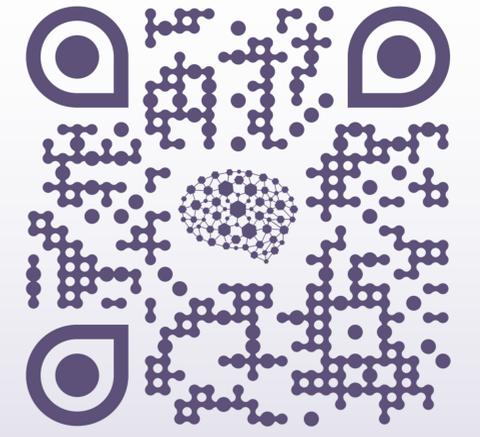


# Aesthetic Chills: A Replicable Path to Self-Transcendence

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## SHORT ON TIME? HERE'S THE SUMMARY

Self-transcendence (ST), a positive altered state of ego-dissolution, interconnectedness, and moral elevation, mediates well-being, resilience, and pro-sociality<sup>1</sup>. While ST arises from major life events, psychedelic and mystical experiences, and advanced meditation, these are not universally accessible. Here we show that aesthetic chills induced by film and music replicate the classical features of ST, democratizing its study.

## MOTIVATION

- Self-transcendence (ST) is a positive altered state of consciousness associated with ego-dissolution, connectedness, and moral elevation, which mediates well-being, meaning-making, and prosociality<sup>1</sup> in daily life and following transformative experiences<sup>2,3</sup>.
- Conventional paths to ST such as religious practice, meditative<sup>2</sup> practice, and psychedelics<sup>3</sup> pose nontrivial barriers to entry, limiting ST's study and wide application.
- Aesthetic chills<sup>4</sup> (henceforth "chills") are a peak psychophysiological response characterized by a pleasurable, cold sensation, and subjective qualities and outcomes intuitively similar to ST. However, evidence is lacking directly relating chills and ST.

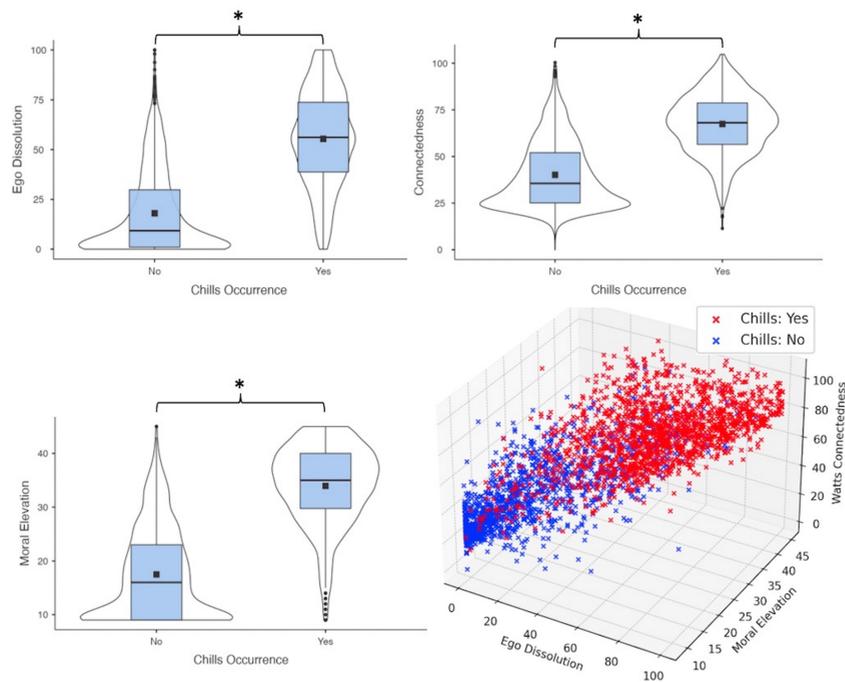


Figure 1. Differences in self-transcendence measures (Ego-dissolution, Connectedness, and Moral Elevation) between participants who reported experiencing chills and those who did not.

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## Self-Transcendence and chills are robustly linked

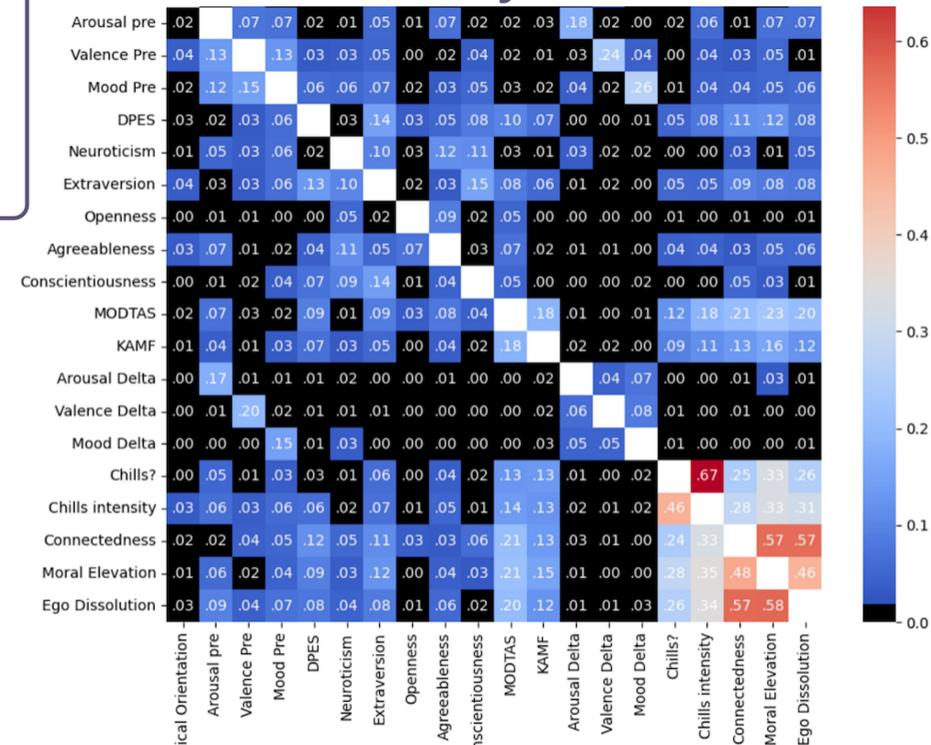


Figure 2. Mutual information in full cohort between traits, demographic variables, and outcomes. Cells in black fall below the bootstrapped general threshold (.03) for significance at  $p < .05$ . Cell values are rounded to 2 decimal places. Coefficients indicate the extent to which measurement of X (row variable) reduces uncertainty about Y (column variable).

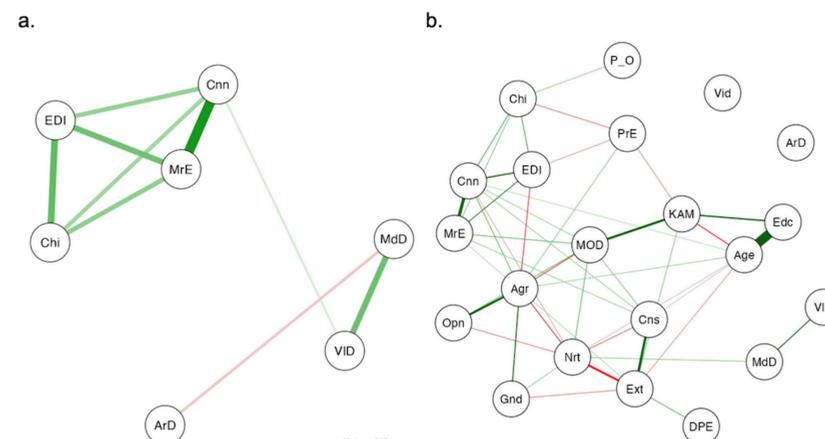


Figure 3. Correlation structure in chills-only participants between (a) outcomes only and (b) Outcomes and traits/demographics. Chi = chills intensity, EDI = ego dissolution, Cnn = connectedness, MrE = moral elevation, MDD = mood delta, VID = valence delta, ArD = arousal delta, PO = political orientation, PrE = prior exposure, Vid = video, MOD = absorption, KAM = kama muta, DPE = positive emotionality, Agr = agreeableness, Ogn = openness, Nrt = neuroticism, Cns = conscientiousness, Ext = extroversion, Gnd = gender

## METHODS

- A sexually, politically, and racially/ethnically diverse sample of 2,937 participants was recruited between April-August 2023, in Southern California.
- Before the chills stimulus, participants completed the Dispositional Positive Emotion Scale (DPES), NEO Five-Factor Inventory (NEO-FFI-3), Modified Tellegen Absorption Scale (MODTAS), and Kama Muta Frequency Scale (KAMF) to assess positive emotionality, big five personality traits, absorption, and proclivity for being emotionally moved.
- Participants were then randomly assigned to experience one of 40 stimuli (20 audio, 20 audiovisual) selected from the ChillsDB<sup>5</sup>, a database of validated chills-evoking stimuli.
- After the chills stimulus, participants reported chills intensity, and completed the Ego-Dissolution Inventory (EDI), Watts Connectedness Scale (WCS), and State Moral Elevation Scale (SMES) to measure self-transcendence components.
- We leveraged non-parametric tests (Fig.1), mutual information (Fig.2), covariance structure analysis (Fig.3), clustering, and principal components analysis (Fig.4) to examine relationships between traits, demographics, chills, and self-transcendence measures.

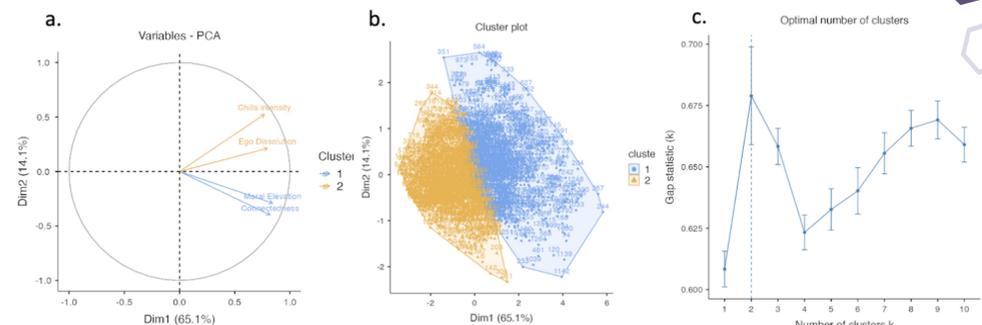


Figure 4. Cluster analysis of ST and chills intensity provides evidence of a covariation along roughly two principal components. (a) principal components of variance in ST and chills intensity (b) clusters of data along these two components. (c) maximizing for parsimony and gap statistic supports a dual cluster/component model.

## CONCLUSIONS

- Aesthetic chills-optimized stimuli replicably and non-pharmacologically induce self-transcendent (ST) experiences, though the chills response likely marks extreme ST rather than causing it.
- We hope democratizing access to the study and experience of ST can help facilitate human flourishing.

## ACKNOWLEDGEMENTS

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