

# MODULE 1

## CHOOSING THE CORRECT STATISTIC

## 250A COURSE FOCUS

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- 250A's focus is on bivariate (two-variable) statistical models involving a single explanatory (independent) variable and a single outcome (dependent) variable
- 250B and 250C cover models with two or more explanatory variables, and more advanced courses cover multivariate models with multiple outcome variables

# OUTLINE

- 1 Choosing the correct statistic
- 2 Comparative research questions
- 3 Association or trend research questions
- 4 Study questions

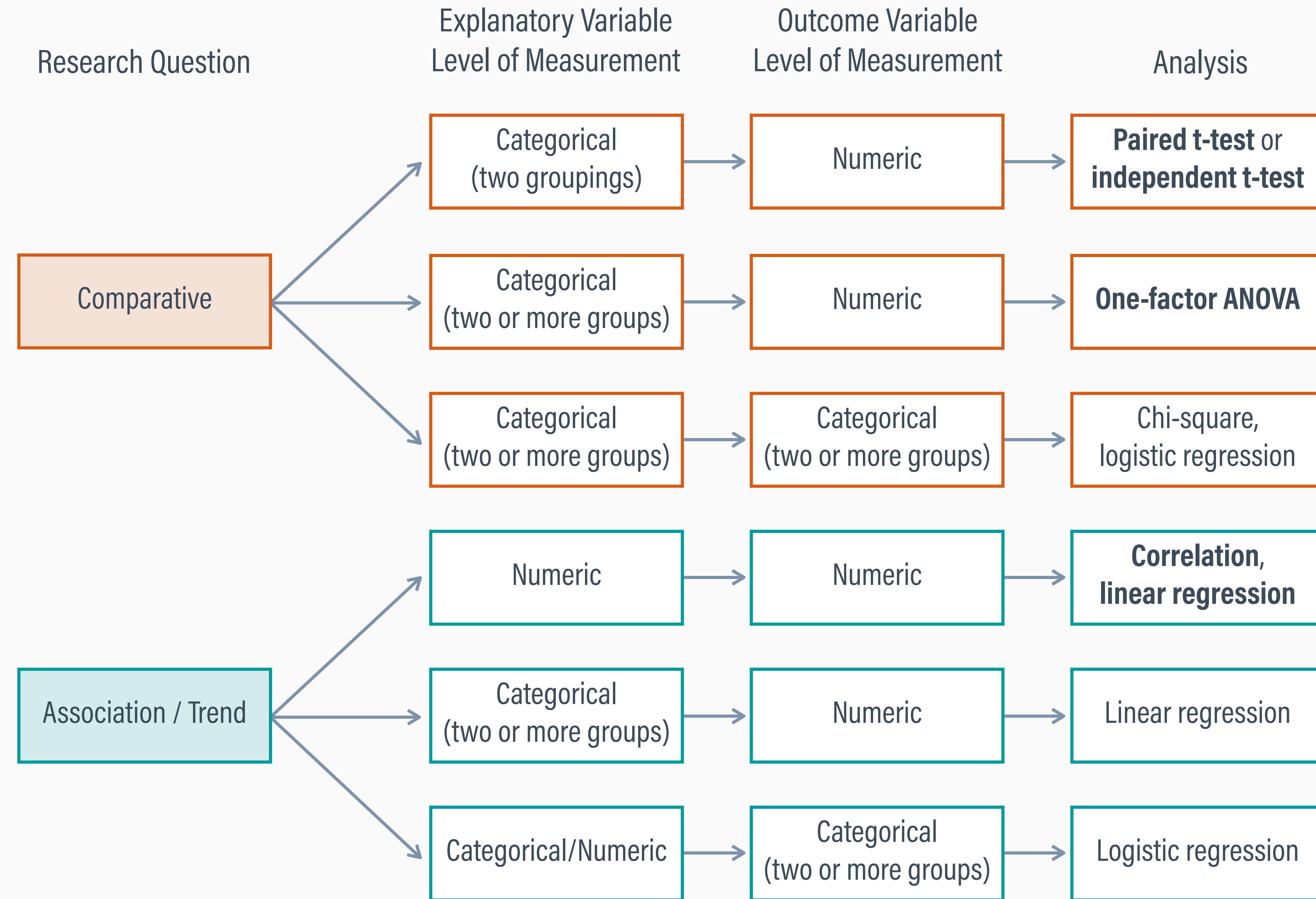
# CHOOSING THE CORRECT STATISTIC

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- Choosing the correct statistic for a particular problem largely depends on two things: the type of research question and the levels of measurement
- Research questions tend to involve comparisons (e.g., Do two groups differ on some outcome) or associations (e.g., Do two variables change in the same or different direction?)
- It is often sufficient to simplify the level of measurement as categorical (nominal, ordinal) or numeric (interval, ratio)

# STATISTICAL ORG CHART

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# OUTLINE

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# COMPARATIVE RESEARCH QUESTIONS

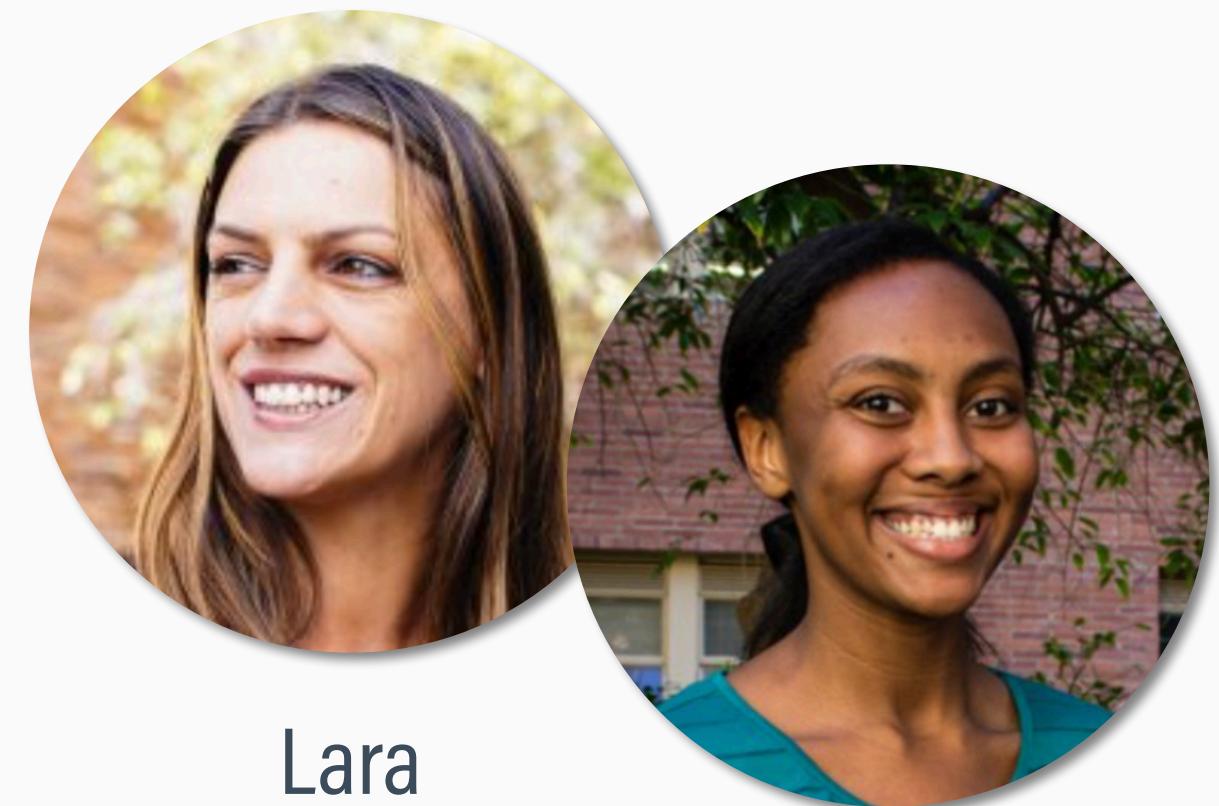
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- Comparative research questions ask whether two or more groups (or occasions) differ from one another
- The explanatory (independent) variable is a categorical classification with two or more groupings
- In 250A, the outcome (dependent) variable will be numeric (it could also be categorical)

# SMOKING AND DRINKING CESSATION TRIAL

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Pharmacological treatments that can concomitantly address cigarette smoking and heavy drinking stand to improve health care delivery for these highly prevalent co-occurring conditions. This superiority trial compared the combination of varenicline and naltrexone against varenicline alone for smoking cessation and drinking reduction among heavy-drinking smokers.



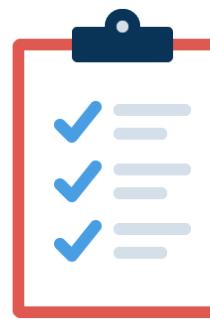
Lara  
Ray

ReJoyce  
Green

Ray, L.A., Green, R., Enders, C., et al. (2021). Efficacy of combining varenicline and naltrexone for smoking cessation and drinking reduction: A randomized clinical trial. *American Journal of Psychiatry*, 178, 818–828.

# KEY VARIABLES

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## Breath (alveolar) carbon monoxide

A measure of carbon monoxide in the lungs.  
Breath carbon monoxide is a biomarker of smoking behavior common in clinical trials.



## Medication arm

Participants were randomly assigned to receive one of two meds: varenicline plus naltrexone or varenicline plus placebo pills

# RESEARCH QUESTION

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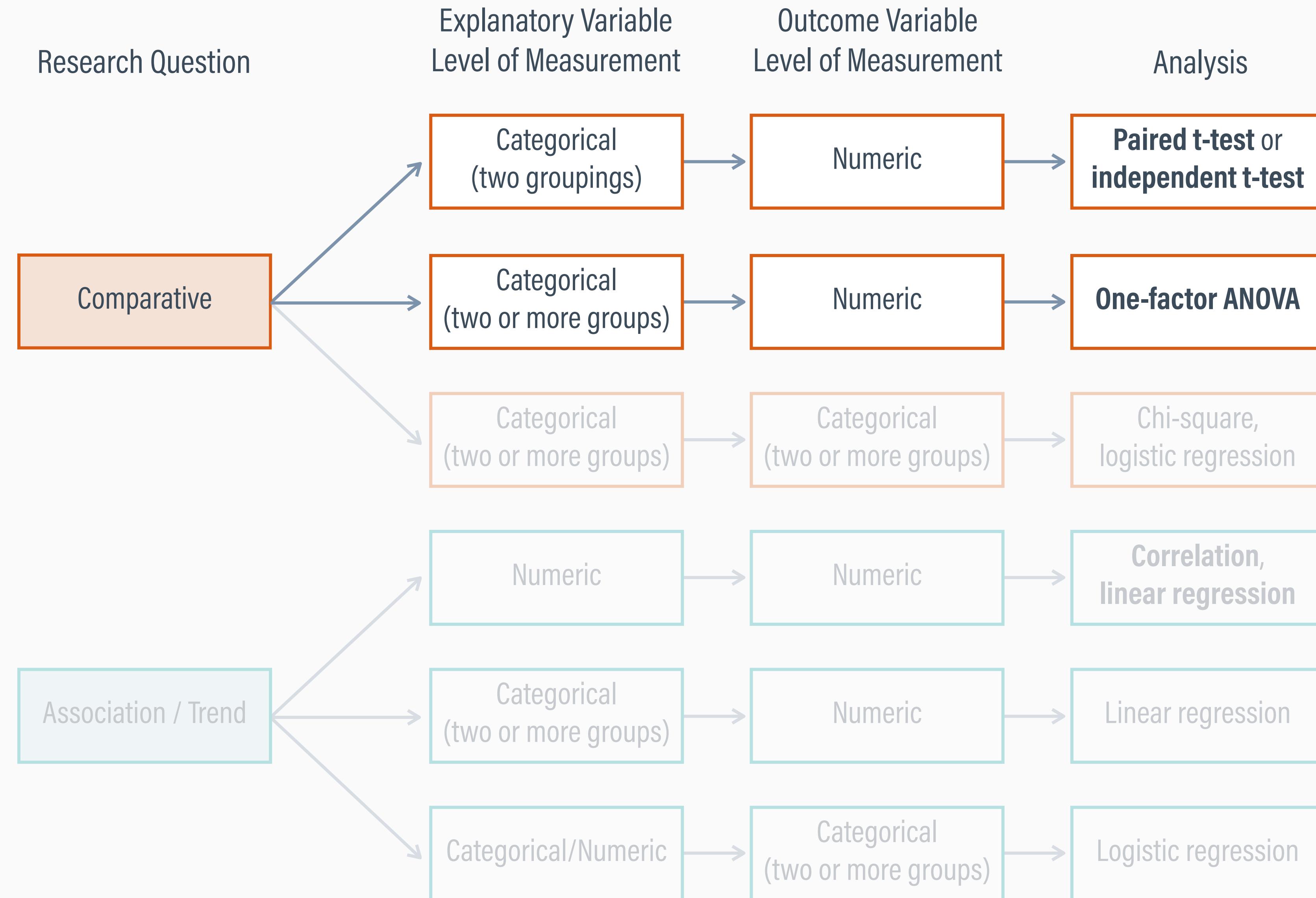
- Question: Does smoking intensity differ between participants receiving a combination of two medications and those receiving a single medication alone?
- The explanatory (independent) variable, medication arm, consists of two groups: varenicline only and varenicline plus naltrexone
- The outcome (dependent) variable, breath carbon monoxide, is a numeric biomarker of smoking intensity



In small groups of two or three, use the statistical org chart to identify the correct statistical procedure for this study.

# STATISTICAL ORG CHART

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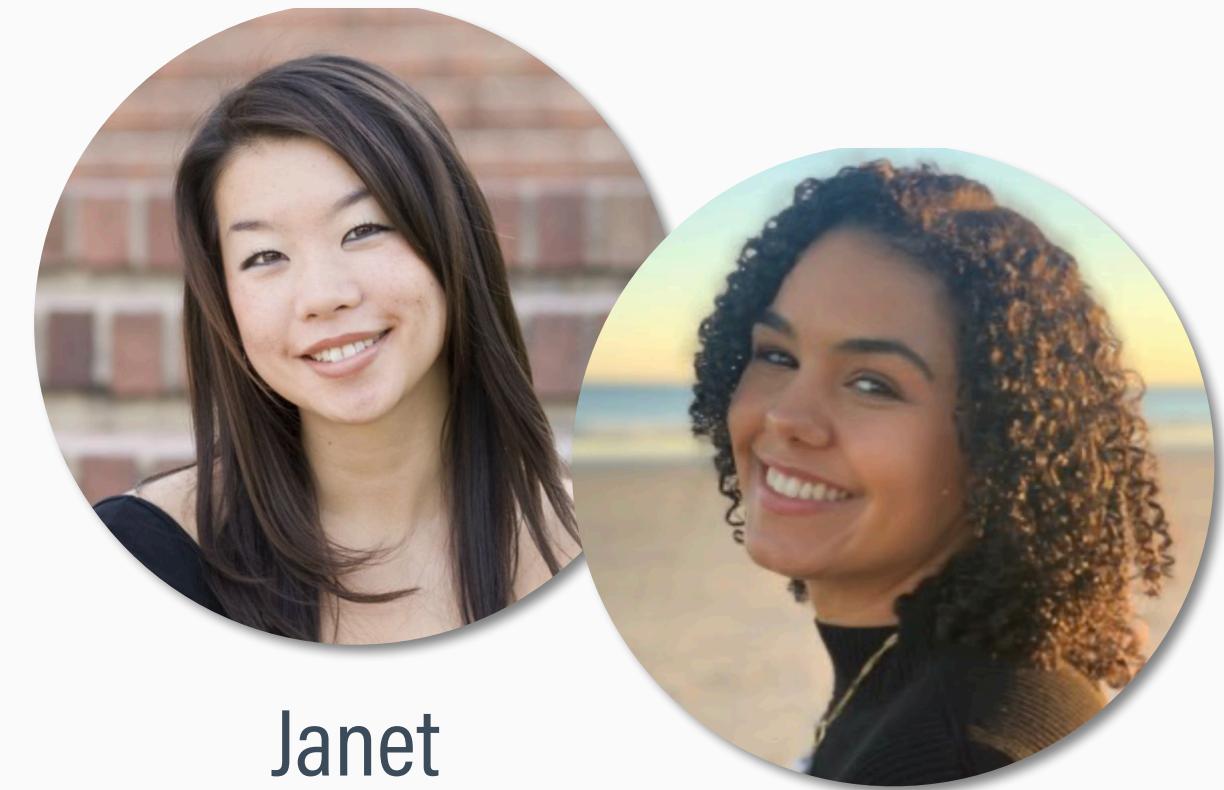


# SKIN COLOR SATISFACTION AND BINGE EATING

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Although it has been demonstrated that (a) body dissatisfaction and internalization of societal appearance standards contribute to disordered eating and (b) that internalization of societal appearance standards leads to decreased skin color satisfaction among Black women, it has not been established whether skin color dissatisfaction contributes to disordered eating among Black women or girls. The objective of the present study is to determine the influence of skin color satisfaction as a potential predictor for binge eating, and its effect through body image in Black girls during the vulnerable developmental period of adolescence.

Parker, J.E., Enders, C.K., Mujahid, M.S., Laraia, B.A., Epel, E.S., Tomiyama, A.J. (2022). Prospective relationships between skin color satisfaction, body satisfaction, and binge eating in Black girls. *Body Image*, 41, 342-353.

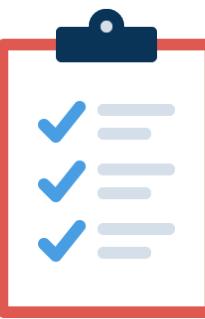


Janet  
Tomiyama

Jordan  
Parker

# KEY VARIABLES

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## Body Satisfaction

Body satisfaction is the facet of self-concept associated with weight, and includes the attitudes, evaluations, and feelings an individual holds about his or her own body.



## Age

The grouping variable was age. Participants were followed longitudinally, with dependent variable measured at ages 10 and 18.

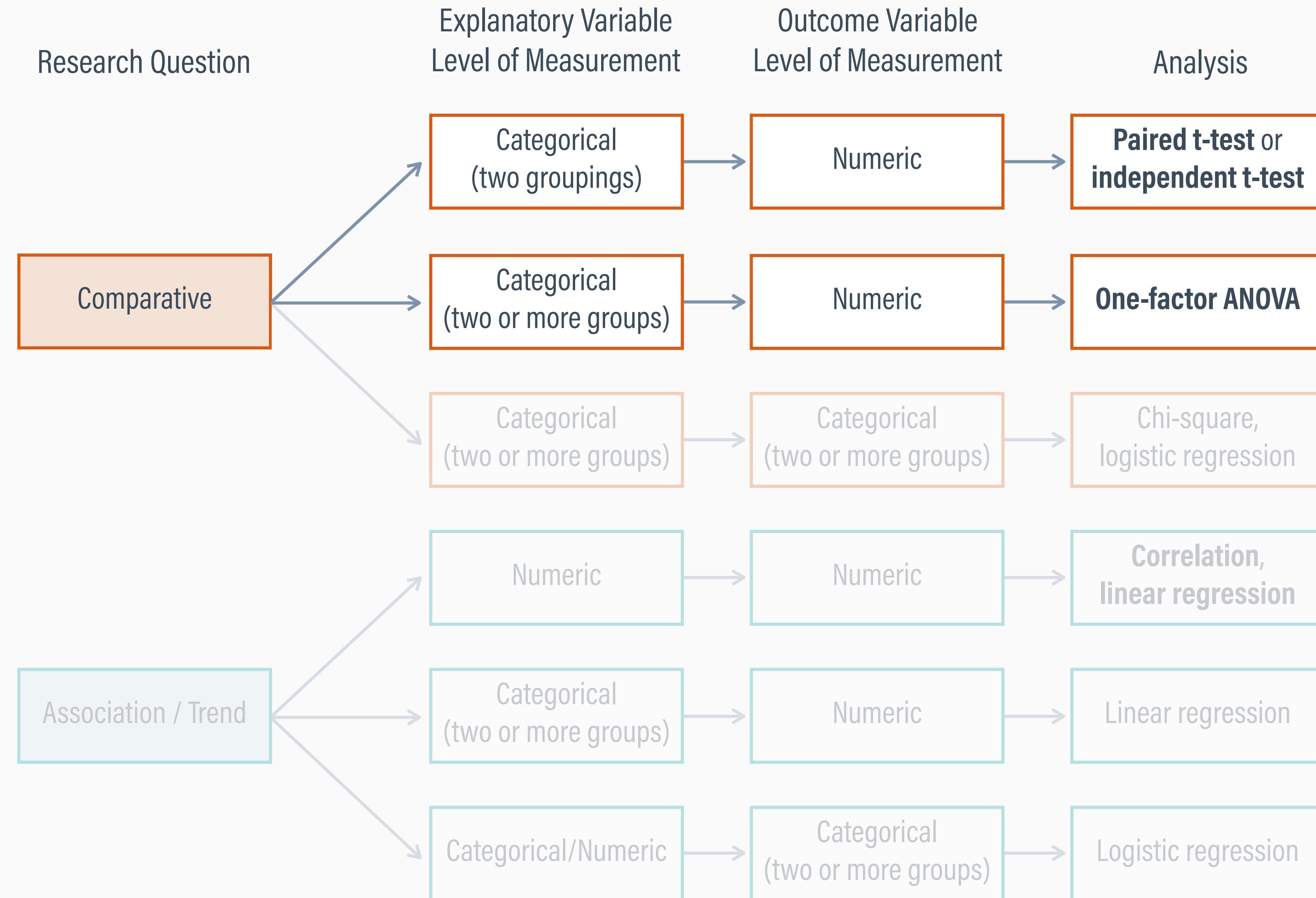
# RESEARCH QUESTION

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- Question: Do Black girls experience a change in body satisfaction during adolescence from age 10 to 18?
- The explanatory (independent) variable, age, consists of two occasions: ages 10 and 18
- The outcome (dependent) variable, body satisfaction, is a numeric scale derived from several questionnaire items

# STATISTICAL ORG CHART

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# RACIAL DISPARITIES IN PTSD

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People of color in the United States disproportionately bear the burden of trauma and posttraumatic stress disorder (PTSD). Pregnant women of color are at particular risk, as perinatal PTSD is associated with adverse maternal and child health.

However, PTSD is a heterogeneous disorder comprising discrete symptom dimensions. In a large sample of Latina, Black, and non-Hispanic White postpartum women in the United States ( $N = 1663$ ), we examined racial and ethnic differences in the factors of the dysphoric arousal model—a leading dimensional model of PTSD.



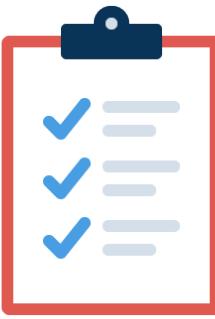
Jennifer  
Thomas

Jennifer  
Sumner

Thomas, J.L., Carter, S.E., Dunkel-Schetter, Sumner, J.A. (2021). Racial and ethnic disparities in posttraumatic psychopathology among postpartum women. *Journal of Psychiatric Research*, 137, 36-40.

# KEY VARIABLES

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## Racial Ethnic Identity

The study classified woman into three racial groups: Black, Latina, and non-Hispanic White



## Anxious Arousal (Hyperarousal)

Anxious arousal (hyperarousal) is the abnormally heightened state of anxiety that occurs when thinking about a traumatic event (e.g., hypervigilance, exaggerated startle).

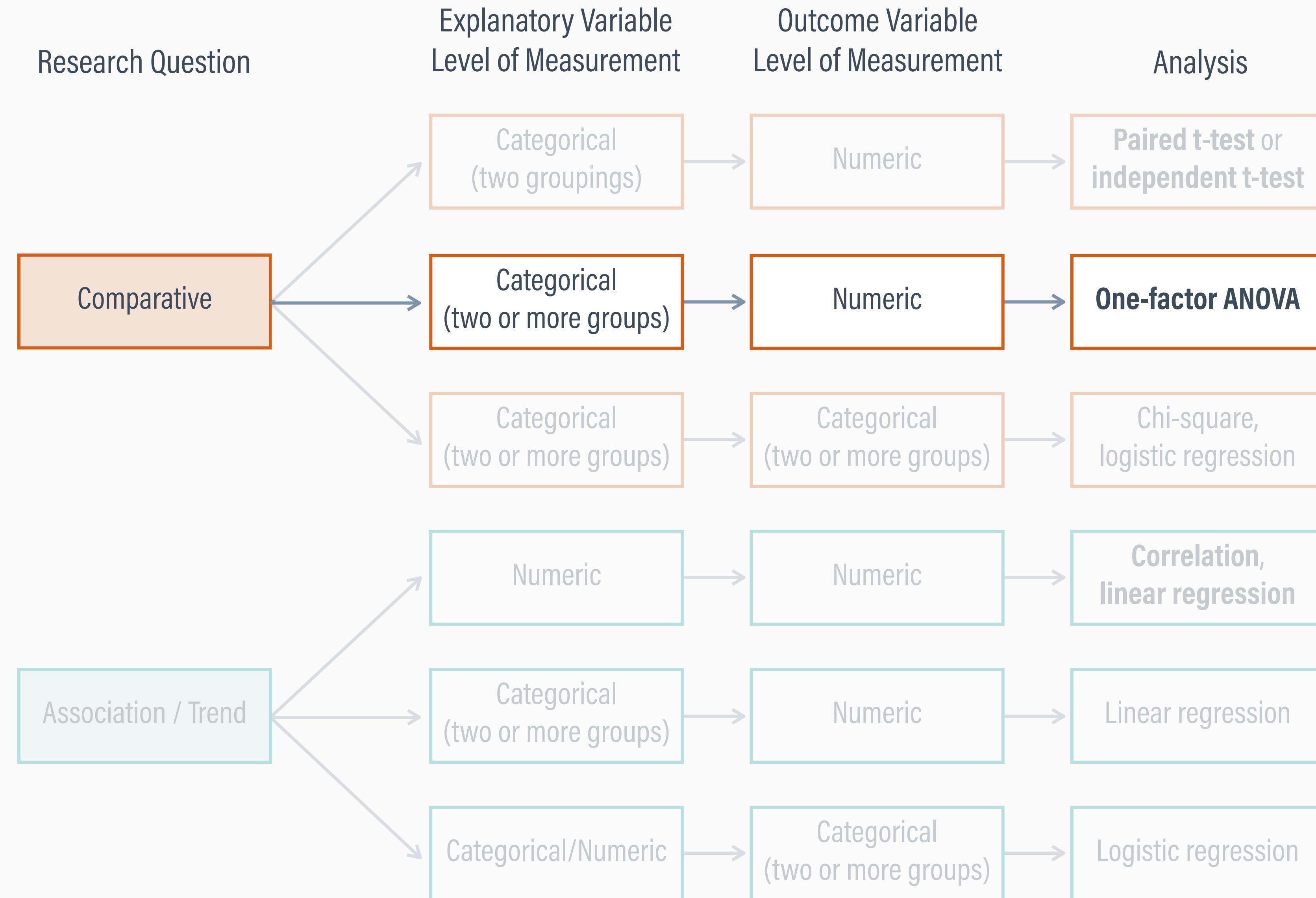
# RESEARCH QUESTION

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- Question: Do women of color (Black and Latina) differ from White women in their levels of anxious arousal?
- The explanatory (independent) variable, race, consists of three groups: Black, Latina, and White
- The outcome (dependent) variable, PTSD, is a numeric scale derived from several questionnaire items

# STATISTICAL ORG CHART

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In small groups of two or three, work together to generate a comparative research question using variables from your domain of interest.

# OUTLINE

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# ASSOCIATION RESEARCH QUESTIONS

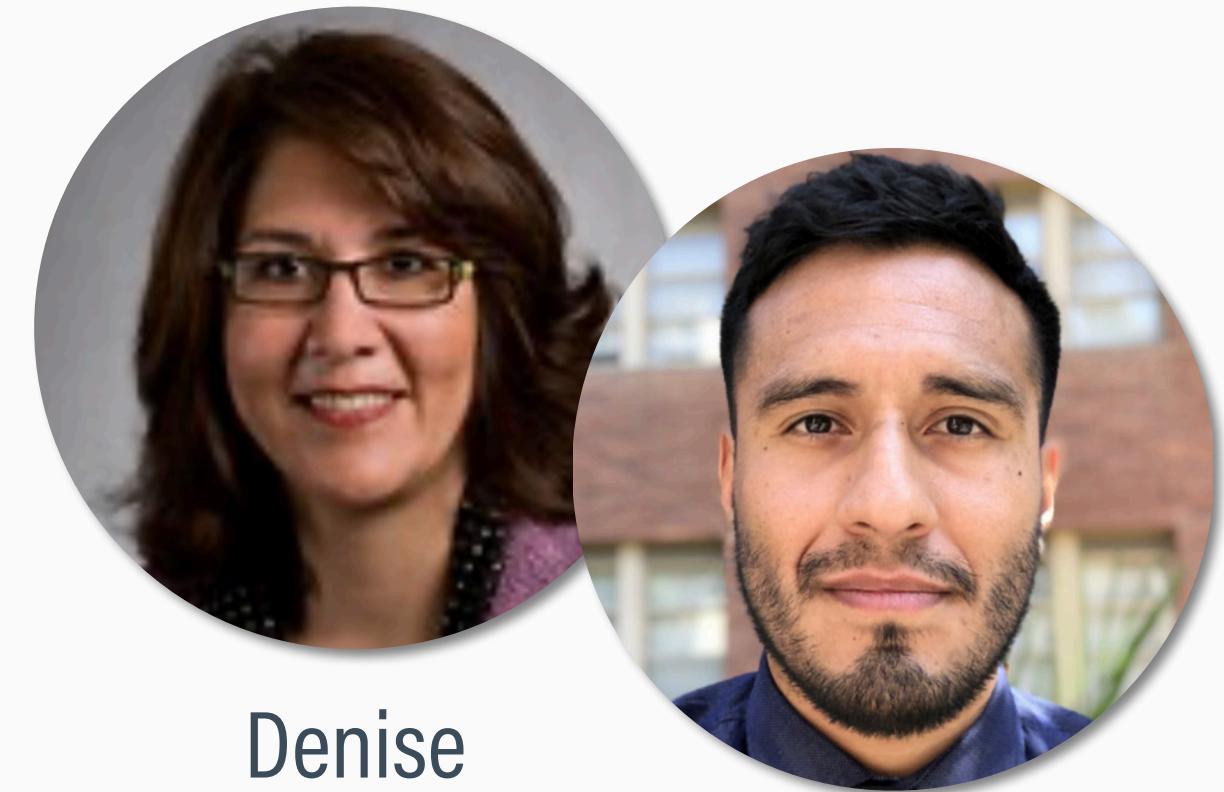
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- Association (trend) research questions ask whether scores on two variables move in the same or opposite directions
- Is an increase in one variable accompanied by an increase or a decrease in the other?
- We focus on cases where the explanatory (independent) and outcome (dependent) variables are numeric scales

## DISCRIMINATION AND INTERNALIZING BEHAVIOR

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There is a well-documented relationship between perceived discrimination and internalizing symptoms among Latinx adolescents. However, few studies have examined how this psychosocial stressor relates to multiple domains of functioning in rural Latinx adolescents simultaneously. This study tested a spillover model of internalizing symptom development, where the negative effects of perceived discrimination are experienced through peer and family relationships.



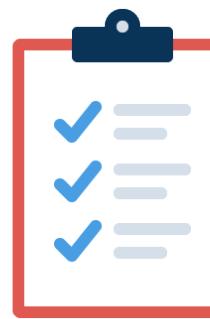
Denise  
Chavira

Giovanni  
Ramos

Ramos, G., Delgadillo, D., Fossum, J., Montoya, A.K., Thamrin, H., Rapp, A., Escovar, E., Chavira, D.A. (2021). Discrimination and internalizing symptoms in rural Latinx adolescents: An ecological model of etiology. *Children and Youth Services Review*, 130, 1-10.

# KEY VARIABLES

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## Perceived Discrimination

Perceived discrimination refers to individuals' perception of negative attitude, judgment, or unfair treatment due to their specific characteristics such as gender, race, ethnicity, and social status.



## Internalizing Behavior

Internalizing behaviors are behaviors directed inwardly toward oneself. Examples include anxious and depressive symptoms, social withdrawal, and somatic (physical) complaints.

# RESEARCH QUESTION

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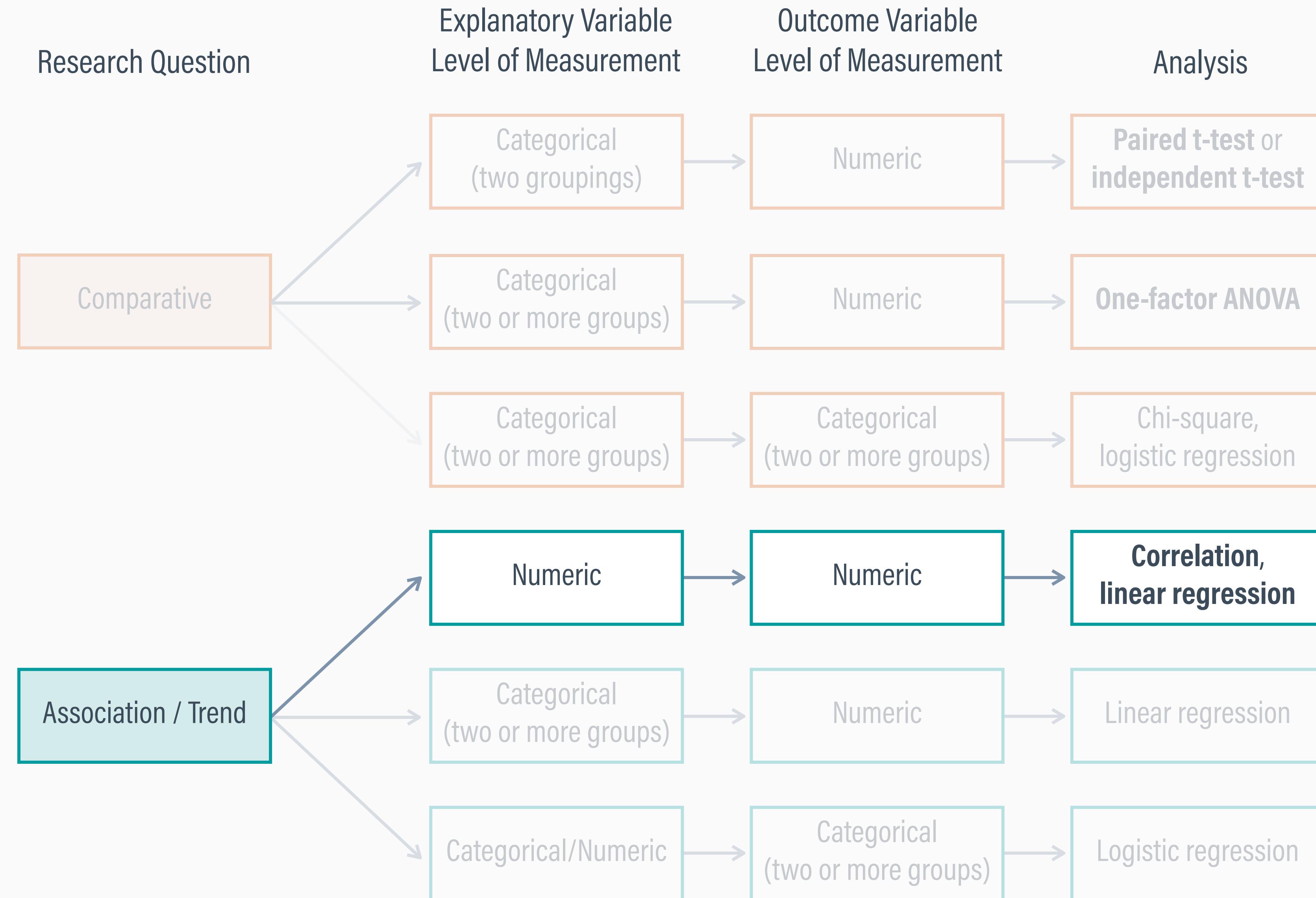
- Question: Is an increase in perceived discrimination accompanied by a systematic increase or decrease in internalizing behaviors?
- The explanatory (independent) variable, perceived discrimination, is a numeric scale derived from several questionnaire items
- The outcome (dependent) variable, internalizing behaviors, is a numeric scale derived from several questionnaire items



In small groups of two or three, use the statistical org chart to identify the correct statistical procedure for this study.

# STATISTICAL ORG CHART

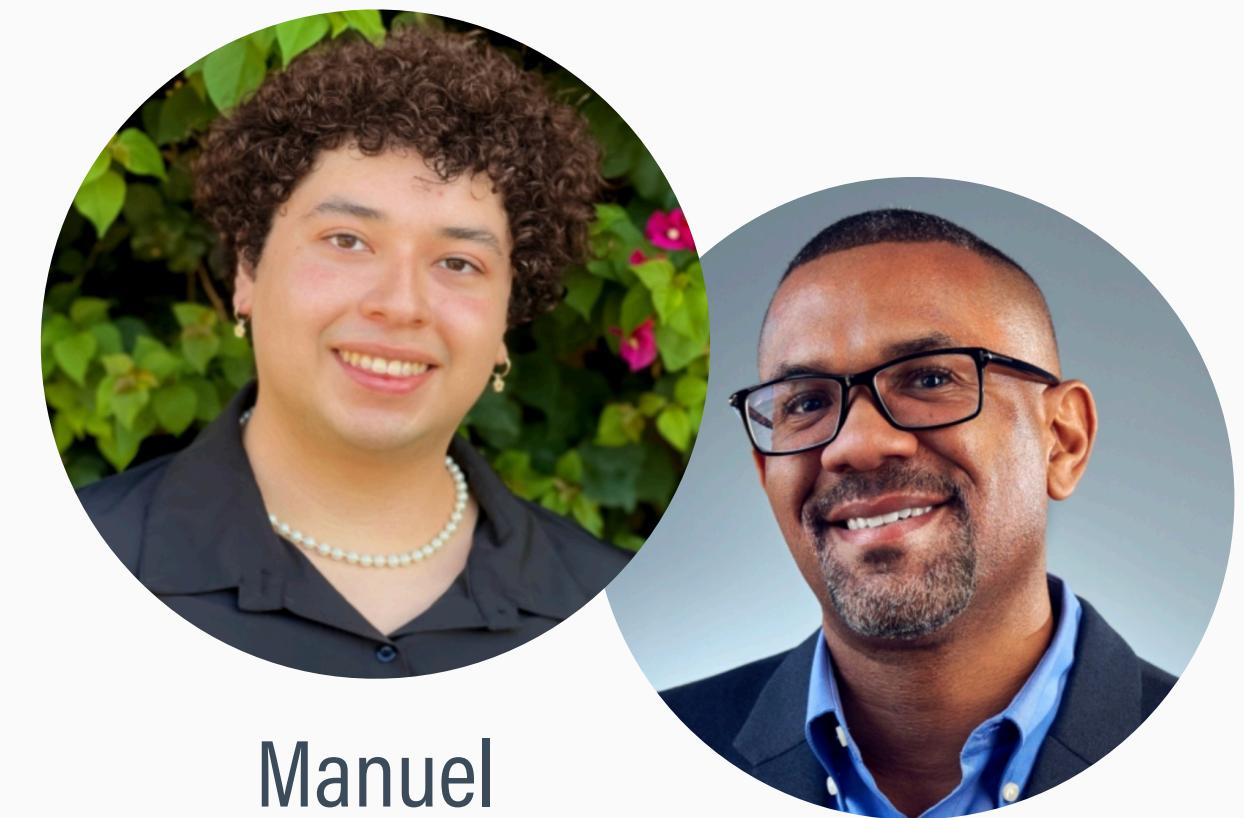
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# DAILY DIARY STUDY OF MOOD

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This study delivered a daily diary to 61 HIV infected men who have sex with men (MSM) between 16 and 24 years old for 66 days to measure HIV-risk behaviors and other psychosocial variables. The study examined the association between daily life stressors and daily negative mood. The study also examined the person-level association between the average number of daily life stressors across the 66 days and the average level of negative mood across that period.



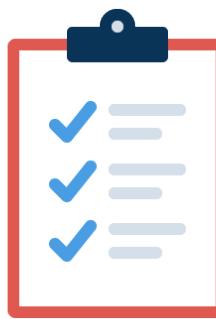
Manuel  
Ramirez

Patrick  
Wilson

Ramirez, M., Wilson, P., Mitchell, R., Enders, C., & Woller, M. (in progress). Daily variability in depressed mood among gay and bisexual youth living with HIV. *Manuscript in preparation.*

# KEY VARIABLES

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## Daily Life Stressors

Respondents were presented with list of stressful events (e.g., fights with family or friends, work stress, financial stress), and they checked how many they experienced each day.



## Depression

Depression was measured using the Profile of Mood States (POMS). The POMS Depression-Dejection scale is computed by summing responses to five questionnaire items, where higher ratings reflect more negative mood.

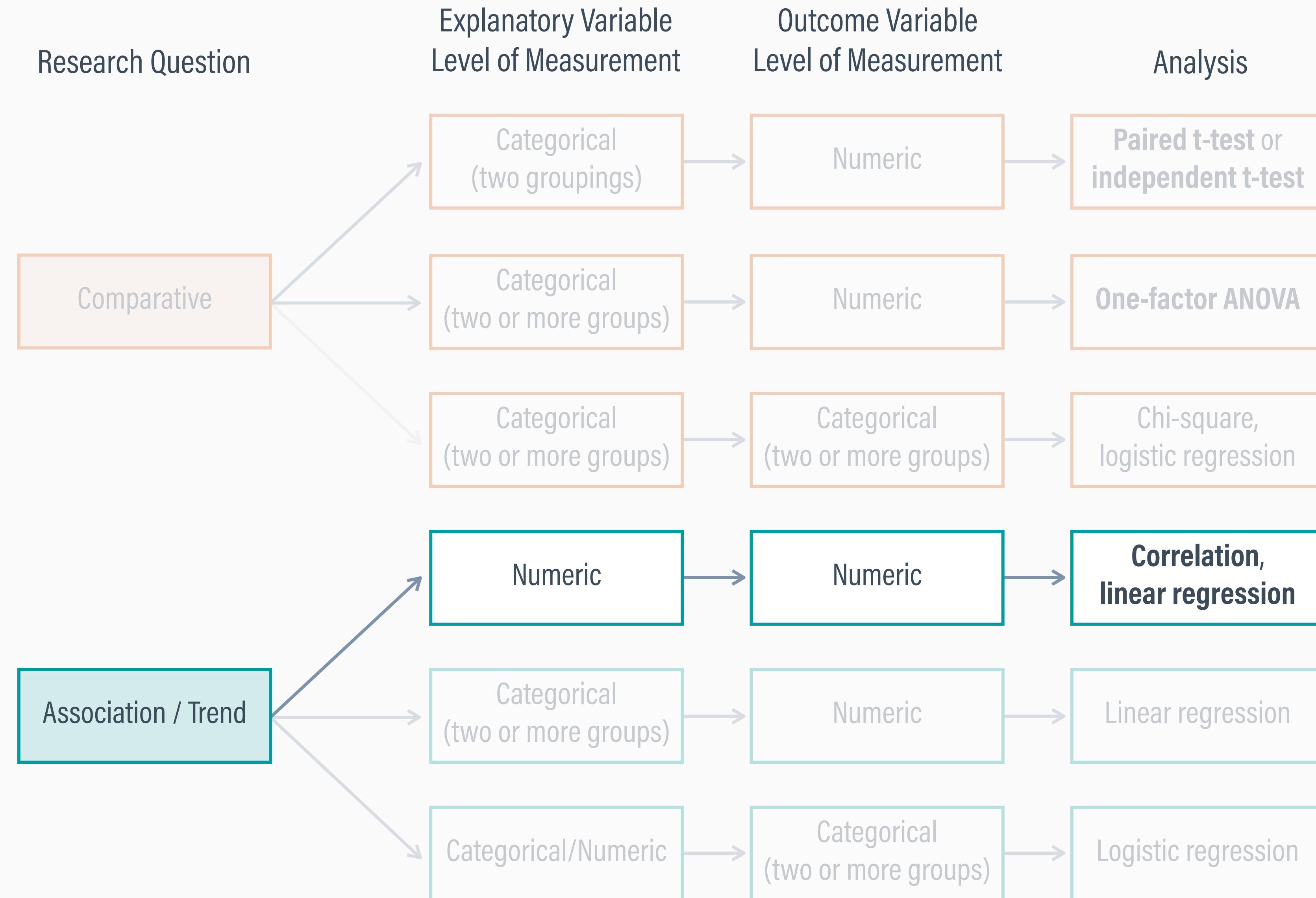
# RESEARCH QUESTION

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- Question: Is there an association or trend between one's number of life stressors and their average depressive mood?
- The explanatory (independent) variable, number of life stressors, is a numeric value derived from a checklist
- The outcome (dependent) variable, depressive mood, is a numeric scale derived from several questionnaire items

# STATISTICAL ORG CHART

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In small groups of two or three, work together to generate an association (trend) research question using variables from your domain of interest.

# OUTLINE

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# STUDY QUESTIONS

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1. Generate a comparative research question using variables from your domain of interest.
  
2. Generate an association (trend) research question using variables from your domain of interest.