

TAG2RISK: HARNESSING SOCIAL MUSIC TAGS FOR CHARACTERIZING DEPRESSION RISK

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Background

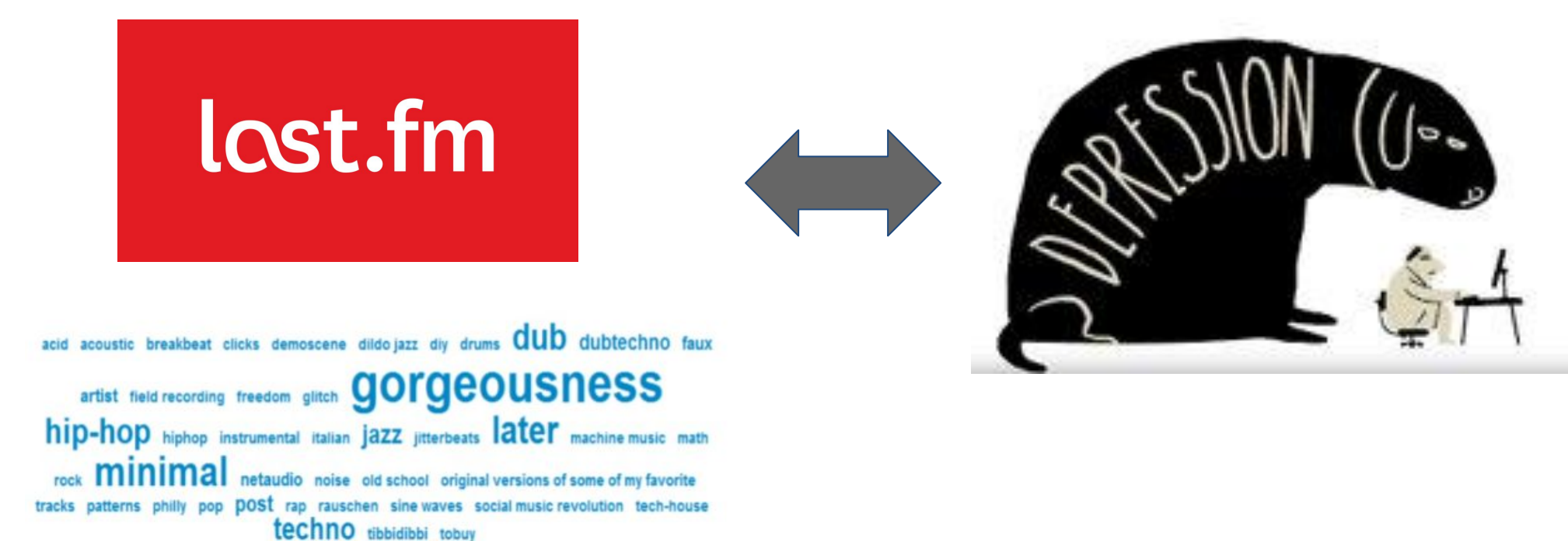
Depression has become the leading cause of disability across the globe as evident by reports from the World Health Organization (WHO)¹ and this number is steadily rising during the COVID-19 pandemic. Recent evidence has emerged claiming that certain musical choices and habits can be associated with ill-health and internalized symptomatology. No studies have looked at the link between active music listening and depression using naturally occurring music behaviour via streaming platforms.

Aim and Objectives

Our study aims to identify emotion tags and their respective occurrences in the music listening behavior associated with individuals at risk for depression.

Music Listening Habits

Depression

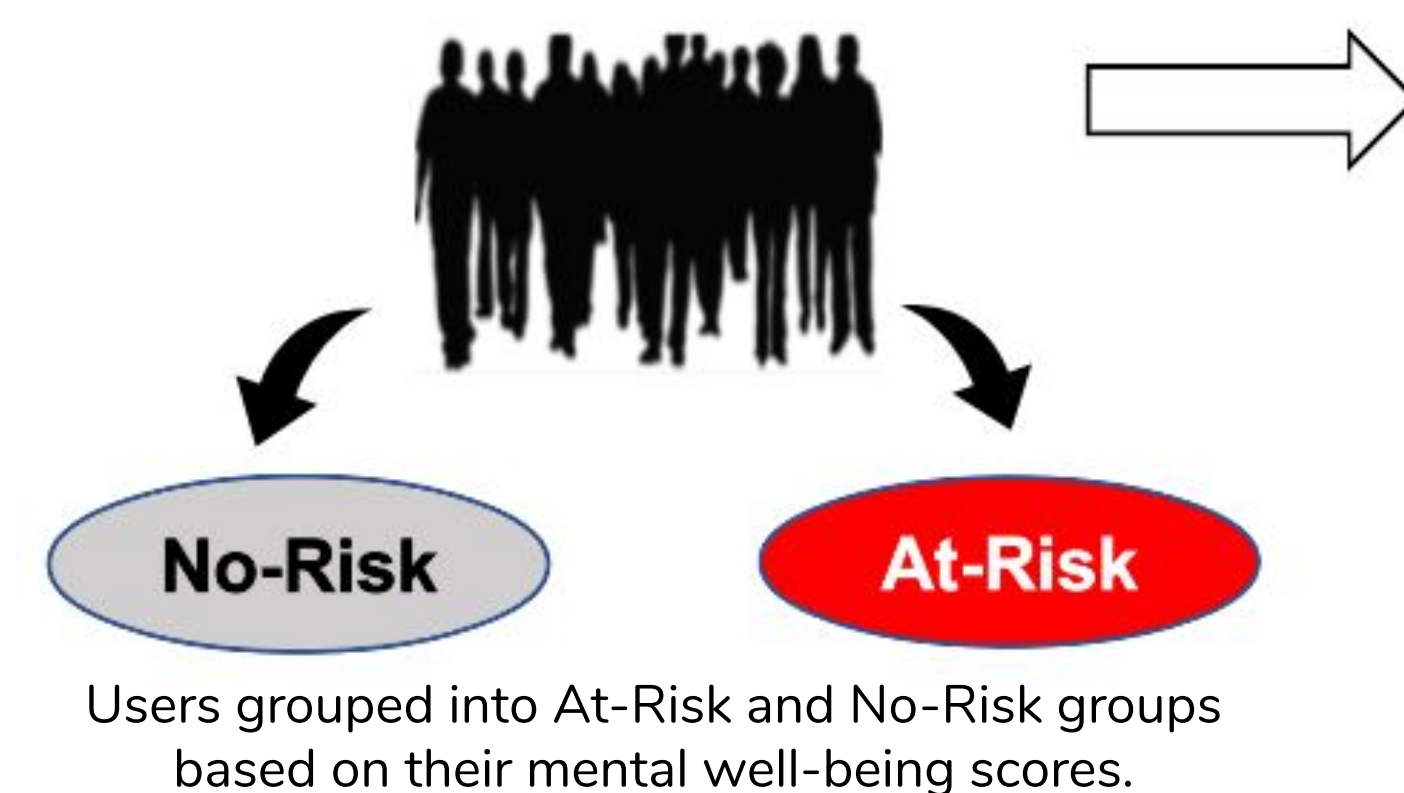


Research questions:

- What are the social tags associated with music chosen by At-Risk users?
- What emotions do these tags signify in the context of musically evoked emotions?
- What genres are mostly associated with At-Risk users?
- How well can we classify users as At-Risk given user-specific social music tags?

Method

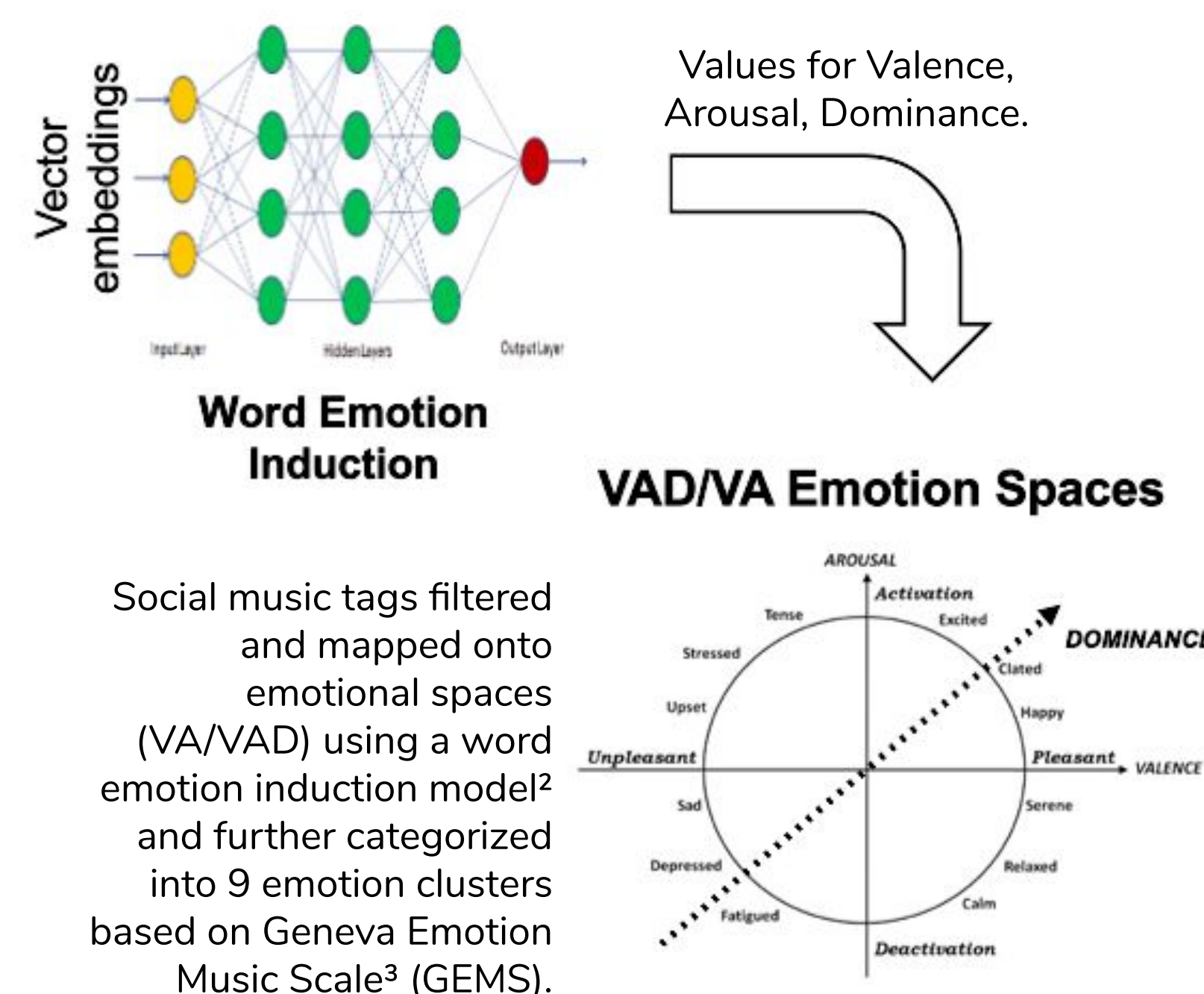
595 Last.fm users (Mean Age = 25.4, SD = 7.3) filled an online survey to collect Last.fm usernames, mental well-being measure and musical engagement strategies.



Statistical Testing to check for group differences

GEMS Emotion Prevalence Scores

Emotional prevalence scores calculated for every user thereby performing Mann Whitney U Test for test of group difference followed by Permutation Testing to check for significance of observed difference.

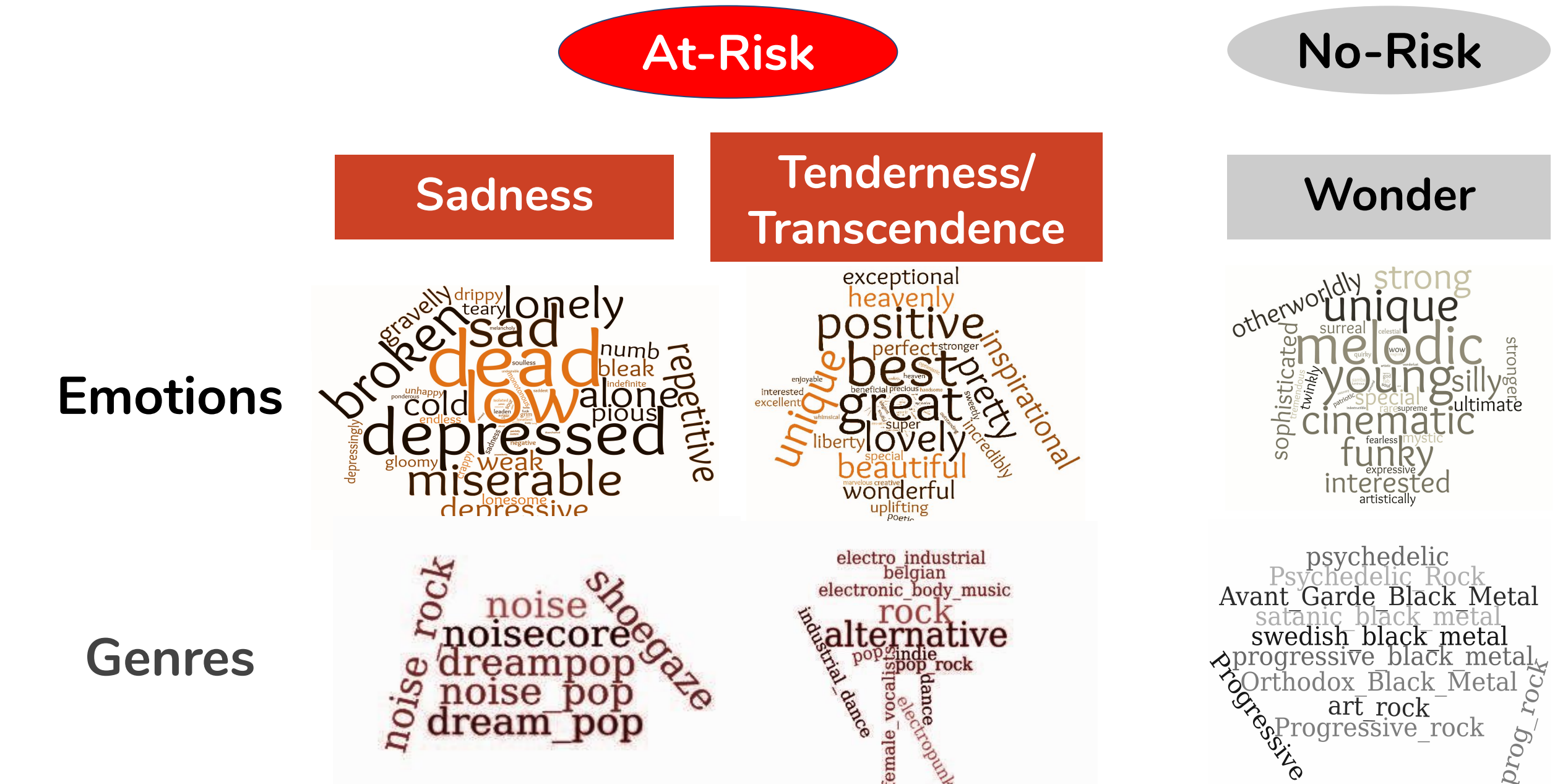


Social music tags filtered and mapped onto emotional spaces (VA/VA) using a word emotion induction model² and further categorized into 9 emotion clusters based on Geneva Emotion Music Scale³ (GEMS).

Geneva Emotion Music Scale (GEMS)



Emotion & Genre Tag Results



Conclusion

- At-Risk individuals attracted to music tagged predominantly with **Sadness** that resonates with their internal state and tend to oscillate between positive and negative states within a general state of low arousal
- genre-based results strengthen the claim that depression may foster musical immersion as an escape from a reality that is perceived to be adverse
- use of only single word tags a limitation of this study
- future work to incorporate multi-word tags in addition to examining temporal evolution of emotion categories, acoustic features, and lyrics

References

1. World Health Organization. (2017). Depression and other common mental disorders: global health estimates (No. WHO/MSD/MER/2017.2). World Health Organization.
2. Buechel, S., & Hahn, U. (2018, June). Word emotion induction for multiple languages as a deep multi-task learning problem. In Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long Papers) (pp. 1907-1918).
3. Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: characterization, classification, and measurement. *Emotion*, 8(4), 494.

Statistical Group Difference Results

Group	Top Tracks	VAD		VA	
		t=±3	t=±2	t=±3	t=±2
At-Risk	n=100	Sadness*		Sadness**	
	n=200	Sadness*	Sadness*, Tenderness*	Sadness*	Sadness*, Transcendence*
	n=500	Sadness*, Tenderness*	Tenderness*	Sadness*	Sadness*, Transcendence*
No-Risk	n=100		Transcendence*		Wonder**
	n=200	Transcendence*	Transcendence*	Wonder*	Wonder**
	n=500	Transcendence*	Transcendence*	Wonder*	Wonder**

t=±3, t=±2 represent 6 months and 4 months duration of music listening history respectively, centred around the time they filled the survey. *p<0.05; **p<0.01