

A Comparative Linguistic Analysis of Narratives Produced by Individuals at High- vs. Low-Risk for Psychosis During COVID-19

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BACKGROUND

- COVID-19 has had a drastically negative effect on mental health in the general population (Dean et al., 2020).
- Increased overall levels of depression, anxiety, stress, loneliness, and psychosis-like symptoms have been documented since the start of the pandemic.
- To better understand the increase in psychosis-risk in the general population, we examined narratives written by high- and low-risk individuals reflecting on the pandemic.
- To reduce bias, we used an automated computational text analysis tool that computes relevant variables from written text.
- Linguistic analysis is an effective method of understanding internal processing.

METHODS

Participants

- The "High-Risk" group was:
 - 53.2% Hispanic/Latinx
 - 39.24% White
 - 6.46% Asian
 - 6.33% Other
 - 5.06% Black
 - 1.27% Native American
 - 1.27% Native Hawaiian
- The "Low-Risk" group was:
 - 28.78% Hispanic/Latinx
 - 52.9% White
 - 19.94% Asian
 - 2% Other
 - 7.12% Black
 - 1.14% Native American
 - 0.3% Native Hawaiian

Procedure

- Participants completed an anonymous, online survey evaluating mental, social, and physical wellbeing.
- Respondents completed a series of questions on demographics, physical health, previous out of body experiences or auditory hallucinations, loneliness, social network, past trauma, and feelings of depression, anxiety, and stress.
- Participants then wrote up to 10 lines of text reflecting on how COVID-19 has affected them, their families, friends, and communities.
- Participants were grouped into "High-" and "Low-Risk" groups according to Ising et al.'s 2012 guidelines:
 - Those who endorsed 6 or more items on the PQ-16 were classified as "High-Risk."

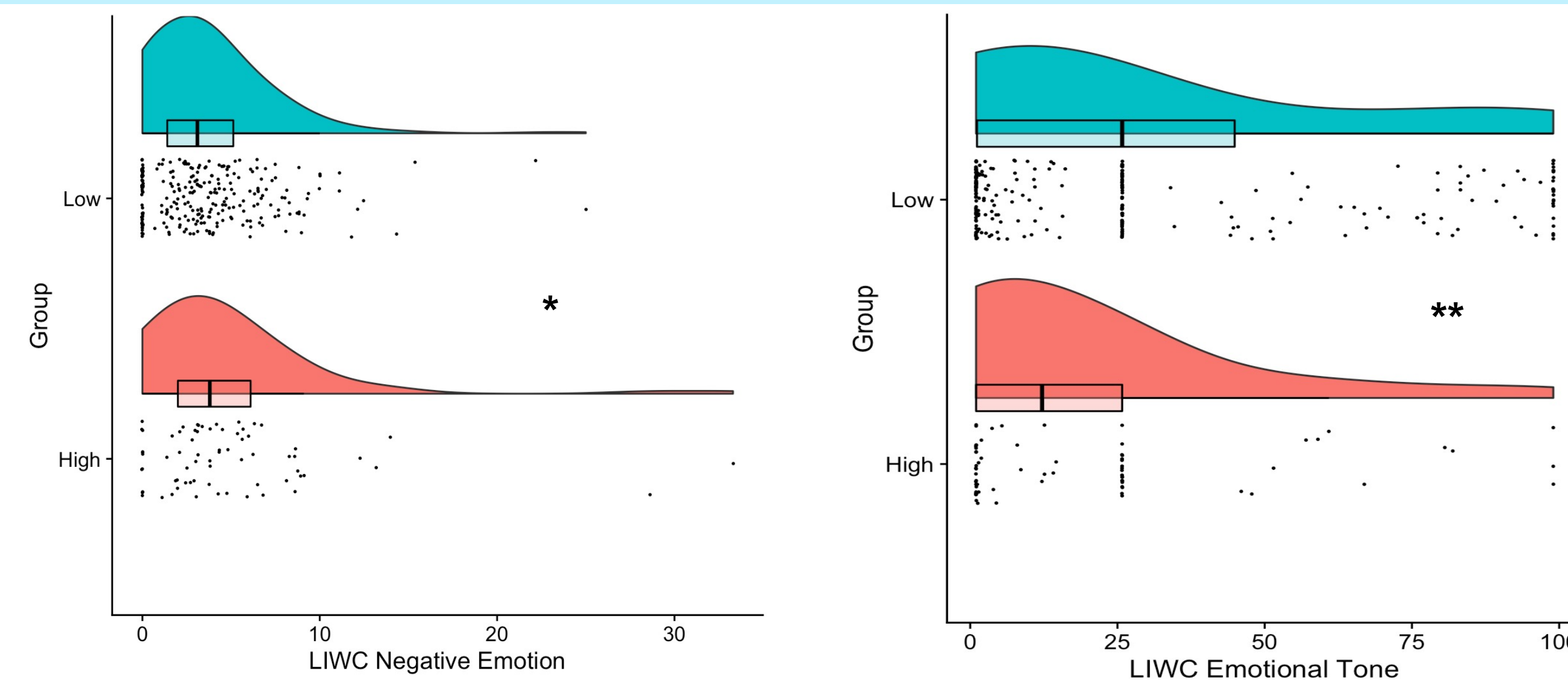
Evaluation

- Resulting narratives were analyzed using the Linguistic Inquiry and Word Count program (LIWC, Pennebaker et al., 2015).
- LIWC computes these basic linguistic variables:
 - Percent self-referring pronouns
 - Percent social words
 - Percent positive emotion words
 - Percent negative emotion words
- LIWC computes these complex variables:
 - Cognitive items
 - Formal and logical thinking patterns ("analytic")
 - Social status or confidence ("clout")
 - Authenticity
 - Emotional tone
- Mental and social wellbeing were assessed using:
 - The UCLA Loneliness Scale
 - The Depression, Anxiety, and Stress Scale (DASS)
 - The Prodromal Questionnaire (PQ-16)
 - The Social Network Index (SNI)

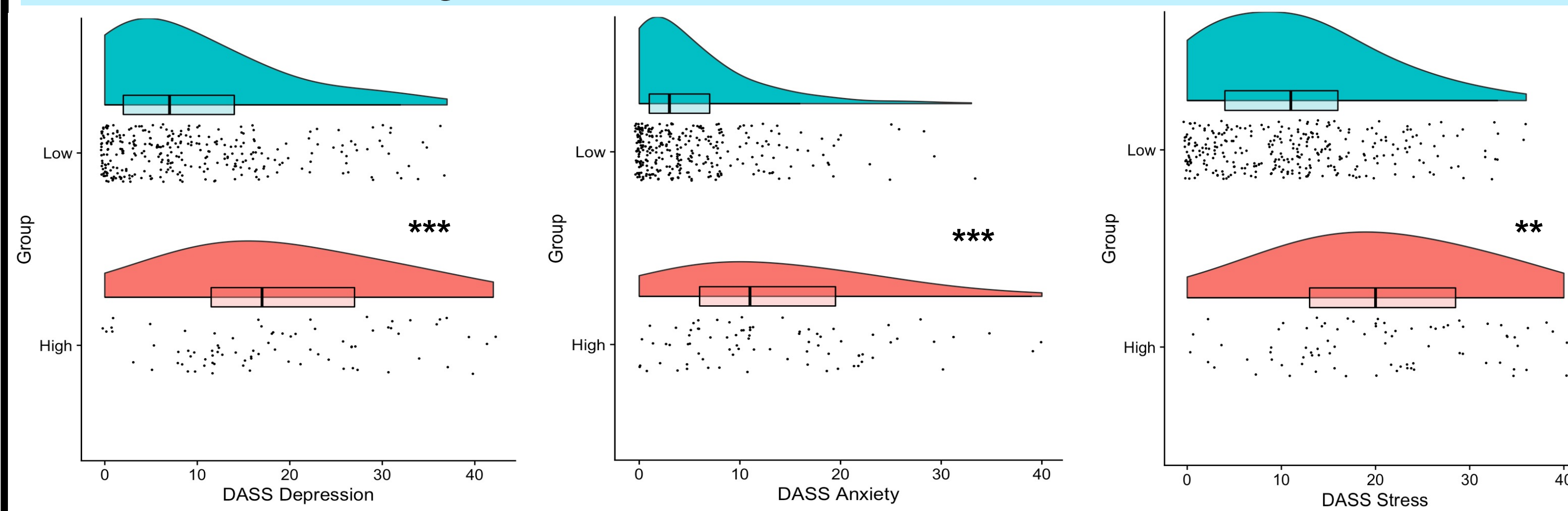
	High-Risk (N = 79)	Low-Risk (N = 351)
	Mean (SD)	Mean (SD)
PQ-16 Items	8.52 (2.28)	1.57 (1.69)
PQ-16 Distress	11.99 (5.83)	1.72 (2.32)
M / F / Other / Pref NA	9 / 66 / 2 / 2	61 / 284 / 4 / 2
Age (yrs)	27.37 (10.27)	32.21 (13.48)
Education (yrs)	15.14 (2.03)	16.46 (2.53)
Employed / Unemployed	52 / 22	276 / 47

RESULTS

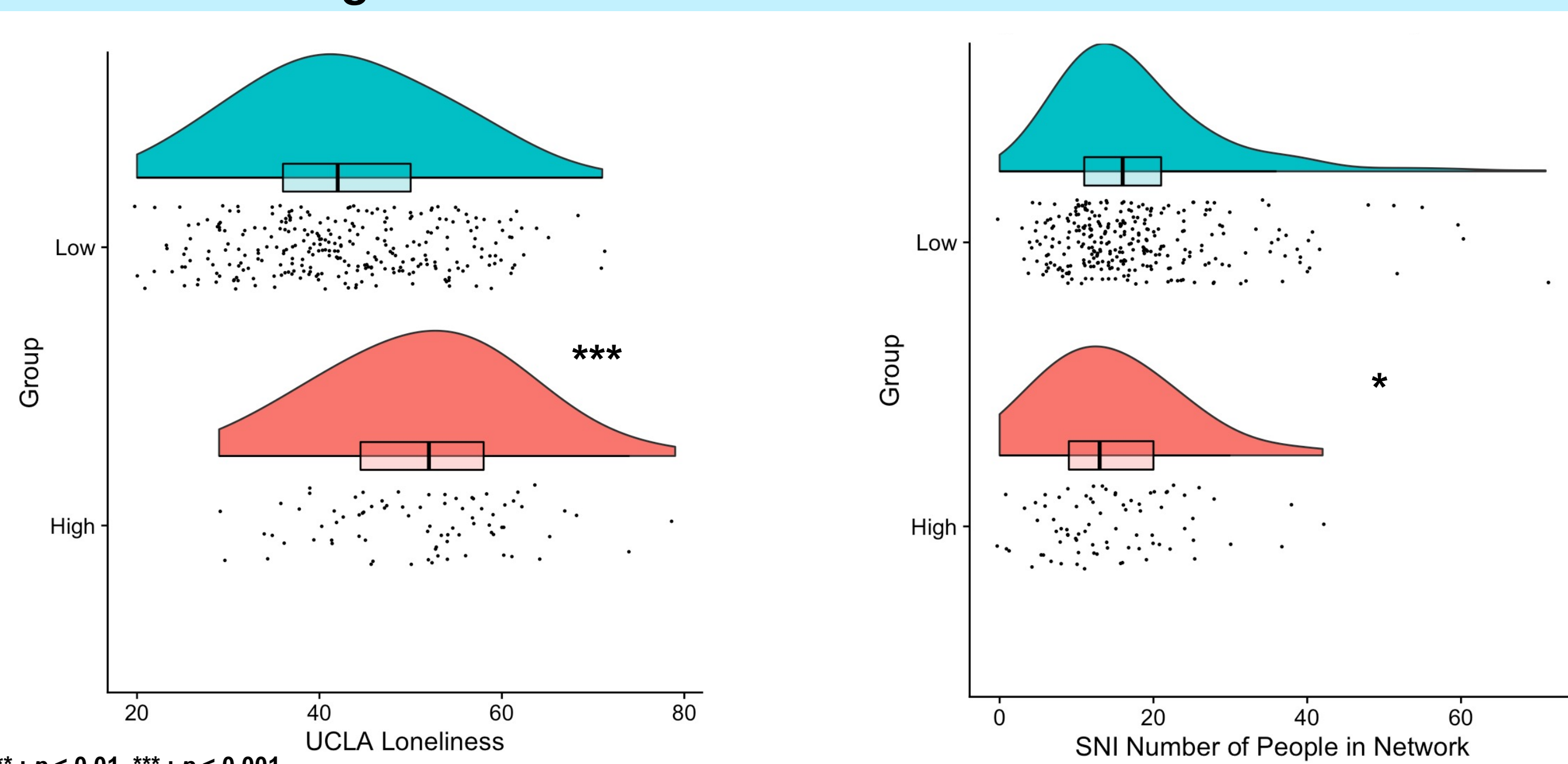
High- vs. Low-Risk: Linguistic Variables



High- vs. Low-Risk: Mental Health Variables



High- vs. Low-Risk: Social Isolation Variables



* : $p < 0.05$, ** : $p < 0.01$, *** : $p < 0.001$

Relationships Between Linguistic and Psychological Variables

- Of the total respondents, 18.4% met criteria as being "High-Risk" for psychosis (Ising et al., 2012), while 81.6% were categorized as "Low-Risk."
 - High-Risk respondents reported auditory hallucinations and out of body experiences at a significantly higher rate, further validating their elevated risk status.
- High-Risk status was heavily related to overall worse mental health, and, in writing, emotional tone and emotion word use:**
 - High-Risk participants reported significantly more loneliness ($p < 0.001$) and a significantly smaller # of people in their social networks ($p < 0.05$) than the Low-Risk group.
 - High-Risk respondents showed increased DASS depression ($p < 0.001$), anxiety ($p < 0.001$), and stress ($p < 0.01$) scores compared to the Low-Risk group.
 - High-Risk individuals produced significantly more negative emotion words ($p < 0.05$).
 - Negative emotion word use was also significantly related to increased PQ-16 distress scores.
 - The mean number of positive emotion words was also inversely correlated with higher PQ-16 endorsement and distress scores.
 - High-Risk individuals wrote with significantly less emotional tone ($p < 0.01$).
 - Emotional tone was also positively correlated with increased PQ-16 endorsement and distress scores.

Relationships Between Demographics and Clinical Variables

- Across both groups, Non-White respondents had significantly higher PQ-16 Item Endorsement ($p < 0.001$) and Distress scores ($p < 0.005$) than White respondents.
- Female respondents had significantly higher PQ-16 Distress ($p < 0.05$) scores and significantly lower LIWC Cognitive Processes scores ($p < 0.001$) than male respondents.
- Participants who had experienced trauma had significantly higher PQ-16 Item Endorsement scores ($p < 0.001$) and PQ-16 Distress scores ($p < 0.001$) than participants who had not experienced trauma, and had significantly lower LIWC Emotional Tone ($p < 0.01$) scores than respondents who had not experienced trauma.

Summary

- We observed many differences in writing style and content that were significantly related to High- versus Low-Risk status, suggesting that these differences reflect the inner psychological states of those at elevated risk for psychosis.

DISCUSSION

- Individuals at High-Risk for psychosis produced more negative emotion words, which was also associated with greater PQ-16 Distress scores, and wrote with less Emotional Tone than Low-Risk respondents.
- Automated text analysis tools help minimize implicit biases inherent in ratings of interviews, yielding a more accurate depiction of participants' true inner psychological states.
- Future work will explore group differences further by comparing written narratives between groups and drawing parallels between High-Risk individuals and those with diagnosed psychosis in order to identify specific writing styles and/or content that may be predictive of psychosis.

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