Latent Profile Analysis of Negative and Positive Psychological Constructs in Patients with Chronic Pain

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BACKGROUND

Individuals with chronic pain (CP) tend to demonstrate greater negative psychological constructs (depression, anger, anxiety) compared to the general population. Still, there exist varying degrees of these traits within the CP population that may affect functional outcomes.

METHODS

An exploratory latent profile analysis (LPA) was performed on a CP subset from the COVID-19 Health and Mental Health Survey[1] (n=288). The survey included the PROMIS Item Bank v1.0 for Self-Efficacy for Managing Chronic Conditions and Emotional Distress (Anxiety, Depression, Anger) short forms. The association between profile membership and self-efficacy was evaluated by univariate, unadjusted linear regression followed by ANOVA and post-hoc Tukey comparisons.

RESULTS

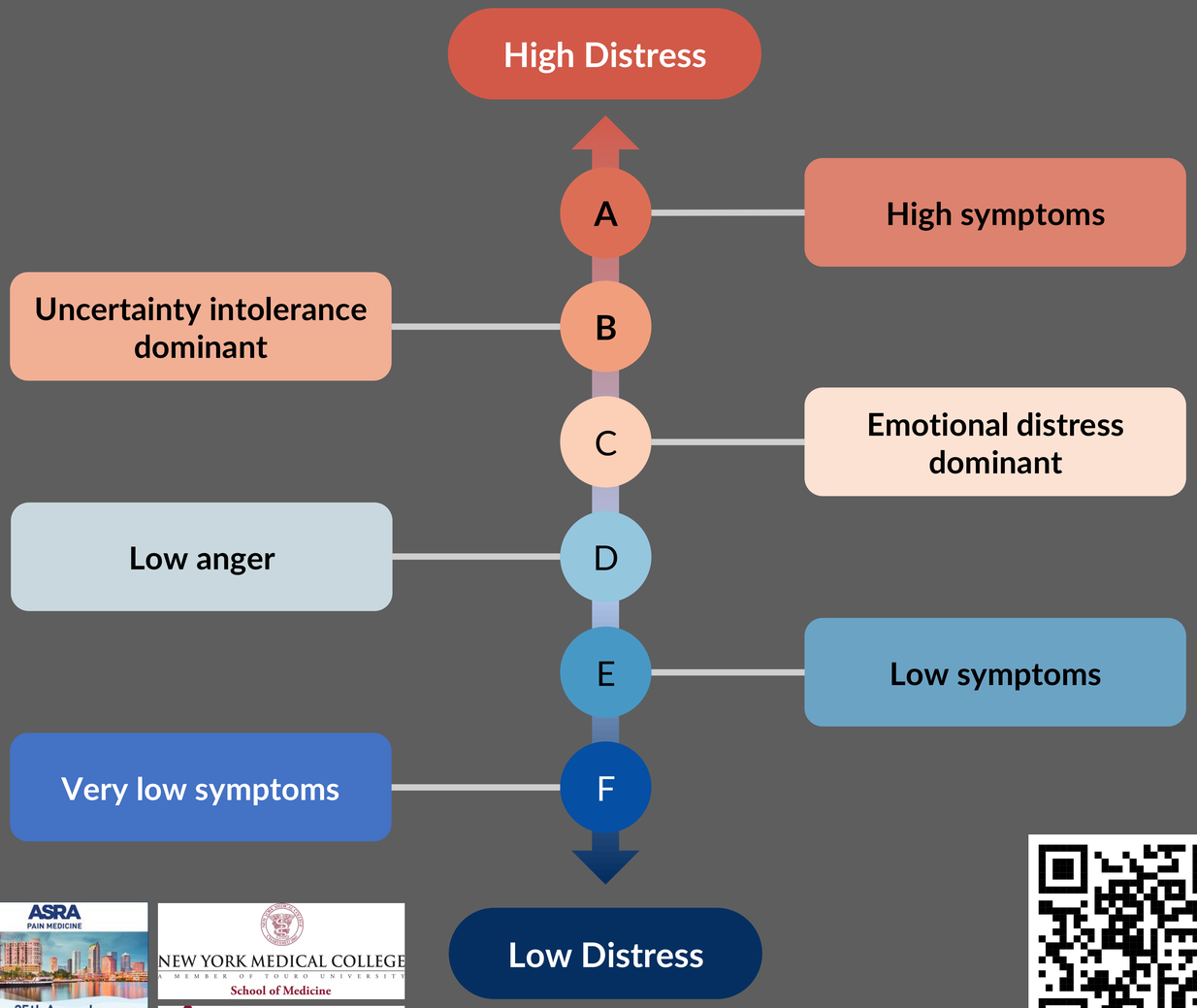
LPA identified six "risk" profiles characterized by varying levels of **depression and anxiety**, **anger**, and **intolerance of uncertainty**. Risk profile membership was significantly associated with self-efficacy and demonstrated a moderate effect size (ANOVA: $F=9.14$, $p<0.001$, partial $\eta^2=0.139$), with significant pairwise differences observed across multiple profiles. In contrast, protective profiles were not significantly associated with self-efficacy. Self-efficacy in this study was operationally defined in the context of managing chronic conditions by symptom management, activities of daily living, and social interaction.

CONCLUSION

Risk profiles characterized by **lower levels of negative psychological constructs** were associated with **greater self-efficacy**. However, greater risk factors did not consistently predict lower self-efficacy. As such, additional factors are likely to impact the relationship between negative constructs and self-efficacy. Future research and clinical intervention should thus highlight individualized approaches that assess and address mediating variables.

[1]Levin, L., R. Liberty, K. Rust, S. Waters, & E. Coffield. (2021). *COVID-19 Health and Mental Health Survey.*

There are distinct profiles within the chronic pain population defined by varying degrees of negative psychological constructs.





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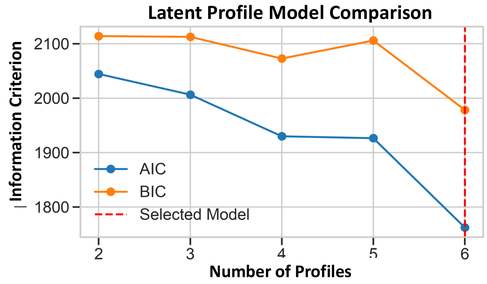


Figure 1. Exploratory latent profile analysis (LPA) was performed to determine the optimal number of risk profiles, defined by composite scores of depression and anxiety, anger, and intolerance of uncertainty. The 6-profile model demonstrated the most favorable Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC).

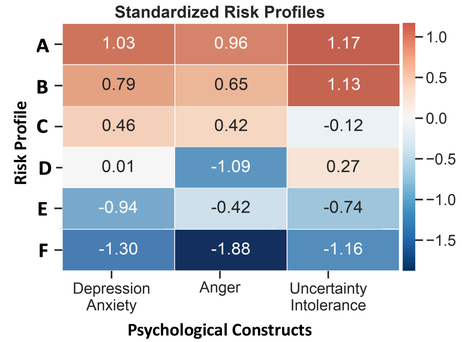


Figure 2. Heatmap describing the degrees of negative psychological constructs (depression and anxiety, anger, uncertainty intolerance) associated with each of the 6 risk profiles. Standardized scores represent the average Z scores of members within each profile, relative to the study cohort.

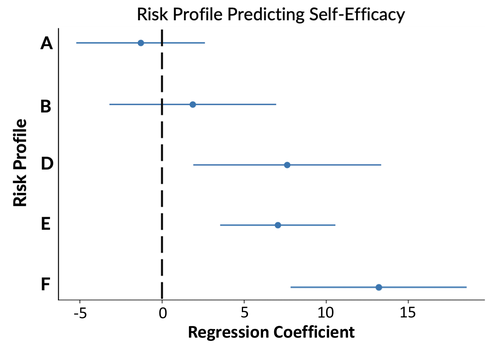


Figure 3. Forest plot depicting the results of ordinary least squares linear regression analysis of the association between risk profile membership and composite self-efficacy score. Profile C (emotional distress dominant) was used as the comparator group relative to all other profiles.

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