STEM For All

Duke UNIVERSITY

EHD Bass Connections — Education & Human Development

Focusing on Retention and Active Learning Pedagogies

Can we **characterize** the **discrepancies** in **confidence** that exist between male and female students in **introductory STEM courses**?

Motivation and Goals

Retention rates of women in STEM majors continue to be relatively low. A key determinant of retention rates is students' self-efficacy.

We examine the role of active learning in increasing self-efficacy with the aim of determining whether active learning can increase retention rates of women and minorities in STEM coursework.

Methodology

Controlled Research Study
Conduct randomized controlled experiments on Duke students in three subjects: Statistics, Economics, Engineering taught in two ways (passive: lecture only, active: with clicker questions).

Steps:
(1) Pre-lesson survey on confidence and anxiety
(2) Mini-lesson on subject - split participants into active and passive learning environments
(3) Post-lesson survey with same questions on confidence and anxiety
(4) Analyze data.

Focus Group: Method 1 NVivo
Code interview data for confidence using NVivo.

Steps:
(1) Interview Duke students in intro STEM classes about their experiences with active and non-active learning
(2) Code interview text for confidence statements. Further subcategorize statements by external and internal attribution.
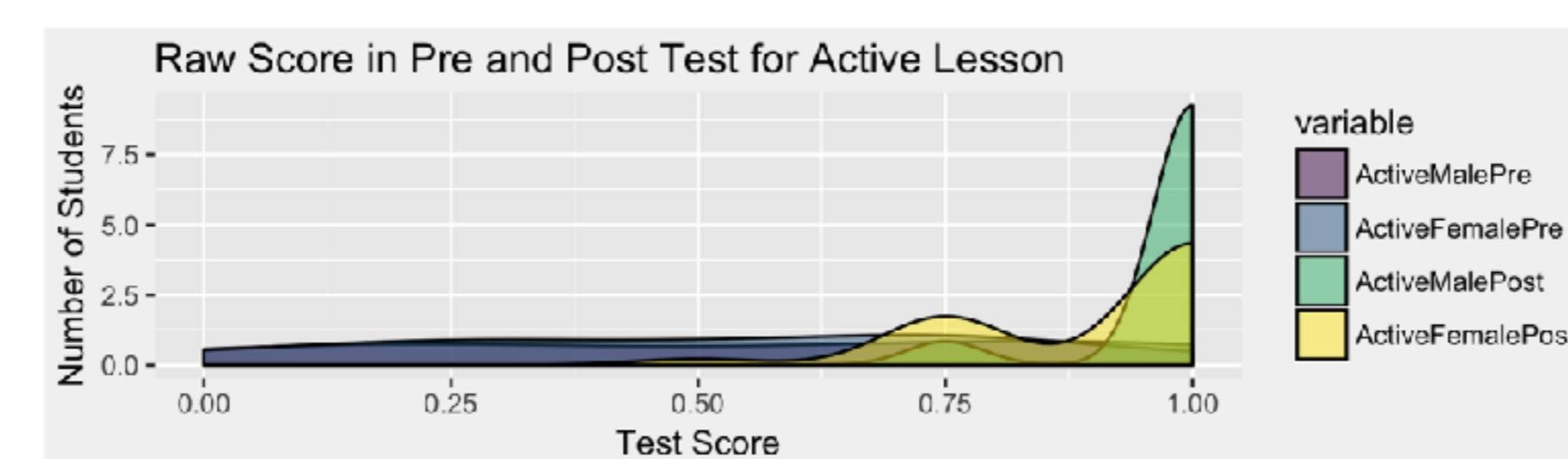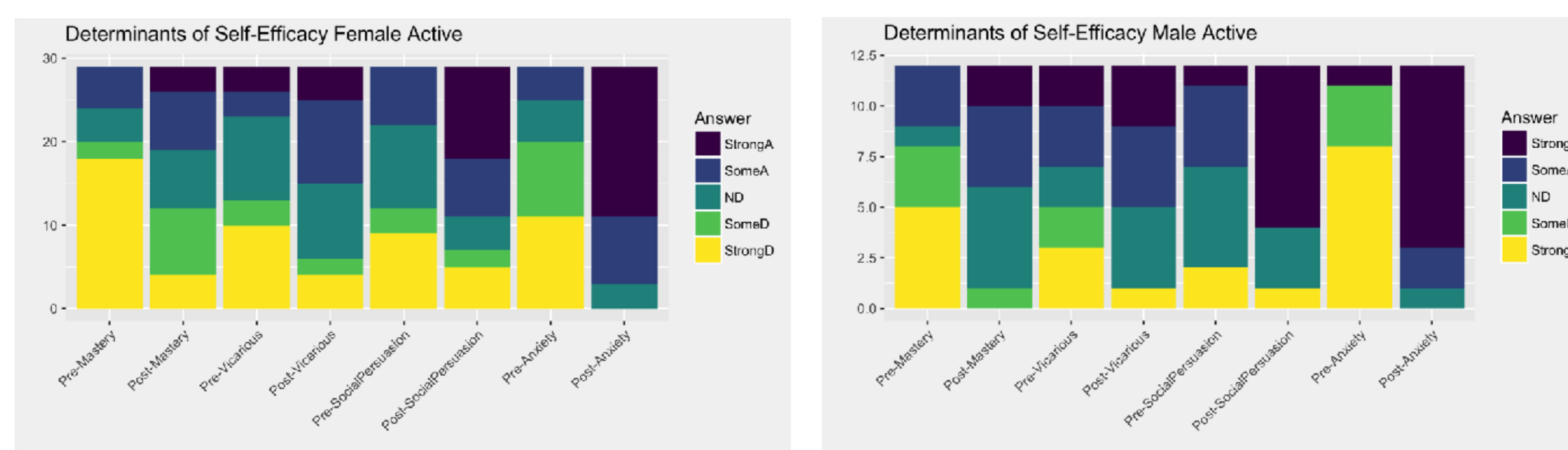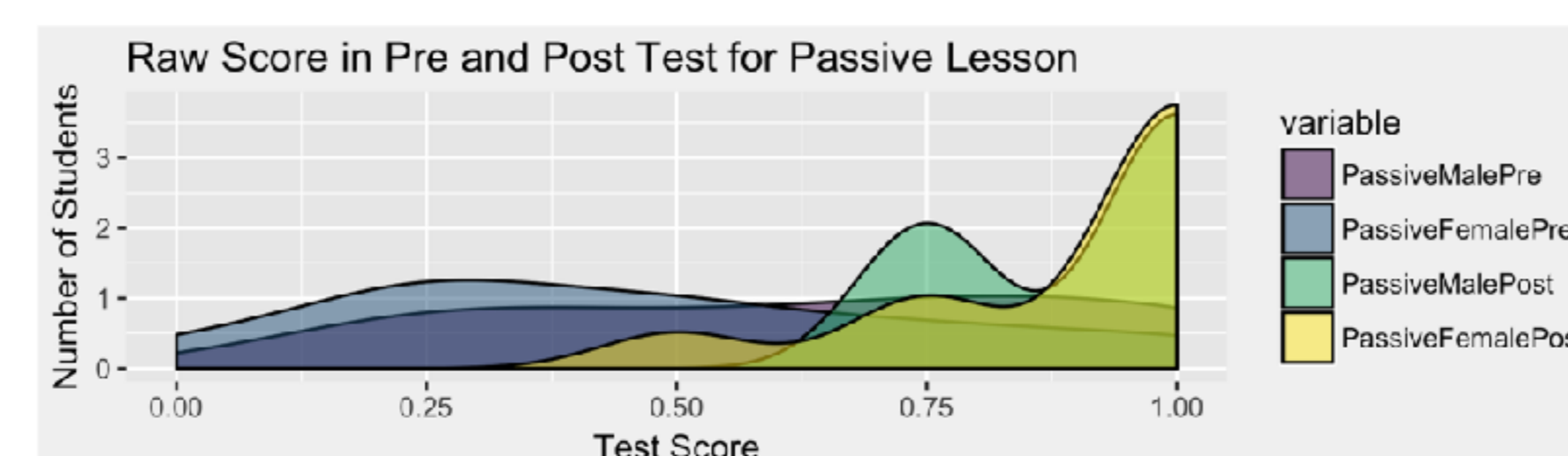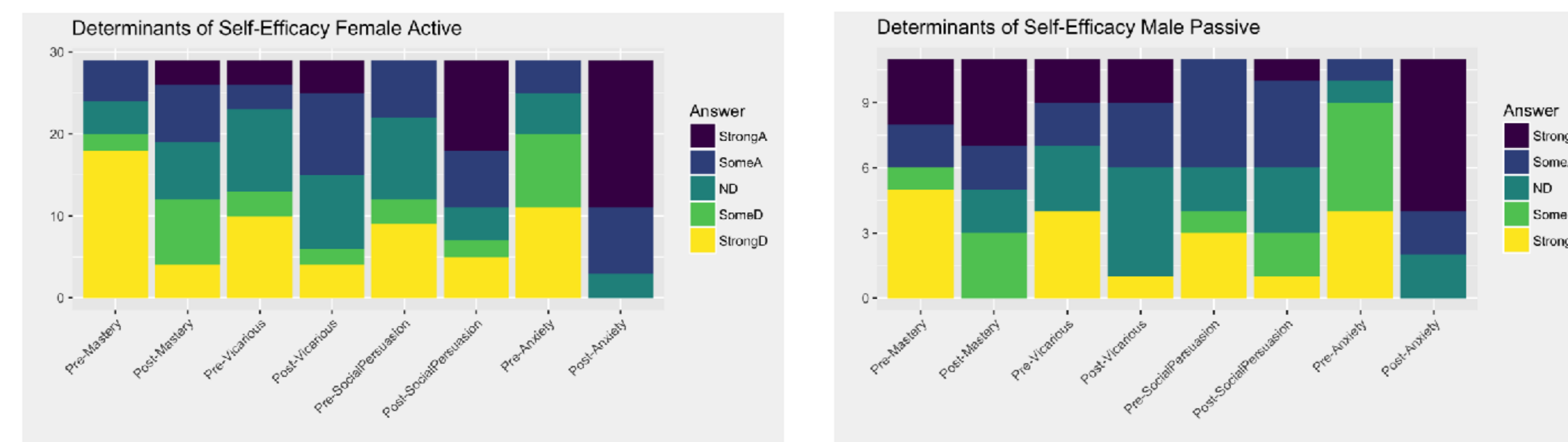
Focus Group: Method 2 R Sentiment Analysis
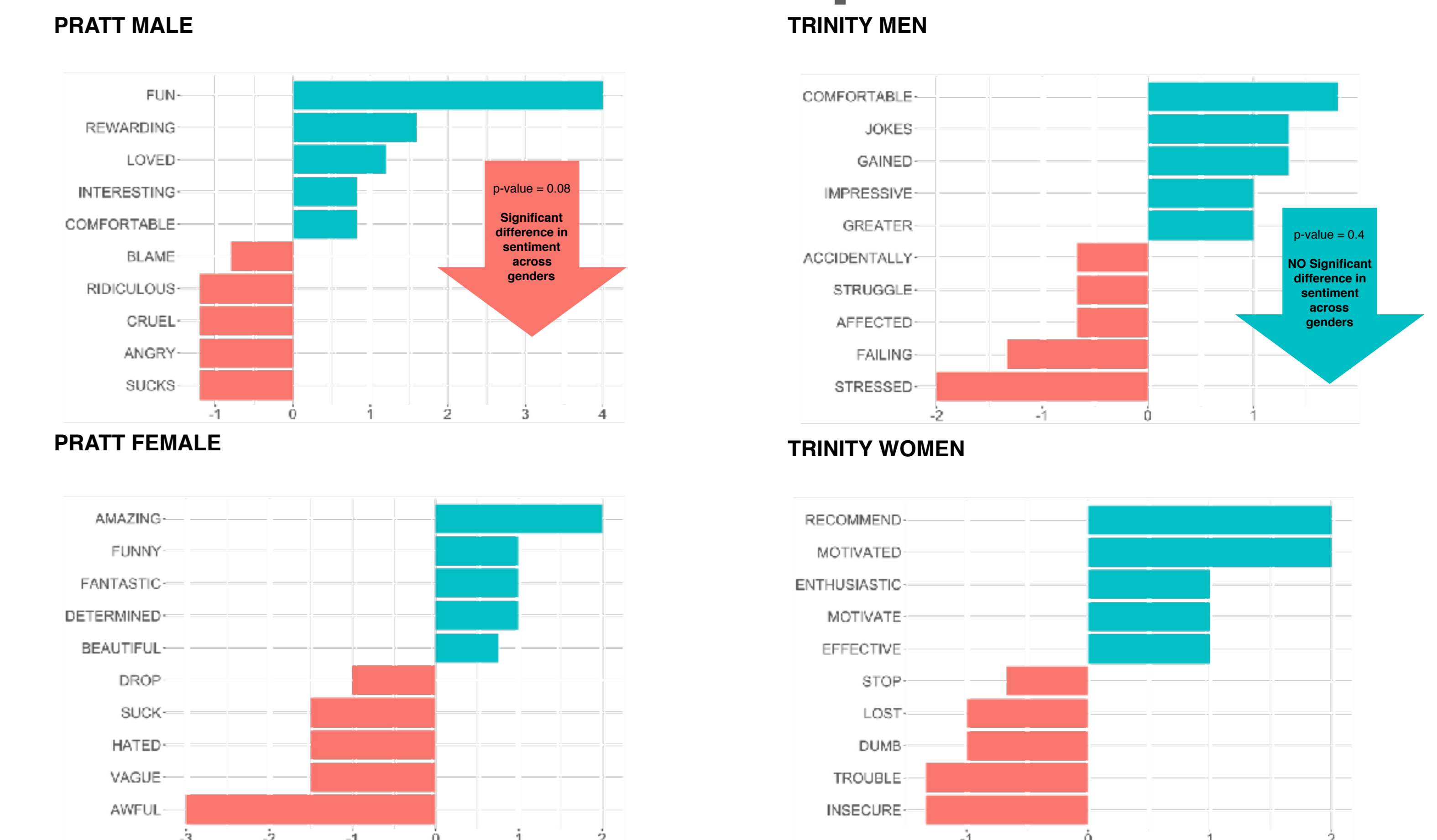Perform sentiment analysis on interview data with R.

Steps:
(1) Analyze the same data set in Method 1 using an automated, objective R program.
(2) Perform sentiment analysis on data set.

Results

Clicker Study

Determinants of Self-Efficacy Female Active

Determinants of Self-Efficacy Male Passive

Raw Score in Pre and Post Test for Passive Lesson

Determinants of Self-Efficacy Female Active

Determinants of Self-Efficacy Male Active

Raw Score in Pre and Post Test for Active Lesson

Focus Group: R

PRATT MALE

TRINITY MEN

PRATT FEMALE

TRINITY WOMEN

Focus Group: NVivo

TRINITY

Pratt

External

INTERNAL

Future Work

Finalize data analysis and visualizations.

Write and publish results.

Present results at upcoming conferences.

STEM FoR ALL 2017 - 2018 Team:

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Find out more at bit.ly/stem_for_all