

# Let Trans Lives Thrive

A Conditional Inference Tree Approach Exploring the Impact of  
Psychosocial Factors on Positive Health Outcomes for  
Transgender and Gender Non-conforming Adults

STAT 228 FINAL PRESENTATION | MAY 6TH 2025

ZOE PENZARRO HABEL



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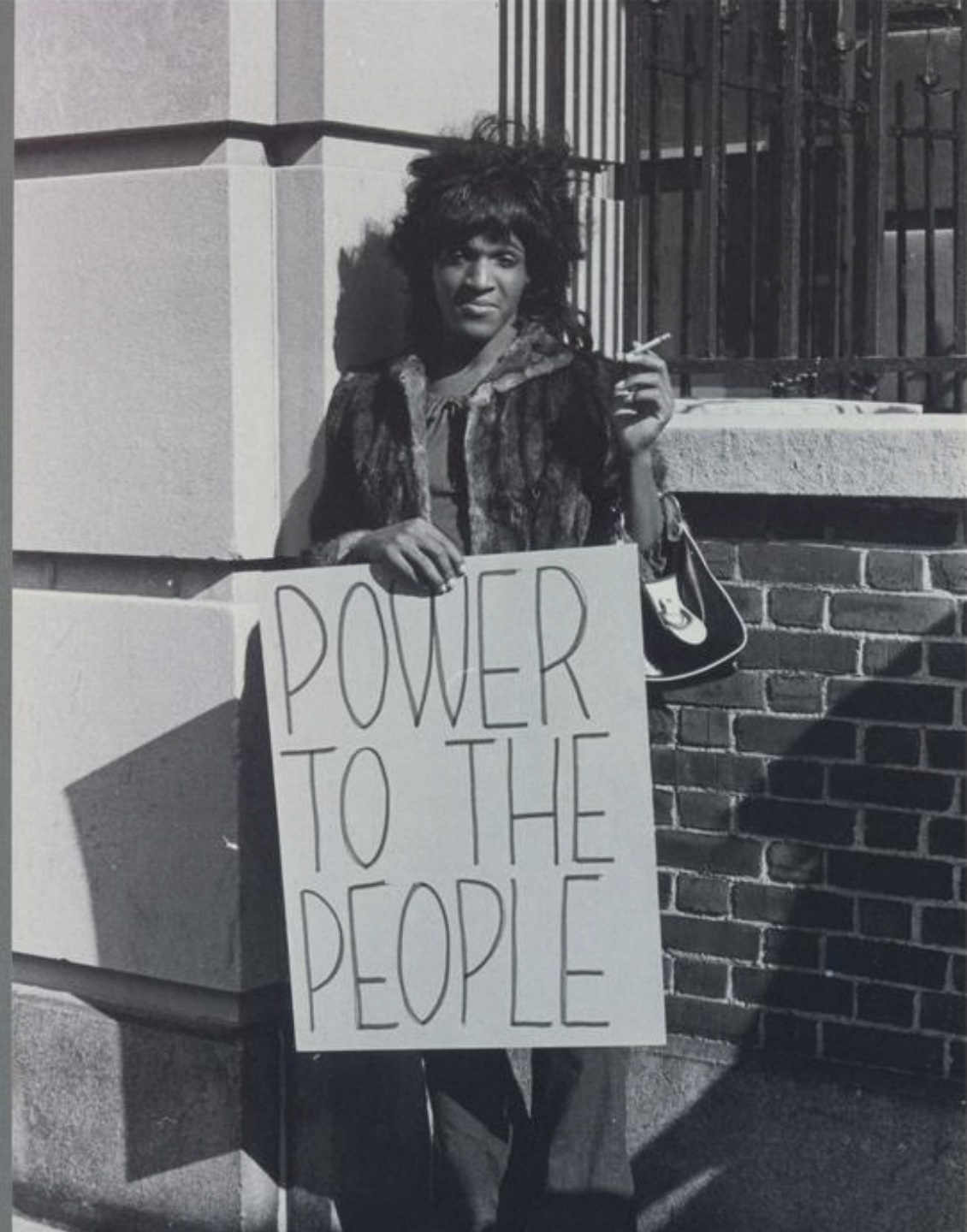
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# TRANS POP

U.S. TRANSGENDER  
POPULATION HEALTH SURVEY





# TRANS POP

U.S. TRANSGENDER  
POPULATION HEALTH SURVEY



...a nationally representative survey on **transgender health** which includes data from **274 transgender** and **gender nonconforming (TGNC)** adults as well as and **1,162 cisgender adults** conducted between **2016-2018** (Meyer 2021).



On March 31, 2025, as a sponsor of this project, NIH requested that the following language be added to this website: This repository is under review for potential modification in compliance with Administration directives.



A Population Health Data Archive

Data Sharing for  
Demographic Research

Log In/Create Account

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Resources

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# TransPop, United States, 2016-2018 (ICPSR 37938)

Version Date: Jun 23, 2021  [Cite this study](#) | [Share this page](#) ▼



Not a federally  
funded  
researcher



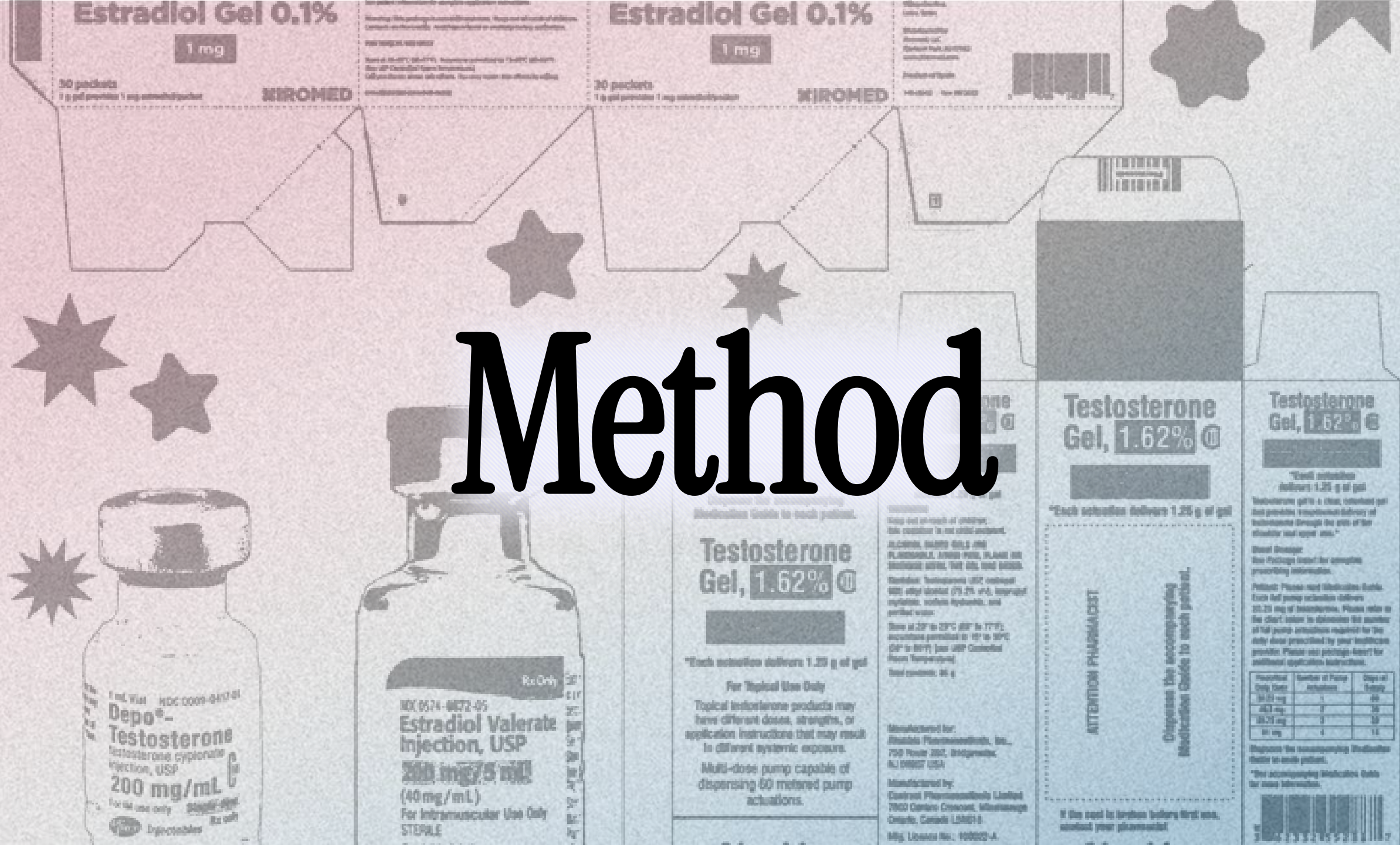


# Research Question

Which experiences and stressors (or the lack thereof) are most pertinent to the social well-being and satisfaction with life of TGNC adults?



# Method



**Estradiol Gel 0.1%**  
1 mg

30 packets  
1 g gel provides 1 mg estradiol/packet

**NIROMED**

Reading this product's instructions is important for safe and effective use. (Insert instructions here)

NIROMED

**Estradiol Gel 0.1%**  
1 mg

30 packets  
1 g gel provides 1 mg estradiol/packet

**NIROMED**

Reading this product's instructions is important for safe and effective use. (Insert instructions here)

NIROMED

1 mL Vial NDC 0009-0412-01

**Depo-Testosterone**  
testosterone cypionate  
injection, USP  
200 mg/mL

For IM use only

**Depot**

For Only

NDC 0574-0072-05

**Estradiol Valerate Injection, USP**  
200 mg/5 mL  
(40 mg/mL)

For Intramuscular Use Only

**STERILE**

Deposure the accompanying Medication Guide to each patient.

**Testosterone Gel, 1.62% ®**

Each application delivers 1.25 g of gel

For Topical Use Only

Topical testosterone products may have different doses, strengths, or application instructions that may result in different systemic exposure.

Multi-dose pump capable of dispensing 60 metered pump actuations.

**Warnings:**  
Keep out of reach of children. This product is not child resistant. **ALCOHOL, GEL, OIL, AND FLAMMABLE.** Avoid fire, flame, or electrical arcs. Use only as directed. Contains testosterone USP (testosterone) 100% ethyl alcohol (75.2% v/v), isopropyl myristate, acetone, hydroxyethyl, and purified water.

Store at 20° to 25°C (68° to 77°F); excursions permitted to 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature].

Total content: 90 g

Manufactured for: **Shionogi Pharmaceuticals, Inc.**, 750 Route 202, Bridgewater, NJ 08807 USA

Manufactured by: **Control Pharmaceuticals Limited**, 7800 Centre Crescent, Mississauga, Ontario, Canada L4W 1G9

Mfg. License No.: 100023-A

**Testosterone Gel, 1.62% ®**

Each application delivers 1.25 g of gel

**ATTENTION PHARMACIST**

Deposure the accompanying Medication Guide to each patient.

If the seal is broken before first use, consult your pharmacist

**Testosterone Gel, 1.62% ®**

Each application delivers 1.25 g of gel

Testosterone gel is a clear, colorless gel that provides transdermal delivery of testosterone through the skin of the shoulder and upper arm.

**How to Use:**  
See package insert for complete prescribing information.

**Patient:** Please read Medication Guide. Each full pump actuation delivers 25.25 mg of testosterone. Please refer to the chart below to determine the number of full pump actuations required for the daily dose prescribed by your healthcare provider. Please see package insert for additional application instructions.

Patient's Daily Dose	Number of Pump Actuations	Days of Testing
50 mg	2	10
75 mg	3	15
100 mg	4	20
125 mg	5	25

Deposure the accompanying Medication Guide to each patient.

\*See accompanying Medication Guide for more information.



## **Psychosocial Factors**

### **Identity:**

- Community Connectedness
- Non-Affirmation of Gender Identity

### **Healthcare access & utilization:**

- Healthcare Stereotype Threat

### **Stressors:**

- Internalized Transphobia
- Everyday Discrimination
- Childhood Gender Conformity
- Gender Identity Non-Disclosure
- Negative Expectations of the Future
- Social Support

## **Demographics**

- Gender identity
- Race
- Sexual minority status
- Age

## **Outcomes**

- **Satisfaction with Life**
- **Social Well-Being**



# ctree: Conditional Inference Trees

**Torsten Hothorn**  
Universität Zürich

**Kurt Hornik**  
Wirtschaftsuniversität Wien

**Achim Zeileis**  
Universität Innsbruck

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## Abstract

This vignette describes the new reimplementation of conditional inference trees (CTree) in the R package **partykit**. CTree is a non-parametric class of regression trees embedding tree-structured regression models into a well defined theory of conditional inference procedures. It is applicable to all kinds of regression problems, including nominal, ordinal, numeric, censored as well as multivariate response variables and arbitrary measurement scales of the covariates. The vignette comprises a practical guide to exploiting the flexible and extensible computational tools in **partykit** for fitting and visualizing conditional inference trees.

*Keywords:* conditional inference, non-parametric models, recursive partitioning.

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### Unbiased Splitting:

- Uses permutation tests to select covariates and split points, avoiding bias toward variables with many splits.
- Tests global independence (via p-values) between covariates and response; stops if no significant association exists.

### Flexibility:

- Handles diverse response types (numeric, ordinal, censored, multivariate) and covariates (nominal, ordinal, numeric).
- Supports weights, missing data (via surrogate splits), and clustered observations.

### Algorithm:

**Step 1:** Select the covariate with the **strongest association** (smallest p-value).

**Step 2:** Choose the **optimal split by maximizing** a standardized statistic (e.g., mean differences). *Recursively repeats until stopping criteria (e.g., alpha-level, sample size) are met.*



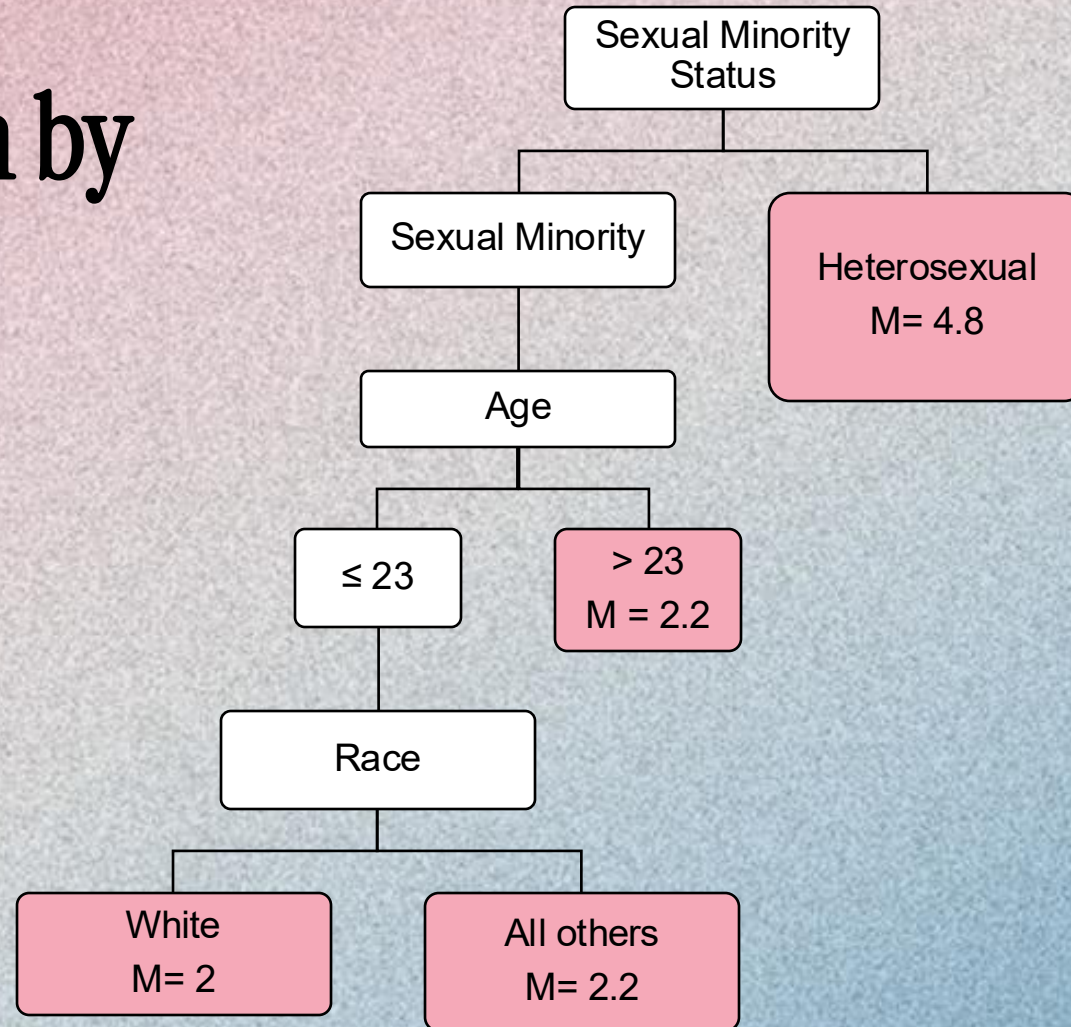
```
` `` {r}
# Life satisfaction - stressors only
lifesat_tree_stressors = ctree(
  formula = as.ordered(LIFESAT) ~ INTERNALIZED_I +
    EVERYDAY_I + CHILDGNC_I + NONDISCLOSURE_I +
    NEGEXPFUTURE_I + SOCSUPPORT_I + CONNECTEDNESS_I +
    NONAFFIRM_I + HCTHREAT_I + SEXMINID,
  data = tranonly,
  minbucket = 26,
  multiway = T,
  na.action = na.omit,
  weights = WEIGHT_TRANSPOP
)
` ``
```



# Results

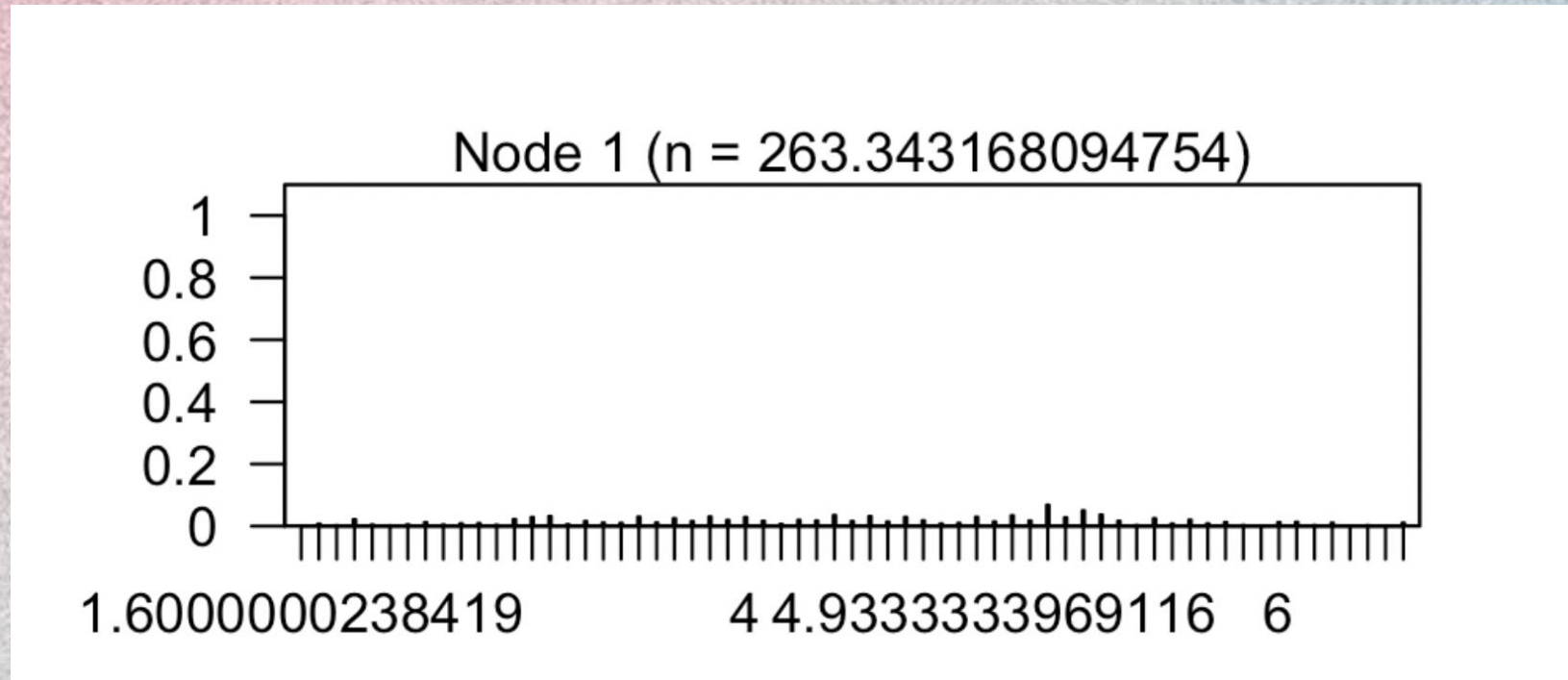


# Life Satisfaction by Demographics



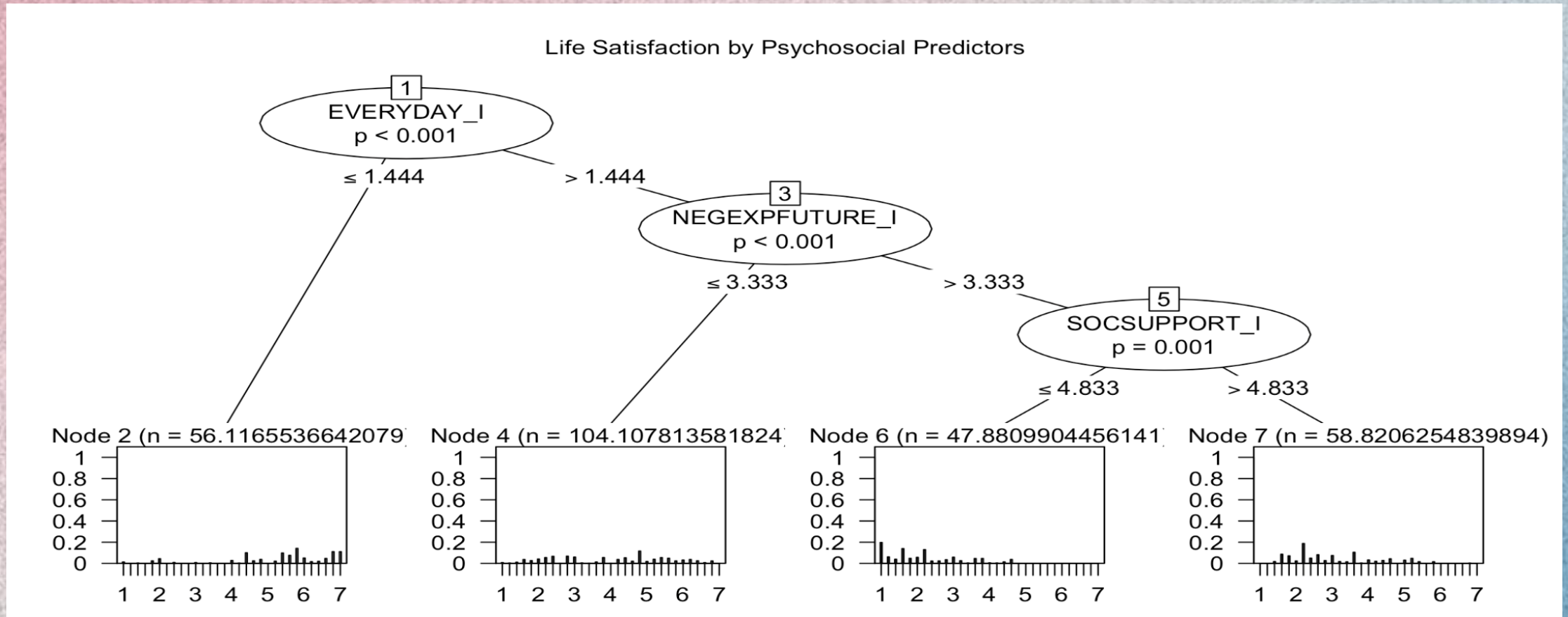


# Social Well-Being by Demographic Predictors





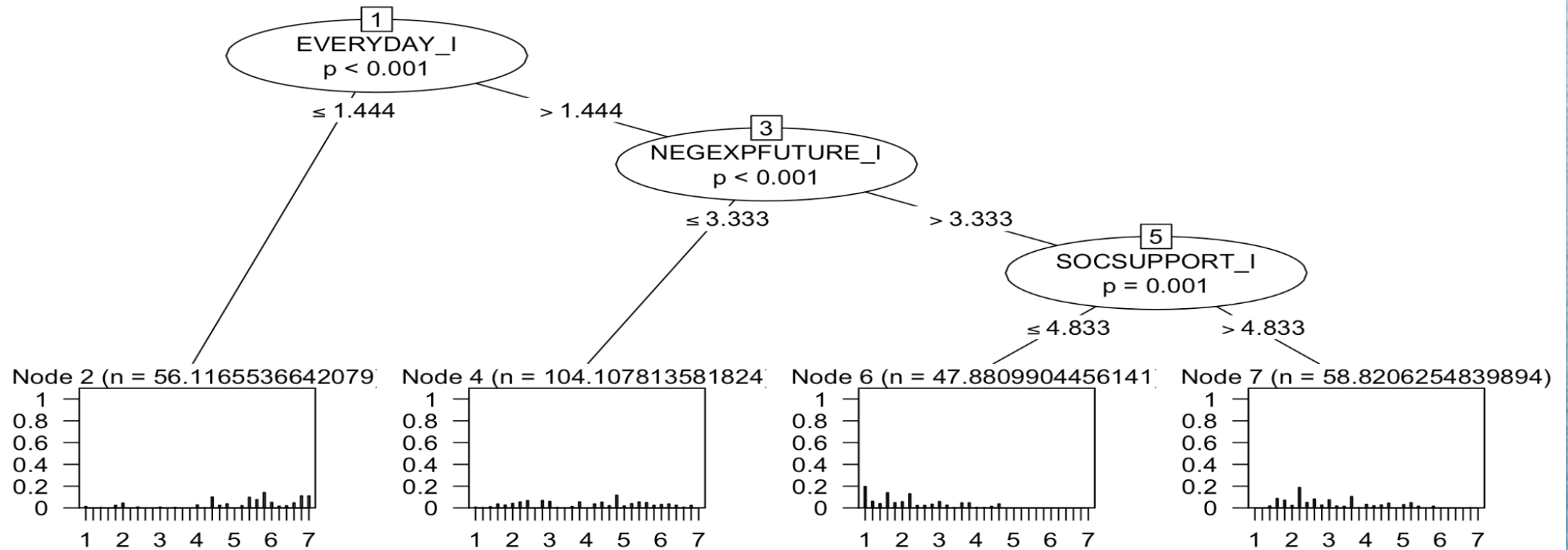
# Life Satisfaction by Psychosocial Predictors





# Social Well-Being by Psychosocial Predictors

Life Satisfaction by Psychosocial Predictors





# Discussion



Trans lives deserved to be  
cherished, honored, and protected.  
Beyond that TGNC individuals  
deserve to thrive.



## Action items:

- Create and foster **safe spaces for TGNC individuals** to connect with and support one another (especially for TGNC youth)
- **Increase awareness** of the adverse effects of invalidating identities and create **trans-inclusive environments within healthcare**
- **Foster community and hope** for the future within these supportive spaces. Look to previous movements
- **Reduce instances of everyday discrimination**

Though this may feel like too big of a hurdle, transgender activists such as Marsha P Johnson and Sylvia Rivera made massive strides in how TGNC folks are treated and viewed in society today. **The torch is now ours, and it's important not to give up hope. Trans is forever.**



# Local Resources





FREE gender affirming  
garments from the  
Massachusetts Transgender  
Political Coalition



Fenway health is accepting new  
patients for gender affirming  
healthcare !







# References

Hothorn T, Hornik K, Zeileis A (2006). “Unbiased Recursive Partitioning: A Conditional Inference Framework.” *Journal of Computational and Graphical Statistics*, 15(3), 651–674.  
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Hothorn T, Zeileis A (2015). “partykit: A Modular Toolkit for Recursive Partytioning in R.” *Journal of Machine Learning Research*, 16, 3905-3909. <https://jmlr.org/papers/v16/hothorn15a.html>.

Krueger, E. A., Divsalar, S., Luhur, W., Choi, S. K., & Meyer, I. H. (2020). *TransPop - U.S. Transgender Population Health Survey (Methodology and Technical Notes)*. Los Angeles, CA: The Williams Institute. Retrieved from: <https://www.transpop.org/s/TransPop-Survey-Methods-v18-FINAL-copy.pdf>

Meyer, I. H. (2021). *TransPop, United States, 2016-2018 [Dataset]*. Inter-university Consortium for Political and Social Research [distributor]. <https://doi.org/10.3886/ICPSR37938.v1>



# Questions?

If transgender rights are important to you, please let your representatives know by signing **this petition from the ACLU.**

