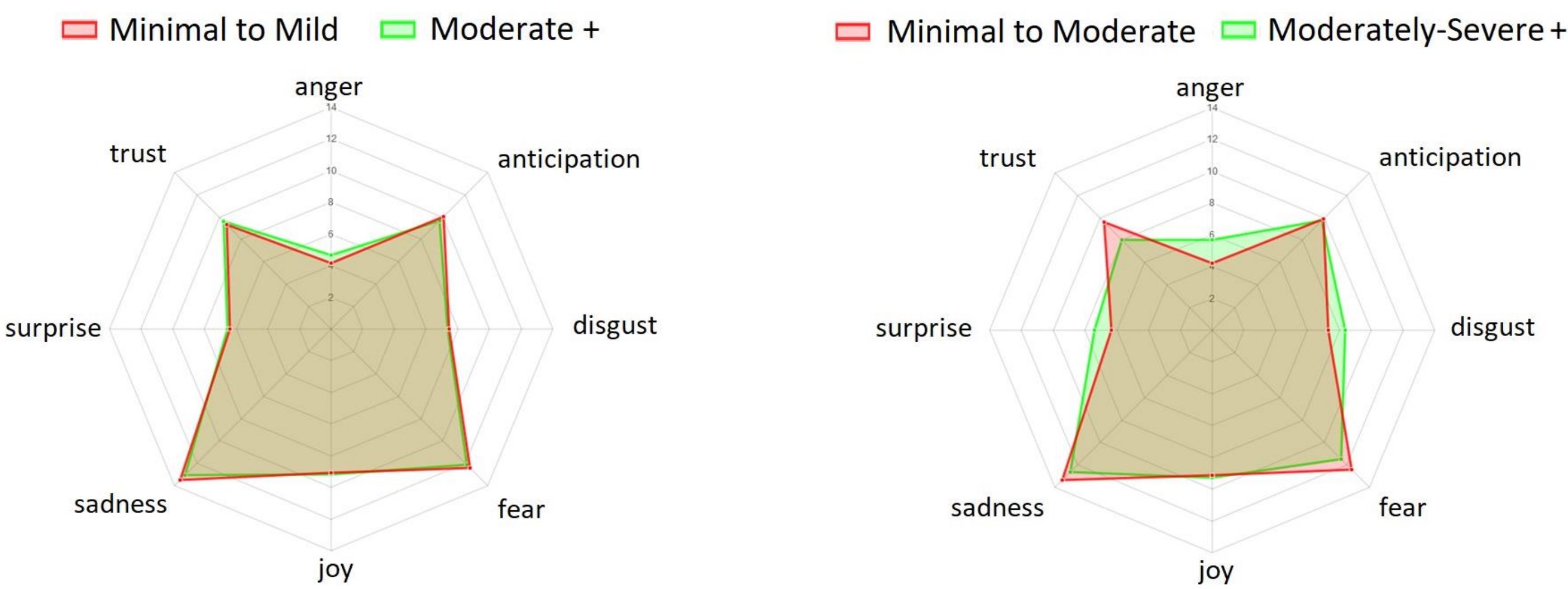
SELF-REFERENTIAL WORDS:

- Counted instances of “**me**”, “**myself**”, and “**I**” in statements
- Calculated proportion of self-referential words per statement

Results

Emotional Content of Statements by PHQ-9 (Depression) Score

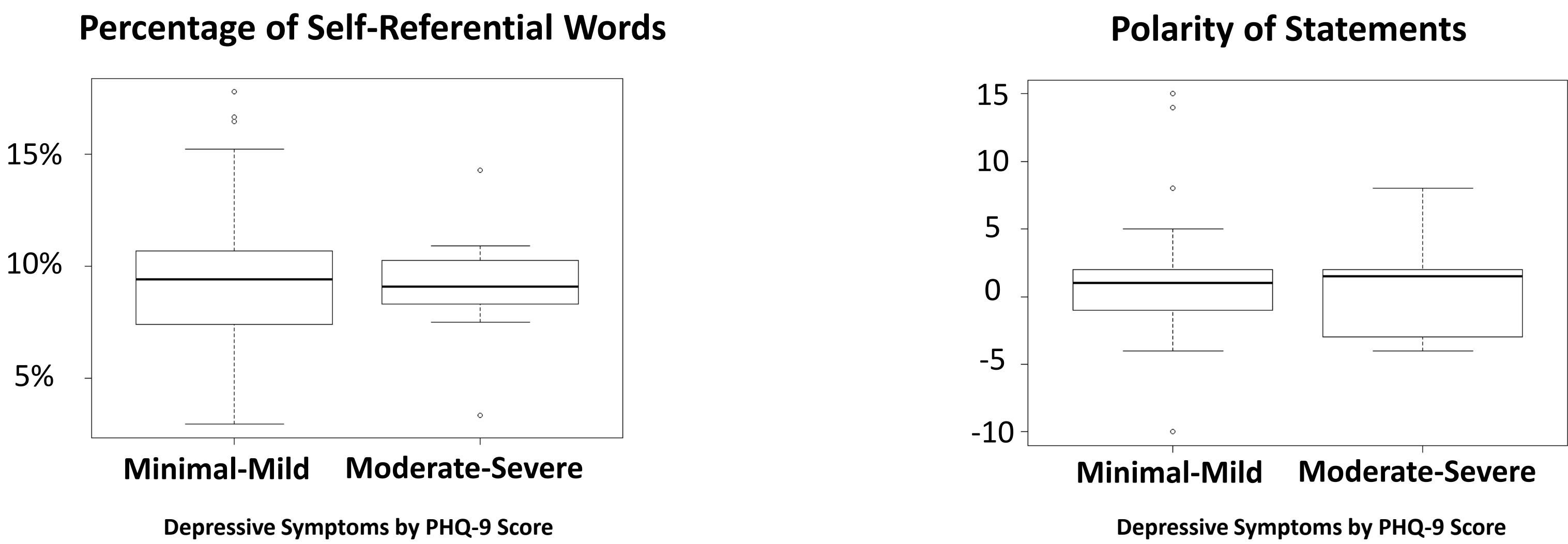
Cutoffs of 10 (left - Moderate) vs. 15 (right - Moderately-Severe)



When a PHQ-9 **cutoff of 15** is used (Moderately-Severe to Severe Depression), statements from patients with higher PHQ-9 scores **trend** toward **qualitative differences in expressed sentiment proportions**, with anger being most prominent (Moderately-Severe to Severe > Minimal to Moderate, $p > 0.05$)

Comparison of Patient Personal Statements to Language Trends Identified in the Literature

Self-Referential Word Use (left) and Positivity/Negativity(right)



No significant differences were seen in either the **proportion of self-referential words** or **polarity of statements** when comparing patient populations **based on their PHQ-9 scores** with cutoffs of both 10 (Moderate) and 15 (Moderately-Severe) symptoms

Discussion of Findings

• SENTIMENT ANALYSIS:

- Negligible differences were seen in the emotional content of personal statements when a cutoff of PHQ9=10 (Moderate symptoms) was used
- **There was a trend toward the use of more words associated with anger and disgust** by patients with **Moderately-Severe depressive symptoms**

• LITERATURE TRENDS: Self-referential Words and Polarity

- **There were no significant differences in proportion of self-referential words** or **polarity of statements** when comparing patient populations to published norms **based on PHQ-9 scores** with cutoffs of Moderate and Moderately-Severe symptoms
- Bariatric patient statements are **quantitatively similar to each other regardless of depressive** symptoms- this differs from findings published on the general population
- **Confounding factors may contribute:** these could include **life, health, and social stressors** associated with obesity, which may be present regardless of depression

Next Steps

- Increase power for analysis by **increasing sample size**
- Explore demographic factors that may contribute to **differences between patient groups**
- Integrate **clinical factors which might contribute to depression** such as medical comorbidities

Conclusions

- **Trends** in the emotional content of motivational statements were be observed when comparing patients with **varying levels of psychological distress**, but these did not reach statistical significance
- **Depression-associated language trends** identified in the general population were **not observed** in this population of bariatric surgery patients