

Adolescent Suicidal Ideation
Symptom Clustering:
Machine Learning Driven
Data Exploration

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BACKGROUND: Several lines of research have aimed to identify profiles of suicidal thinking and subtypes of adult individuals at risk of suicide. We investigate symptom clusters of adolescent suicidal ideation with a variety of unsupervised machine learning techniques.

METHODS:

- 1. Used the TADS trial (Treatment for Adolescents with Depression Study)
 - a. n = 439
 - b. Examined baseline symptom clustering
 - i. Trial secondary measure: Suicidal Ideation Questionnaire Junior (SIQ-JR)
- 2. Applied hierarchical clustering
- 3. Sensitivity analyses
 - a. Examined clusters with different times, parameters, and ML methods
 - i. K-means clustering
 - ii. Non-negative matrix factorization
 - iii. t-distributed Stochastic Neighbor Embedding

DISCUSSION:

- 3 cluster solution (with one poorly clustered item) appears to emerge
- a. Silhouette score = 0.280, 95% CI (0.195, 0.319)
 - i. Scores bounded between -1 and +1 for incorrect to dense clustering
 - ii. Scores around 0 indicate overlapping clusters

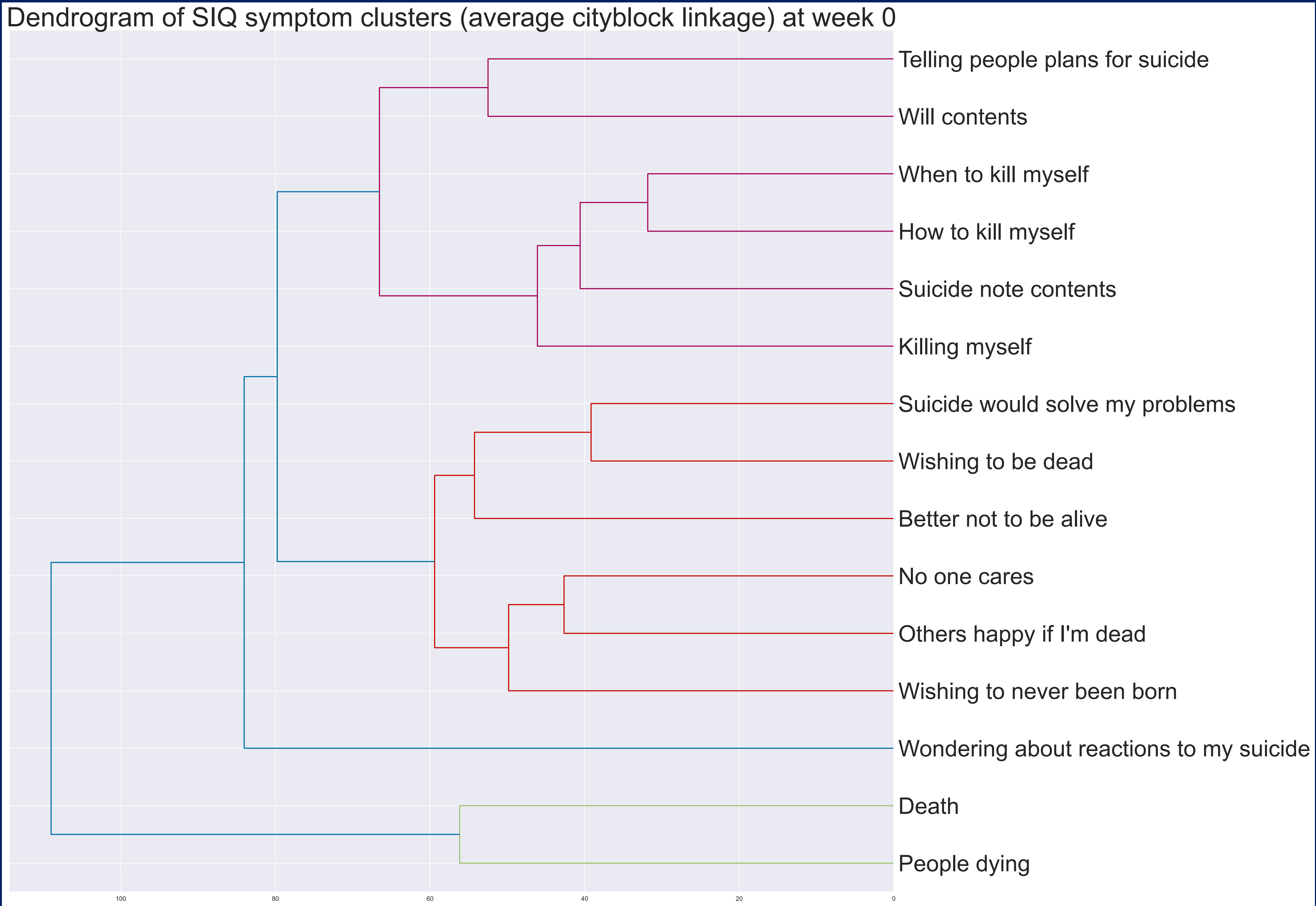
Without clear consensus in cluster evaluation, sensitivity analyses are used:

- a. Clusters are comparable across techniques (Tables 1 & 2), time, parameters (not shown)

Such preliminary findings require external validation or replication with larger sample

Next steps: assessing differential treatment outcomes related to symptom clusters

We investigated symptom clusters of
adolescent suicidal ideation using
unsupervised machine learning techniques.



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Table 1. K Means Clusters (k=3) for Baseline SIQ-JR	
Cluster 1	Better not to be alive, Killing myself, Wishing to be dead, Suicide would solve my problems, Others happy if I'm dead, Wishing to never been born, No one cares, Wondering about reactions to my suicide
Cluster 2	How to kill myself, When to kill myself, Suicide note contents, Will contents, Telling people plans for suicide
Cluster 3	People dying, Death

