Assessing the Emotional Impact of User Interface Design and Virtual Reality Experiences Using Color-Emotion Associations

Vanshaja Diya Misra, Department of Mathematical & Computational Sciences and Psychology, The College of Wooster

Advised by: Dr. Asa'd As'ad (Computer Science) and Dr. Claudia Thompson (Psychology)

Background

In an increasingly digital world, the design of user interfaces (UI) plays a significant role in shaping emotional experiences. Poorly designed environments, whether through confusing layouts, unintuitive navigation, or overwhelming visuals, can lead to heightened negative emotional responses. While much of the existing research on UI and emotion focuses on usability, fewer focus on the psychological toll of intentionally bad design. Simultaneously, virtual reality (VR) has emerged as a powerful tool for mood regulation, offering immersive experiences that can calm or stimulate users. This study investigates how bad UI impacts emotional states and whether VR environments, peaceful or stressful, can restore emotional balance. By using color-emotion associations as a measurement tool, this research highlights how digital experiences influence our feelings and how immersive technologies might offer relief. These findings contribute to ongoing efforts in psychology and design to create more emotionally responsive and user-centered digital environments.

Research Questions

How does technology affect emotions?
- Effects of bad design
- Use of VR as stress relief
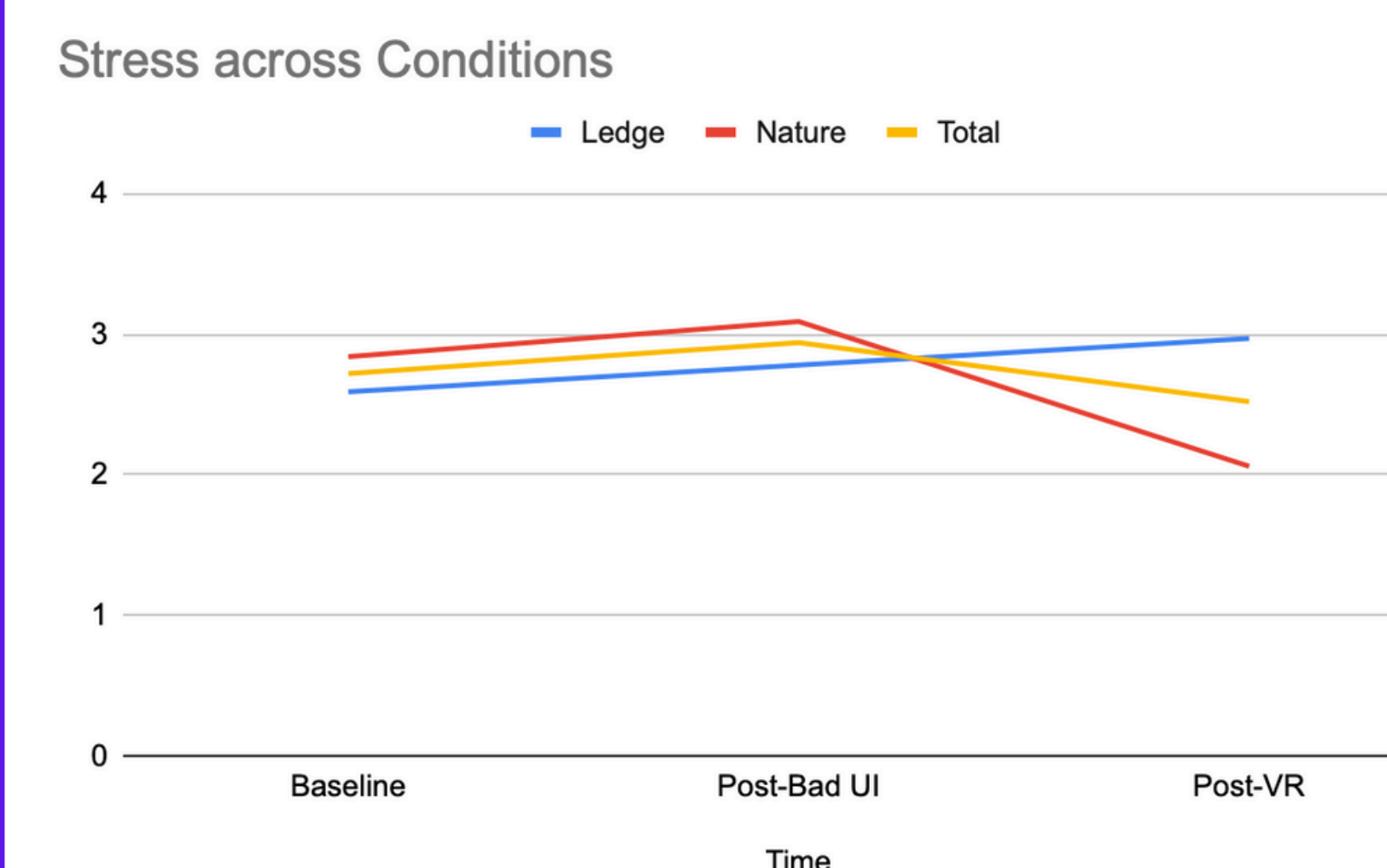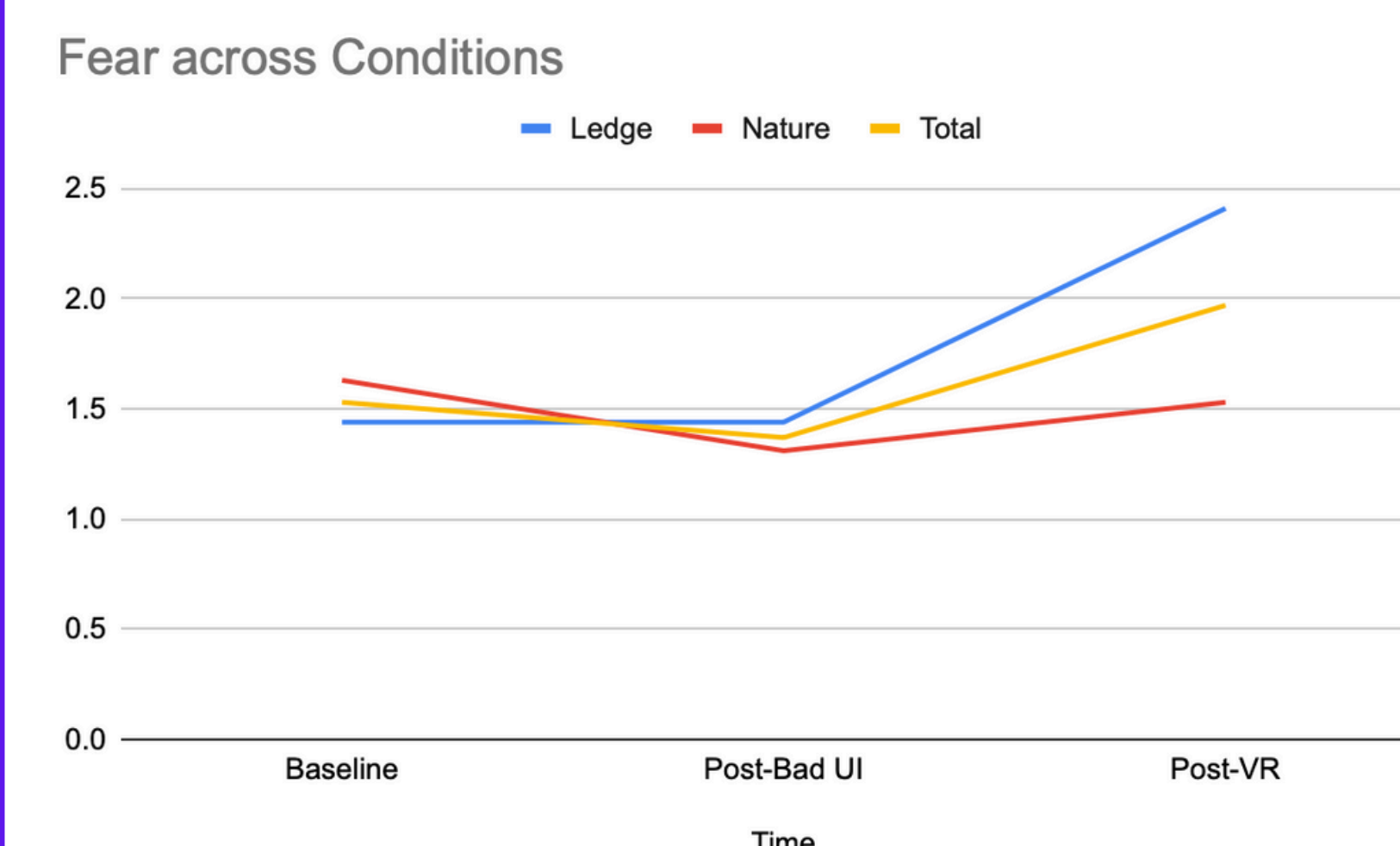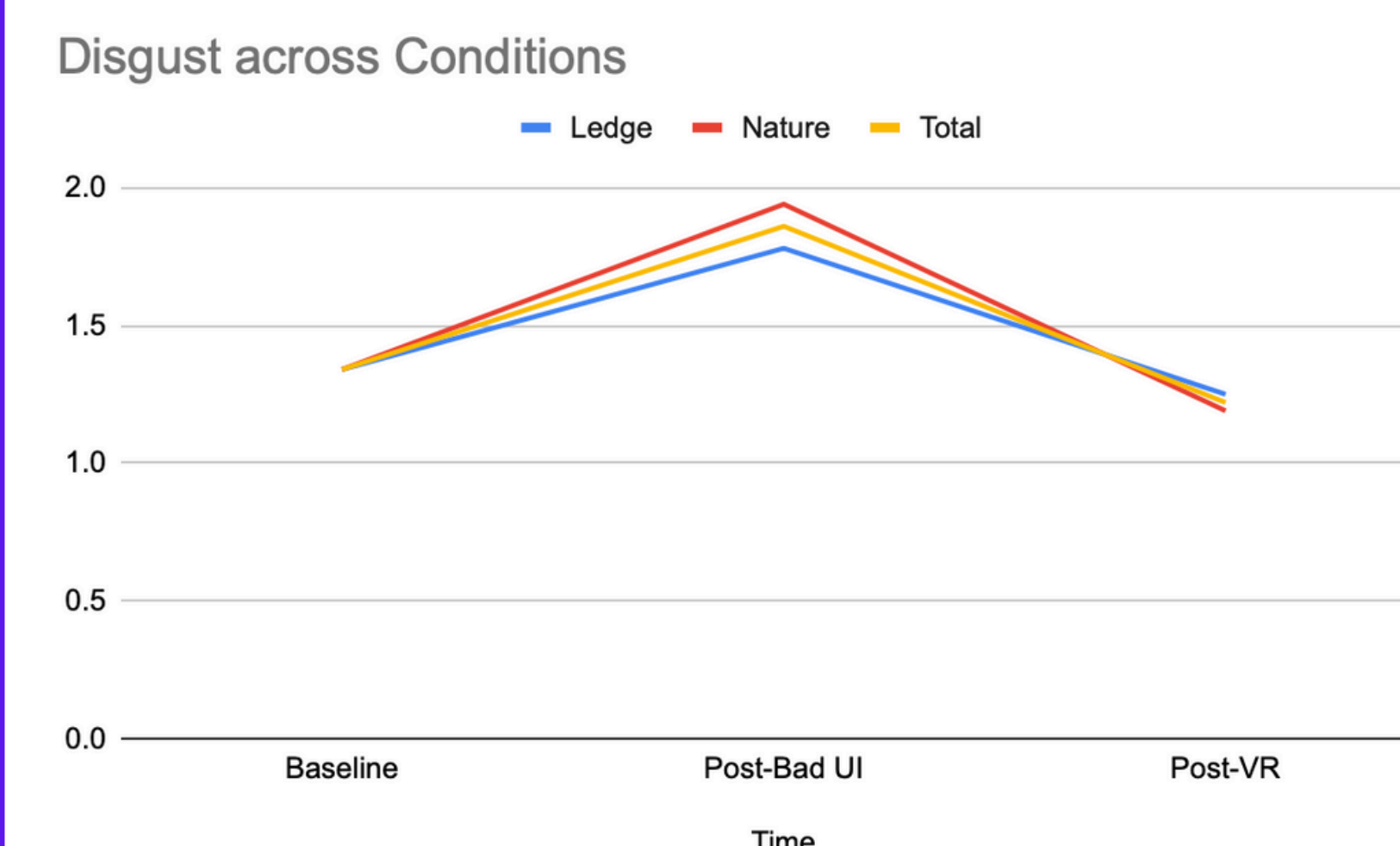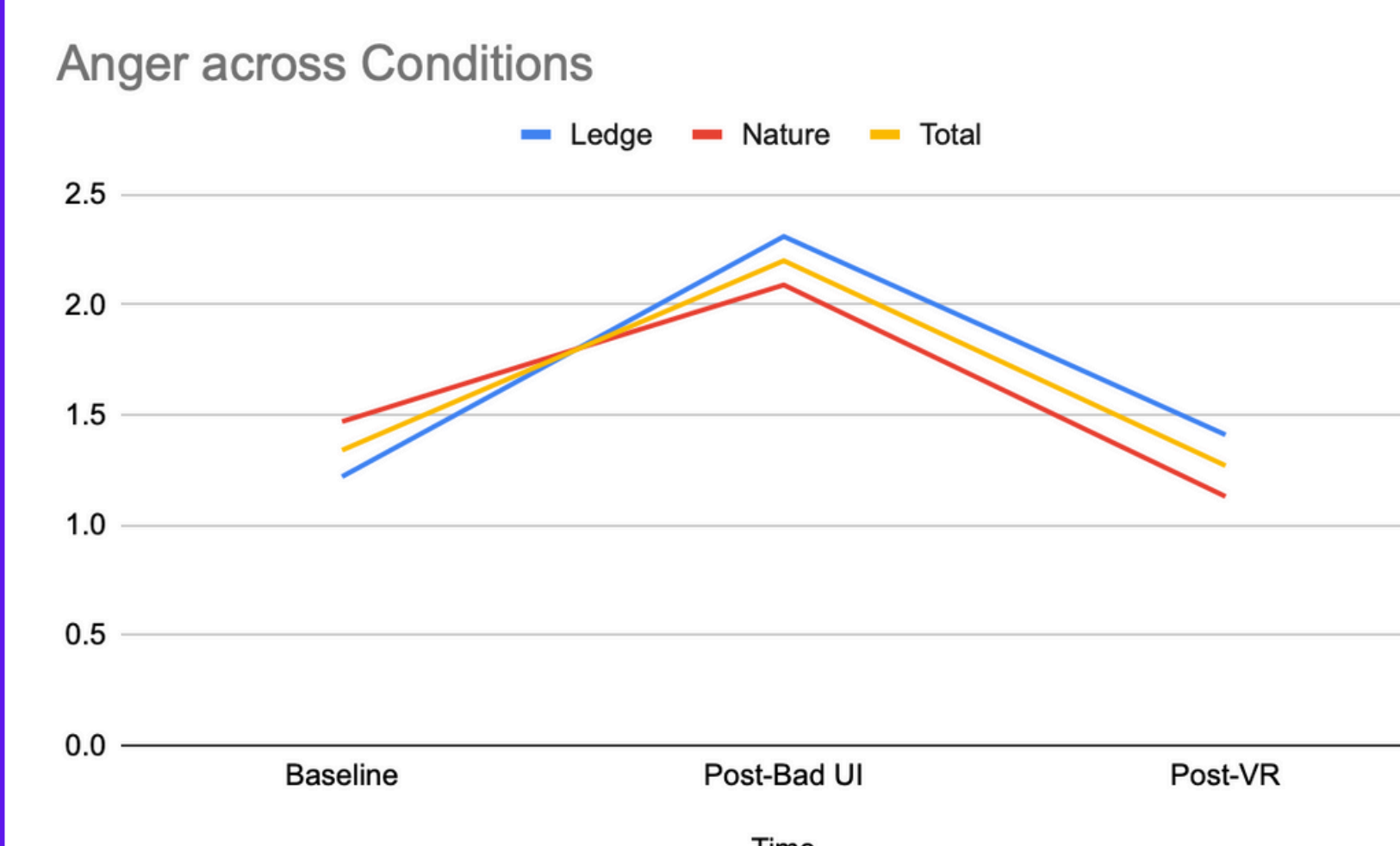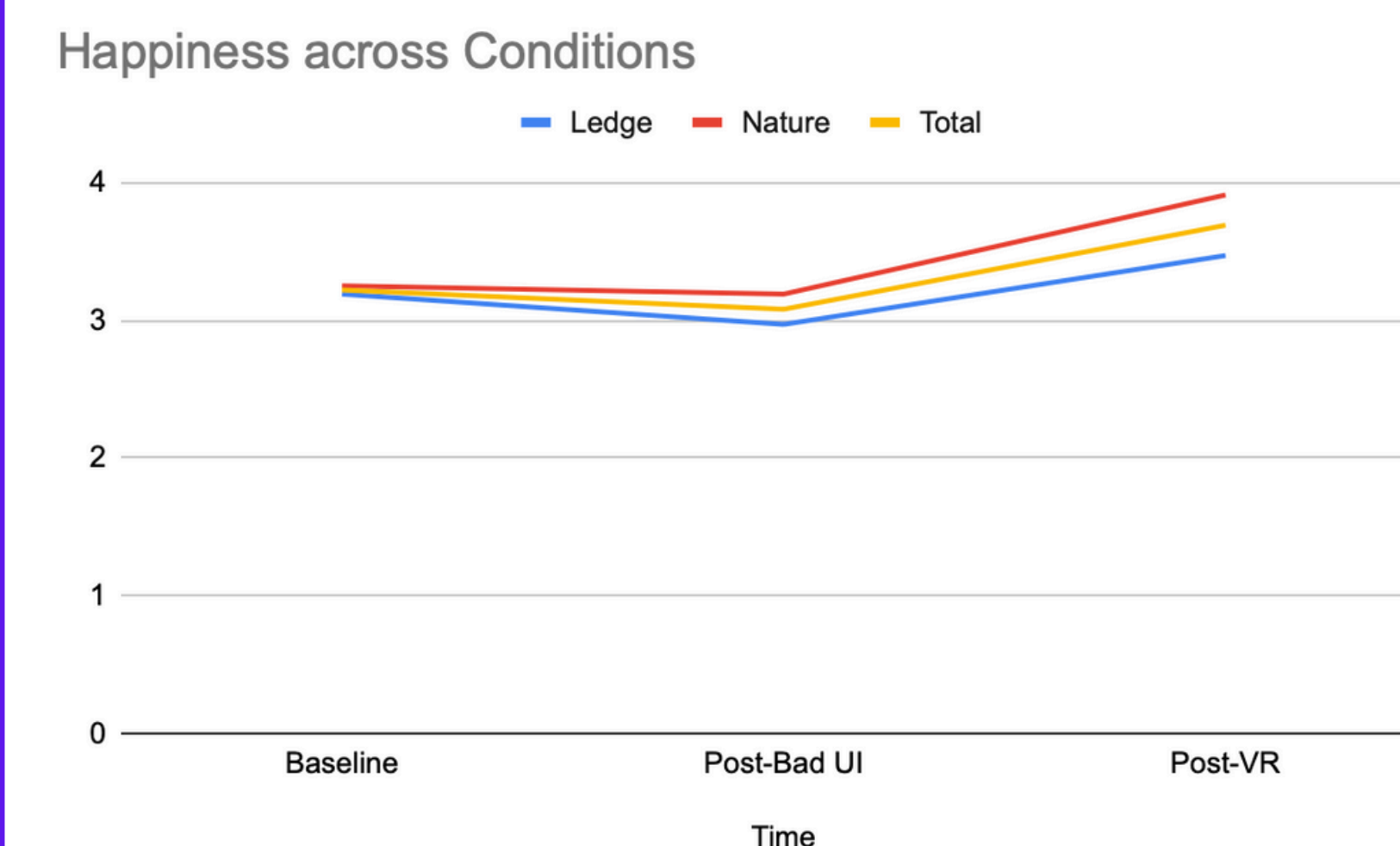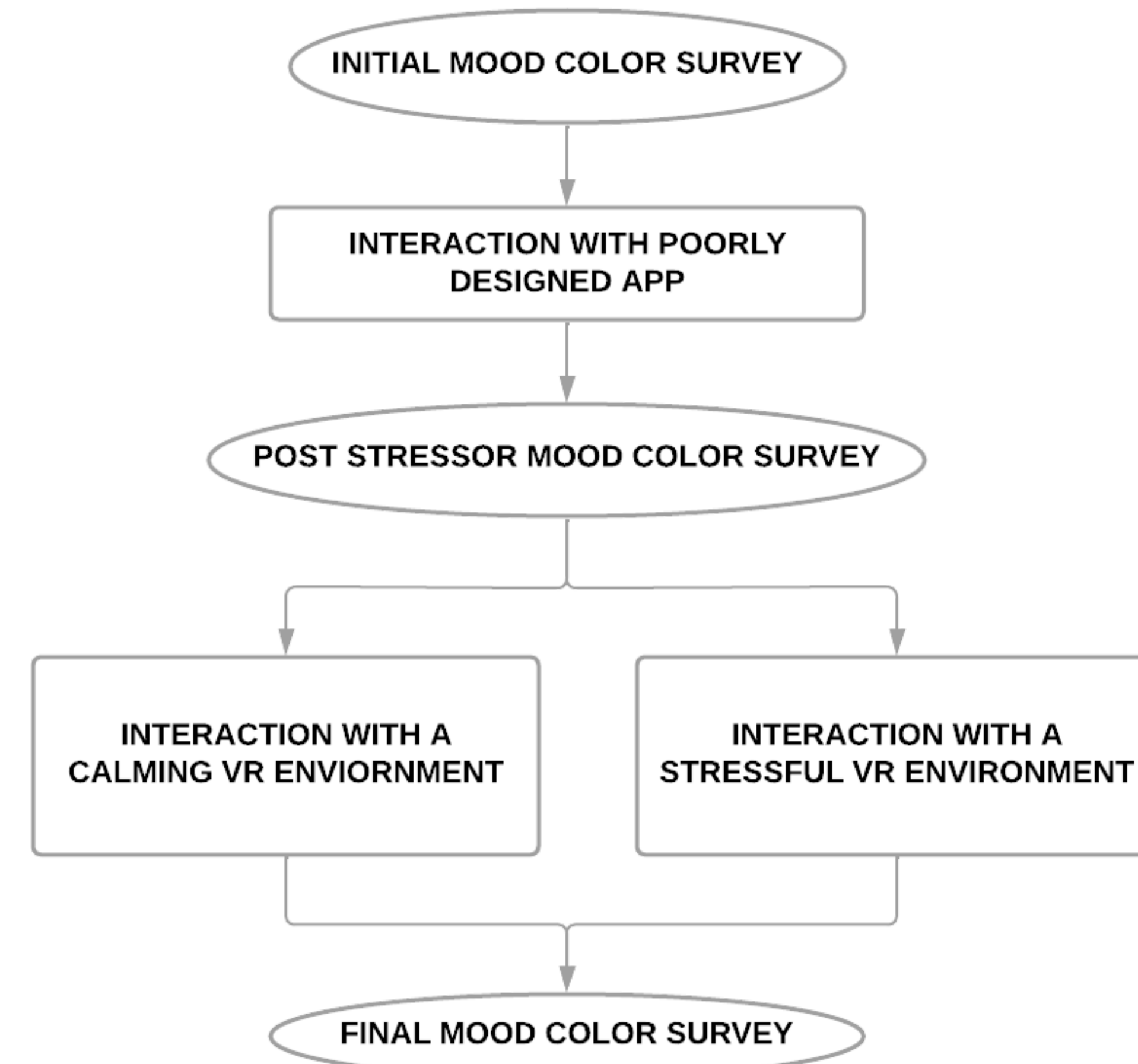- Shades of colors and emotional connections

Mood Color Survey Example

Emotion: Excitement

1   5

Method

- Participants (N = 64) completed three mood color surveys:
  - Baseline, Post-Bad UI App, and Post-VR Exposure.
- Participants used a journaling app, rAInbow, built in React Native/Expo with intentionally bad UI design which was later improved using participant feedback.
- They were randomly placed into peaceful or stressful VR conditions.
- Surveys asked participants to select a color and shade scale for each emotion and rate their intensity (1–5) across Happiness, Sadness, Anger, Disgust, Fear, Stress, Surprise.

INITIAL MOOD COLOR SURVEY → INTERACTION WITH POORLY DESIGNED APP → POST STRESSOR MOOD COLOR SURVEY → INTERACTION WITH A CALMING VR ENVIRONMENT / INTERACTION WITH A STRESSFUL VR ENVIRONMENT → FINAL MOOD COLOR SURVEY

Happiness across Conditions

Anger across Conditions

Disgust across Conditions

Fear across Conditions

Stress across Conditions

Results

1. Average usability score of the poorly designed app was *1.70*.
2. The following colors were associated to each emotion
- Happiness – Pink / Blue
- Sadness – Blue
- Fear – Black
- Anger – Pink
- Surprise – Pink
- Disgust – Orange
- Stress – Black
3. Light shades were associated with positive emotions.
4. Interacting with the poorly designed app significantly decreased happiness and increased anger, stress, and disgust.
5. Exposure to the calming nature VR helped reduce stress and fear effectively.

Discussion & Future Work

- Poor UI design led to increased negative emotions, while VR helped regulate mood.
- Color-emotion associations aligned with prior research.
- Limitations include a small, college-based sample and short exposure times. Future work should explore longer-term effects, diverse populations, and personalized features.
- Enhancements to the rAInbow app could include sentiment analysis, AI-driven pattern detection, and emotional support suggestions.

Resources:

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