

# Unveiling Emotional Engagement and Professional Differences in Bollywood Movie Perception Across Generations

User Centered Design Research

# Overview



## Filmmakers

Focus on technical and creative elements

Filmmakers critically analyze cinematography, editing, and storytelling, viewing film as both art and craft while focusing on directorial choices and techniques.



## Viewers

Emphasize emotional and narrative experience

Viewers engage emotionally, immersing in the story and characters, reacting instinctively rather than analyzing technical details.



## Gen X

Focus on independence  
and traditional values

Gen X, born between 1965 and 1980, grew up in a pre-digital era and saw the rise of the internet. They tend to value independence, work-life balance, and pragmatic approaches to challenges. Gen Xers often prioritize family and are generally more skeptical of technological reliance compared to Gen Z.



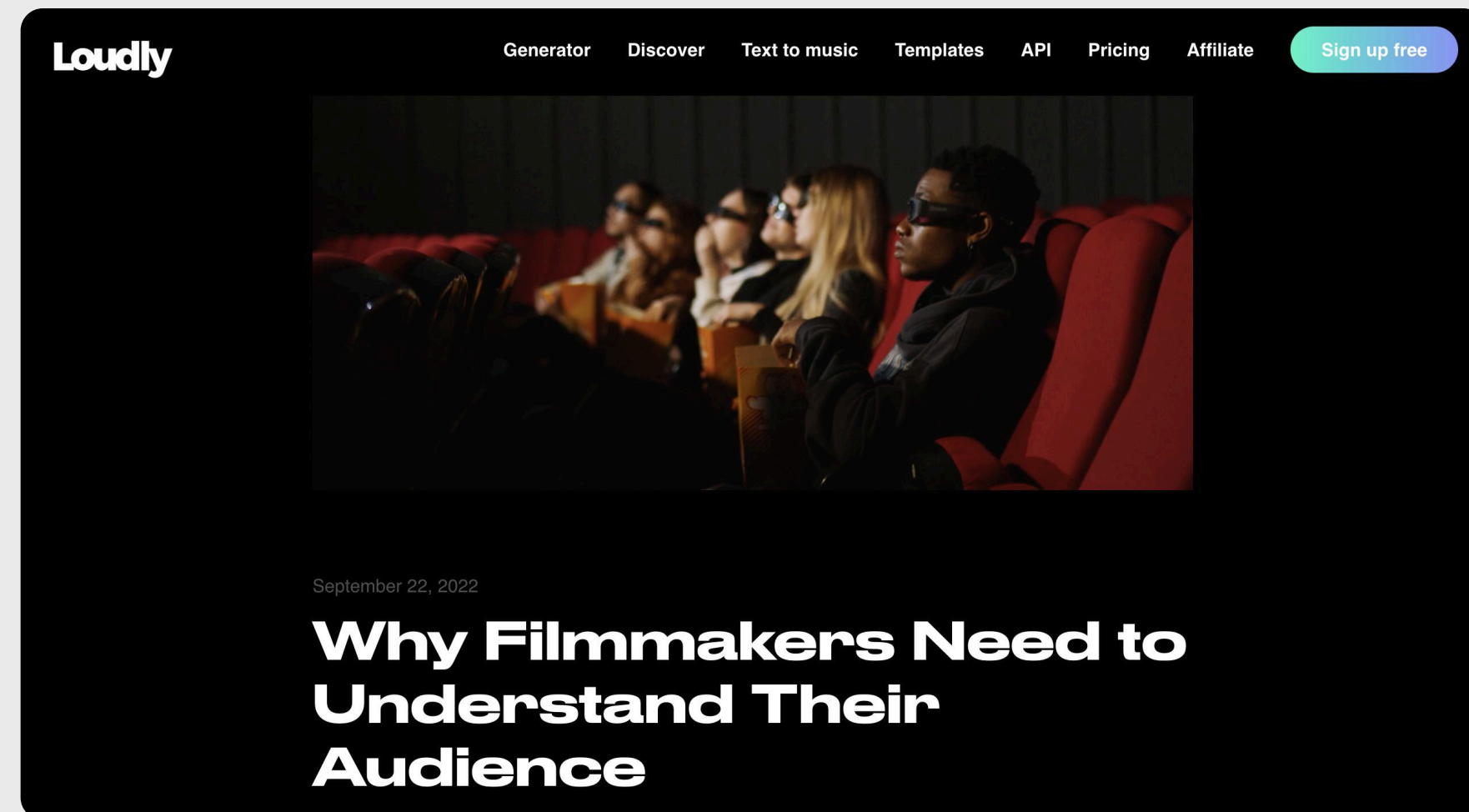
## Gen Z

Emphasize technology and  
social connectivity

Gen Z, born between 1997 and 2012, is deeply immersed in technology and social media. They are often seen as digital natives, with a strong affinity for constant connectivity, quick information exchange, and online communities. They value individuality, social justice, and inclusivity.

# Background Study

## Why Filmmakers Need to Understand Their Audience – Loudly Blog



The article emphasizes the importance for filmmakers to deeply understand their target audience's preferences, behaviors, and reactions. Such understanding is crucial for crafting content that resonates, thereby increasing the likelihood of the film's success and encouraging audience engagement and word-of-mouth promotion.

(Loudly, 2022)

## Filmmakers, Know Your Audience – Ms. In The Biz

### | Filmmakers, Know Your Audience

BY ALEXANDRA BOYLAN ON MARCH 25, 2019

DIY: TIPS & TRICKS, FILMMAKER, JOBS IN THE INDUSTRY, RESOURCES AND FAVORITE THINGS

When I ask someone: "Who is your movie for?" and they respond, "Everyone!" Houston, we have a problem. I have been [teaching a class on independent filmmaking and distribution](#) for over a year now. In that time, I have observed that filmmakers don't know their audience.

Unless you are Paramount, Universal or Marvel films it is nearly impossible to make a movie for "Everyone." If you want to be able to sell your movie, trust me when I tell you to make your movie for a specific audience. Understanding your audience's demographic is vitally important. That's why drop down categories like: Drama-Comedy-Horror-Thriller-Action-Adventure exist. Those categories get even more specific by identifying the age and gender of the audience you are speaking to.

**As an independent filmmaker, understanding your audience is vitally important even before writing or acquiring a script.** I have made a very purposeful decision to make female driven faith based films for three reasons.

1. I am a women of faith, so I am the audience.
2. I looked at the landscape of faith based films and saw a major lack in movies starring women.
3. I also noticed women were not being portrayed positively or accurately.

This piece advises **independent filmmakers to identify and focus on specific audience demographics early in the creative process.** By tailoring content to a defined niche, filmmakers can more **effectively meet audience expectations and fill market gaps, leading to better reception and potential success.**

(Boylan, 2019)



# Inclusion Criteria

Studies using eye tracking, EEG, BCI, or other physiological tools to assess attention and emotions during media viewing.

Focus on dynamic media such as films, OTT content, or interactive videos.

Exploration of the relationship between emotion and attention or engagement.

Involvement of human participants.

# Exclusion Criteria

Studies without eye tracking, EEG, or emotional engagement assessment.

Focus on static images, reading, or unrelated tasks.

Studies analyzing emotion or attention in isolation, not in a media context.

Research involving non-human subjects or irrelevant clinical studies.







# Key Themes Identified

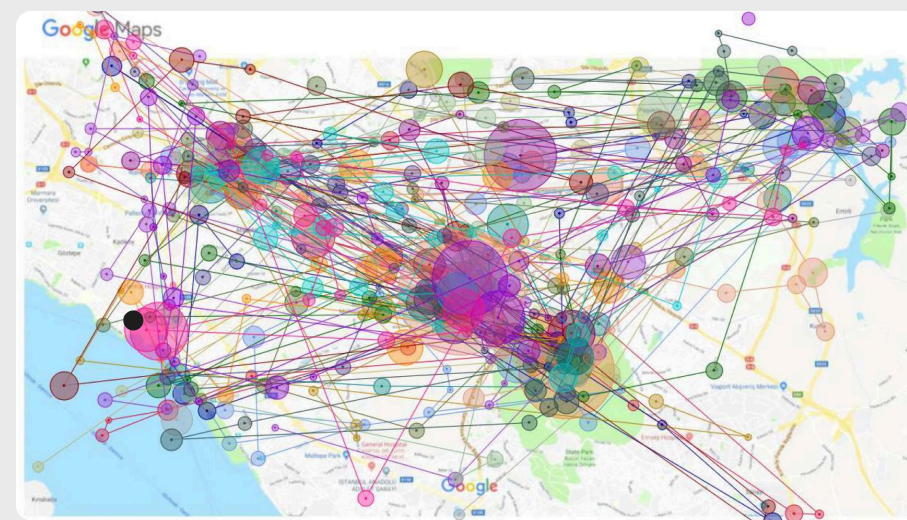
01

# Generational Media Processing Styles



02

## Attention Distribution in Visual Clutter



03

## Emotional Resonance by Genre



04

## Impact of Profession on Visual Perception



# Insights

## Theme 1: **Generational Media Processing Styles**

Media preferences of Generation Z in selecting video content on OTT platforms, using both qualitative (think-aloud usability tests) and quantitative (survey) methods. The research reveals that categories, text descriptions, and thumbnails are the most influential UI components in content selection, with trailers also playing a significant role. Interestingly, the study found no significant generational differences in preferences.

**(Patch, et al. 2018)**

# Insights

## Theme 2: **Attention Distribution in Visual Clutter**

Investigation on how viewers' emotions influence their attention during film viewing. **Using eye-tracking and mood questionnaires**, the study found that pre-existing emotions, particularly negative ones, significantly affected where viewers focused their attention. The findings highlight the importance of integrating eye-tracking and mood assessment to understand how emotions impact viewer engagement with dynamic media.

**(Zhao, et. al. 2020)**



# Insights

## Theme 3: **Emotional Resonance by Genre**

Higher movie ratings were associated with increased smiling, heart rate variability, and heightened brain engagement (beta waves), regardless of genre. Key physiological markers like brain activity, facial muscle activity, HRV, and skin conductance linked to viewer perception and subjective film ratings.

**(Kosonogov, et. al. 2023)**

Selecting suitable classifiers and evaluation methods is very important. Using McNemar's test, researchers compared their Backpropagation Neural Network (BPNN) system with other classifiers, showing that BPNN significantly outperformed them. This highlights the need for rigorous statistical validation in EEG-based emotion recognition research.

**(Das, et. al. 2023)**

# Insights

## Theme 3: **Emotional Resonance by Genre**

The study identified alpha, beta, and gamma frequency bands as key indicators of emotional responses while watching movies. Using classification models, the research achieved 87.53% accuracy in distinguishing positive and negative emotions. Additionally, findings highlighted individual differences in emotional processing, suggesting that personalized models could further improve recognition accuracy.

**(Nie, et. al. 2011)**

# Insights

## Theme 4: **Impact of Profession on Visual Perception**

BCI-enabled films offer interactive yet lean-back experiences, balancing control and immersion. Viewers enjoyed crafting unique versions, with some controllers feeling pressure to create a good film while others embraced unpredictability. Repeat viewings were common as audiences compared different versions. The concept of “User’s Cuts” emerged, allowing for audience-driven narratives over traditional director-led storytelling.

**(Ramchurn, et. al. 2019)**

# Research Gaps

01

## **Generational Gaze Pattern Differences: Gen Z vs Gen X in Bollywood Consumption**

There is no existing research comparing the gaze patterns of Gen Z and Gen X viewers in response to Bollywood storytelling techniques and visual tropes.

02

## **Mismatch Between Director-Intended Focal Points and Audience Gaze Behavior**

No research analyzing mismatch between director-placed focal points vs where general audiences naturally look during complex Bollywood frames.

03

## **Fine-Grained Gaze and Micro-Expression Analysis in Bollywood Film Engagement**

Lack of fine-grained gaze and micro-expression analysis connecting non-verbal cues with audience emotional responses using tools like SAM or emotion recognition as Bollywood films rely heavily on expressive gestures, eye movements, and body language due to their melodramatic style.

04

## **Limited Research on the Effect of Visual Clutter in Bollywood Frames**

There is limited academic inquiry into how Bollywood's traditionally crowded, vibrant frames influence gaze dispersion and cognitive overload among viewers.

# Research Questions Initial

**RQ1:** How do Gen Z and Gen X differ in neural indicators of attention and emotional arousal during film viewing?

**RQ2:** How do different film genres elicit distinct neural patterns related to emotional arousal and engagement?

**RQ3:** How does film-related expertise (e.g., filmmakers vs. general viewers) influence neural responses during complex narrative sequences?

**RQ4:** Can EEG-based emotional and attentional metrics predict individual film preferences better than self-reported ratings?



# Research Questions Revised

**RQ1:** How do Gen Z and Gen X differ in gaze behavior while watching Bollywood films?

**RQ2:** What emotional patterns emerge across different genres for these generational groups?

**RQ3:** How do professional backgrounds (movie buffs vs. filmmakers) influence cognitive and emotional film perception?

**RQ4:** How do gaze fixation patterns correlate with self-reported emotional responses across film genres?

# Aim

To explore **generational and professional differences** in emotional and visual engagement with Bollywood films by analyzing gaze patterns and non-verbal emotional responses, thereby uncovering **how viewers perceive and process cinematic content** across age and expertise.

# Objectives

01 | To compare visual attention patterns between Gen Z and Gen X viewers while watching Bollywood films using eye-tracking data.

02 | To analyze differences in emotional responses across generations and professional backgrounds (movie buffs vs. filmmakers) using facial expression analysis and post-viewing self-assessments.

03 | To examine the influence of film genre (comedy, sad, thriller) on viewer engagement across both age groups.

04 | To identify how professional training in filmmaking affects gaze behavior and emotional interpretation of cinematic elements.

# Hypothesis

01

**H<sub>0</sub>:** There is no significant difference in visual attention (gaze patterns) between Gen Z and Gen X participants while watching Bollywood films.

**H<sub>1</sub>:** There is a significant difference in visual attention (gaze patterns) between Gen Z and Gen X participants while watching Bollywood films.

02

**H<sub>0</sub>:** There is no significant difference in gaze behavior between filmmakers and movie buffs.

**H<sub>1</sub>:** Filmmakers (experts) demonstrate more structured and focused gaze behavior compared to movie buffs (non-experts).

03

**H<sub>0</sub>:** There is no difference in emotional arousal levels across genres.

**H<sub>1</sub>:** Thrillers elicit higher emotional arousal levels across both generations compared to comedy and sad genres.

04

**H<sub>0</sub>:** Emotional responses (measured via SAM and facial emotion recognition) do not differ across generations for each film genre.

**H<sub>1</sub>:** Emotional responses (measured via SAM and facial emotion recognition) differ across generations for each film genre.

05

**H<sub>0</sub>:** There is no difference in gaze shift speed and emotional variability between Gen Z and Gen X.

**H<sub>1</sub>:** Gen Z participants exhibit quicker gaze shifts and higher emotional variability compared to Gen X participants.

# Existing Methods

## Role of Technology in Film Perception

**1 Eye-Tracking:**  
Identifies where viewers focus their attention on-screen, revealing which elements of a scene truly capture interest.

**2 EEG (Electroencephalography):**  
Measures brain activity, helping us analyze emotional engagement, cognitive load, and desensitization over time.

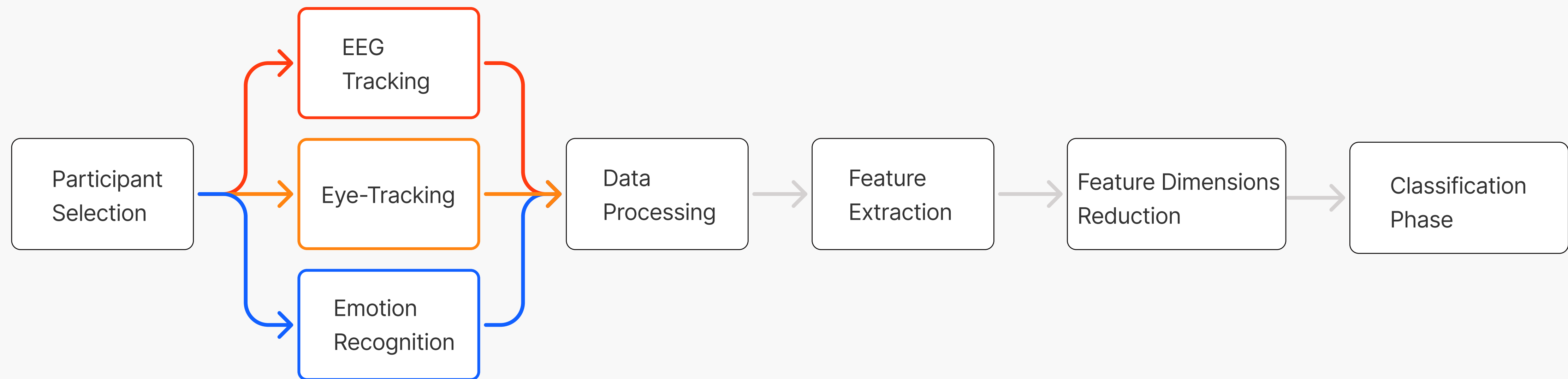
**3 Real-time Facial Emotion Recognition:**  
Tracks micro-expressions to detect real-time emotional responses such as fear, excitement, or indifference.

By combining these techniques, this research aims to uncover the true impact of films on audiences. **This will help us bridge the gap between filmmakers intent and viewers engagement**, leading to deeper insights into media psychology, content creation, and viewer experience.



# Pilot Study Workflow: Initial

To ensure a structured approach, we followed a systematic process for our pilot testing with two filmmaker participants. The experiment will involve the following key stages:



# Initial Pilot Study

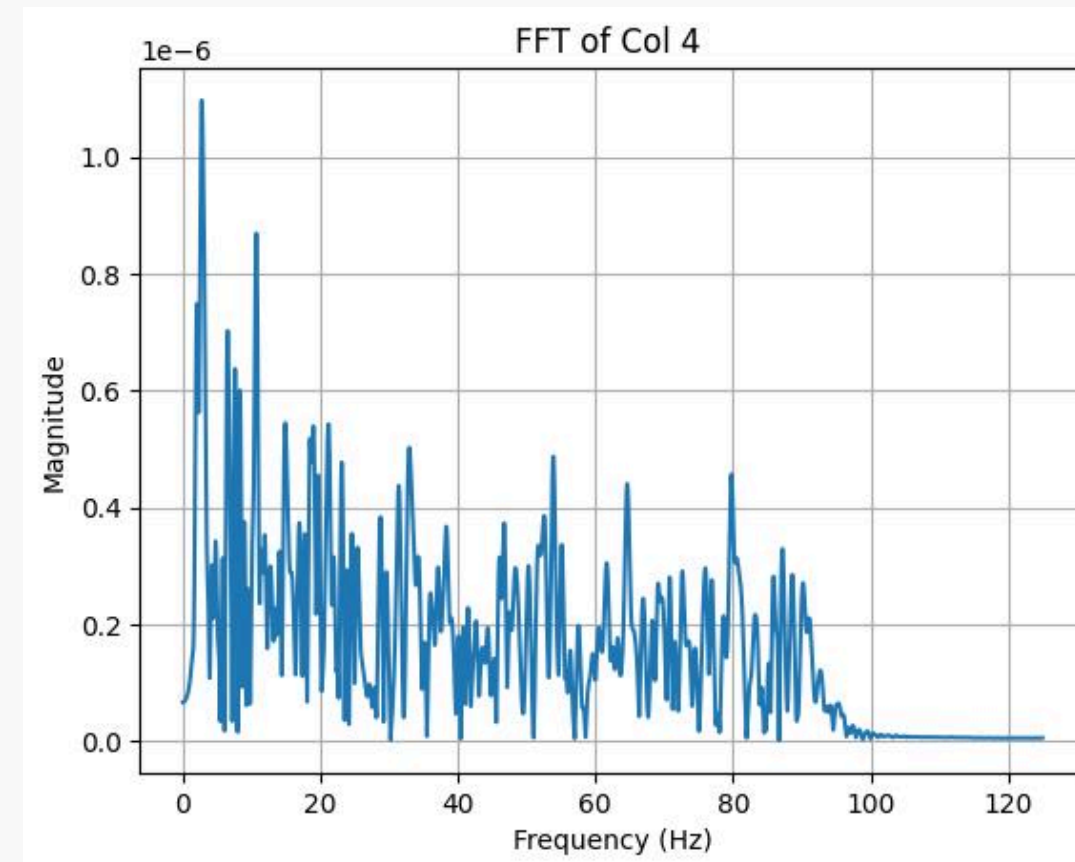
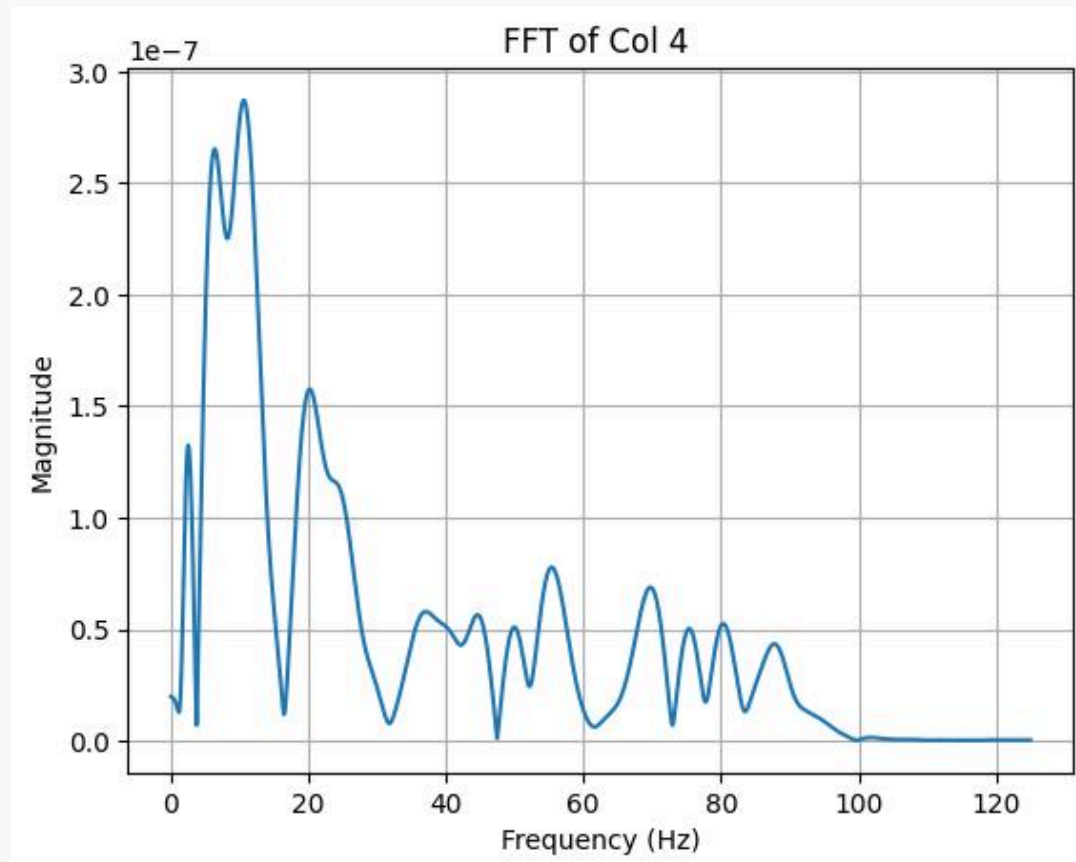


The primary objective of this study is to **identify differences in emotional engagement and cognitive processing** between participants, as well as to explore the influence of film genre on viewer responses.

By capturing EEG data, we aimed to assess how the brain processes visual stimuli, and whether different participants show distinct patterns of emotional or cognitive engagement with film content.



# EEG Results of Initial Study

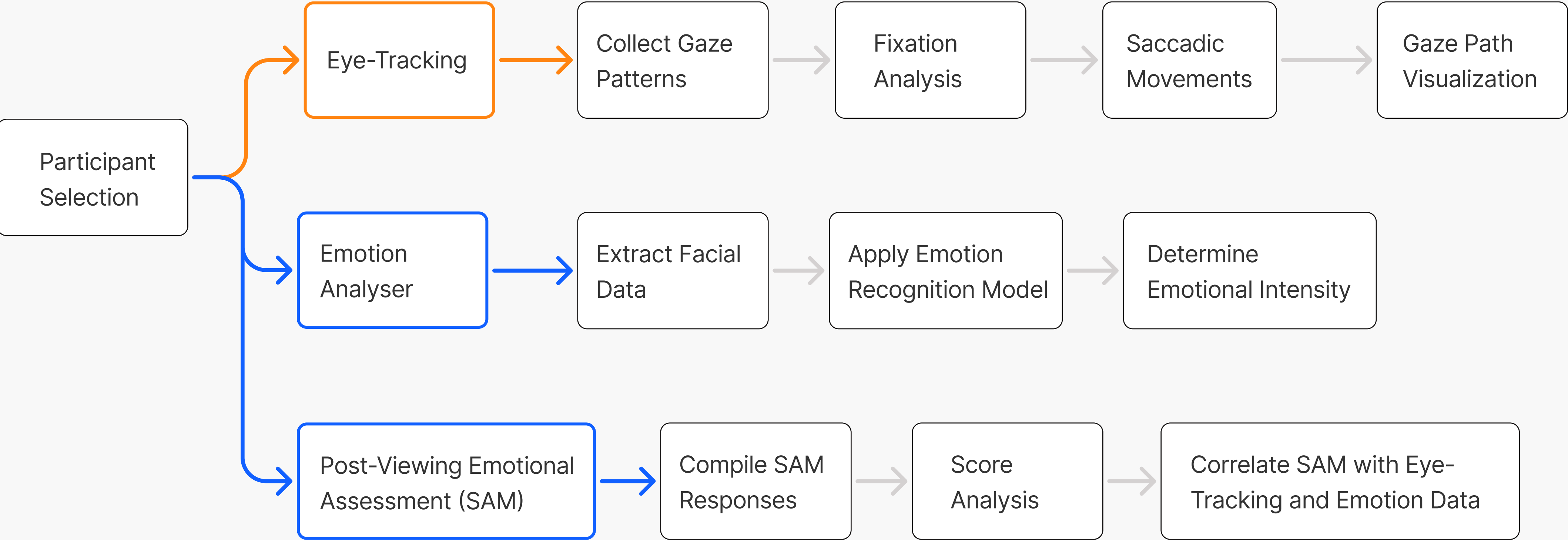


Due to technical issues with the EEG equipment, we had to change our methodology for this study.

**User 1** appears to have lower frequency activity and fewer oscillations in higher frequencies, suggesting either a **lower emotional or cognitive engagement** with the movie or a more passive viewing state (perhaps more focused on the visual experience without deep emotional involvement). **User 2**, with more spread-out frequency activity, might indicate higher emotional or cognitive responses. The varied frequencies suggest the viewer could have experienced shifts in attention, emotional arousal, or mental processing in reaction to different scenes in the movie, possibly reflecting a more **intense emotional or cognitive involvement**.

# Pilot Study Workflow: Updated

To ensure a structured approach, we followed a systematic process for our pilot testing. The experiment will involve the following key stages:

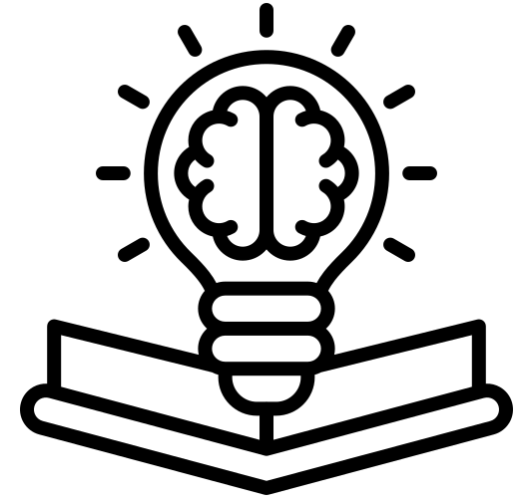


# METHODOLOGY

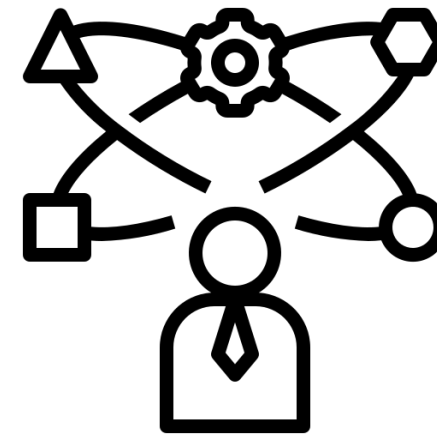


# Participant Selection Criteria

- We had participants from two generational groups: Gen Z (18-25 years) and Gen X (40-55 years).
- Classified them into two categories: Movie Buffs and Filmmaking Professionals.
- Must be familiar with Bollywood films.



Advanced Knowledge



Practical Experience



Research Alignment

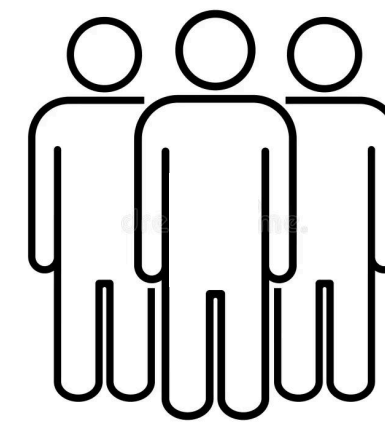
# Participant Preparation

## Participants Consent



Clearly explain the study's purpose, procedures. Obtain written consent, ensuring participants understand their rights

## Participant Readiness



The participant should be comfortable and seated in a relaxed position, with minimal distractions during the experiment.

## Pre-Experiment Guidelines



Encourage comfortable environment and ensure participants have had adequate rest.

# Film Selection

Curated movie selections based on 3 Genres

01

**Comedy**

Jab We Met (2007)



Total Time: 10 mins

02

**Sad**

Black (2005)



Total Time: 10 mins

03

**Thriller**

Gangs of Wasseypur (2012)



Total Time: 10 mins

# 1.1. Preparation Phase

## 01 Set Up the Eye-Tracking Equipment

- Install and position the Tobii Pro nano eye-tracking system in a quiet, controlled environment.
- Ensure the participant is seated comfortably in front of the screen at the optimal distance for tracking.

## 03 Prepare the Stimuli

- Ensure the film clips are loaded and ready to be presented in the correct order.

## 02 Calibrate the Eye-Tracker

- Run the calibration process for each participant to ensure accurate gaze data.
- Ask the participant to follow the on-screen calibration dots to adjust for their unique eye characteristics.

## 04 Data Recording

- Start recording gaze data once the participant is ready and begins watching the clips.



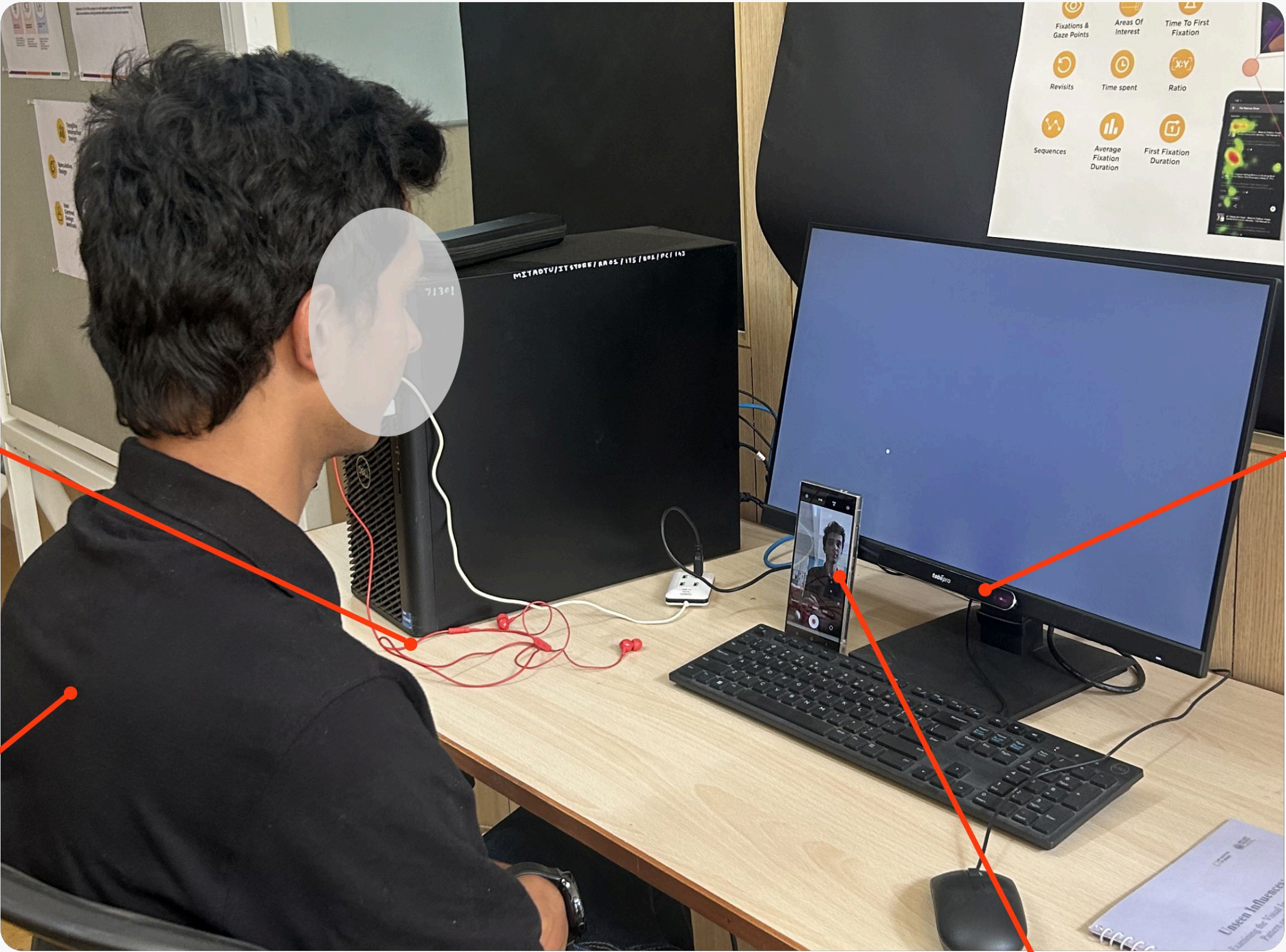
# Experimental Setup

## In- Ear Headphones

To ensure good sound quality while watching the movie

## Participant

Seated at an optimal distance from the screen for eye tracking



## Tobii Pro

A screen-based eye tracker which captures gaze data

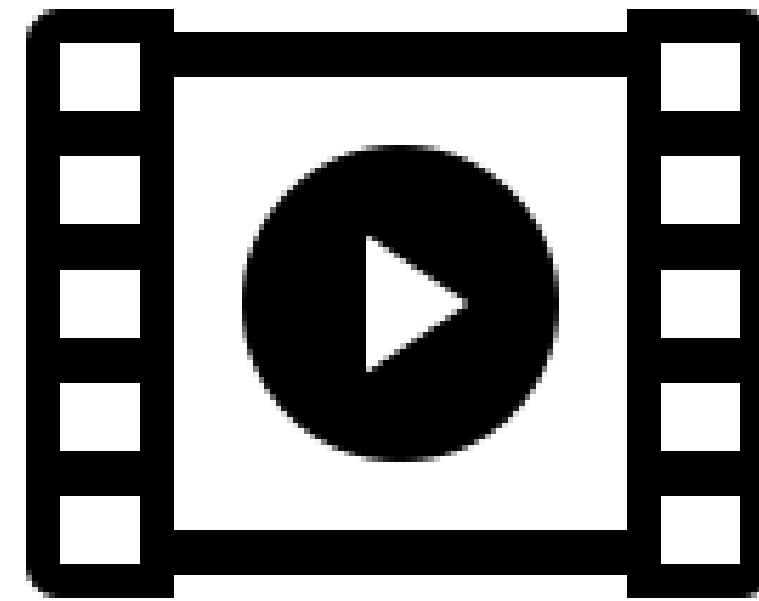
## Mobile Camera

Used for recording facial expressions



## 1.2. Facial Expression Recording

**Proper placement of the  
webcam/ camera for recording**



Record participants' facial expressions during the viewing of the film clips to capture real-time emotional reactions.

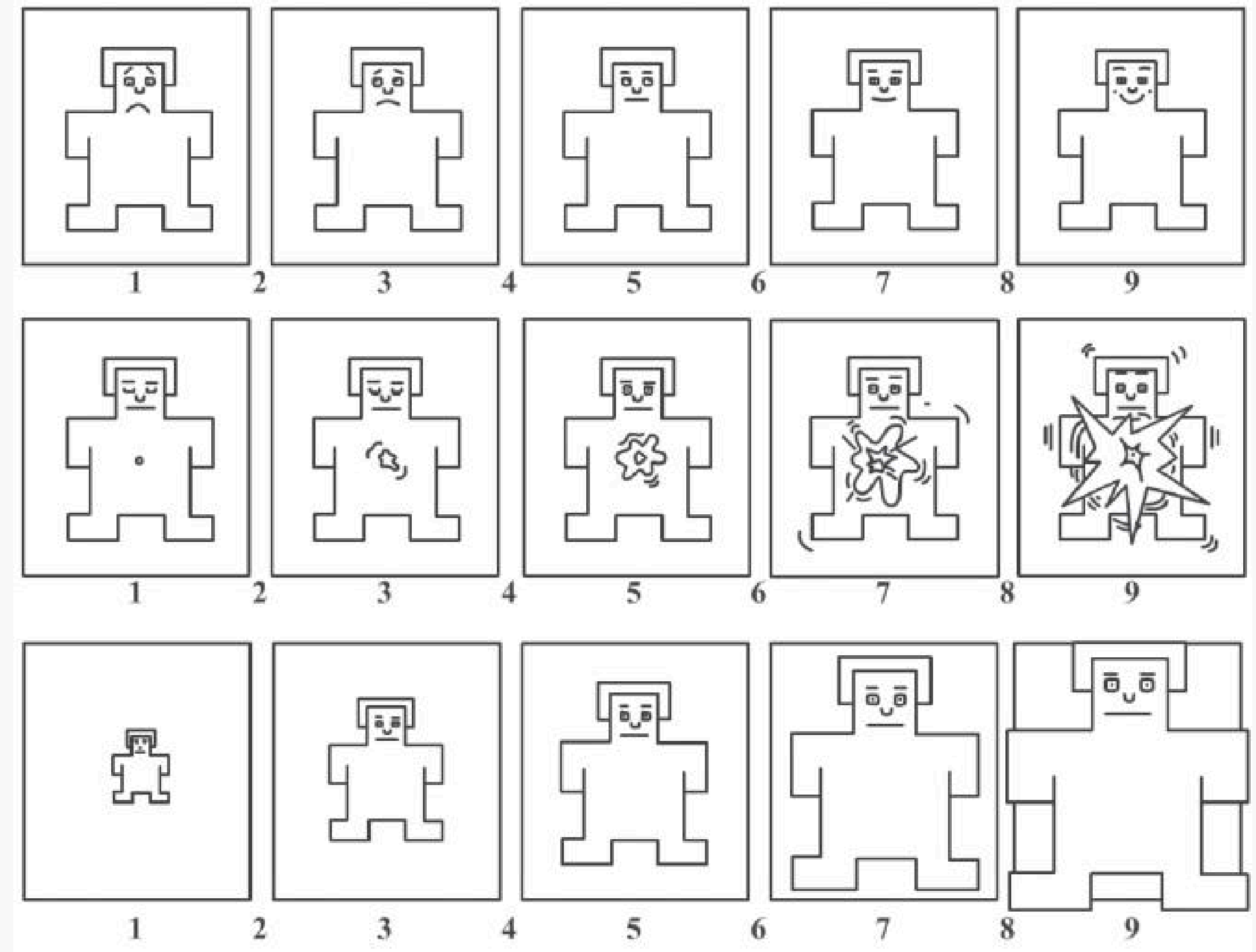
## 2. Post-Viewing Emotional Assessment (SAM)

### Stimulus Presentation



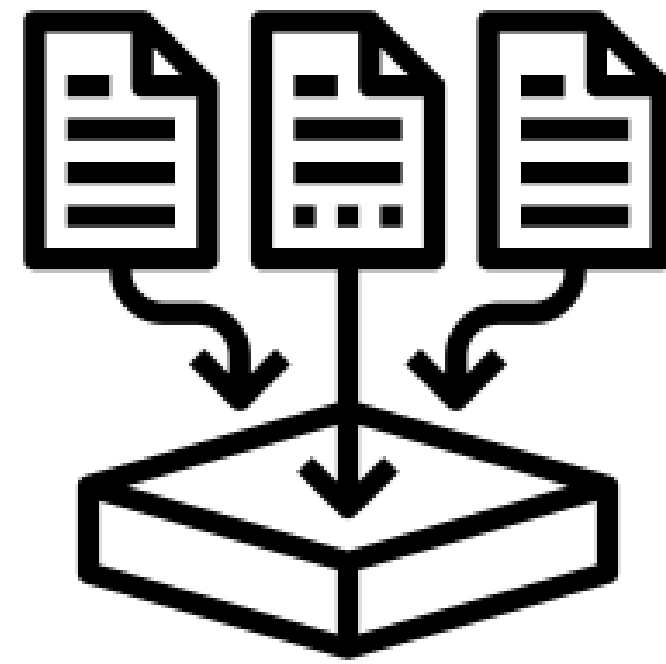
After watching the movie clip, the participant is asked to rate their emotional state using a scale like the Self-Assessment Manikin (SAM), which typically evaluates valence (positive to negative emotions) and arousal (calm to excited).

This provides a subjective emotional response, which can be compared with the Eye Tracking data for validation.





### 3. Final Data Collection



After all sessions, the eye-tracking data and self-assessments (SAM forms) are collected and ready for further analysis to classify emotional states based on both visual attention patterns and subjective reports.

## 4. Data Analysis

**01**

Analyze the eye-tracking data to identify gaze patterns and attention shifts during the film.

**02**

Analyze the recorded facial expressions using an emotion recognition model to identify the emotions participants experience (e.g., happiness, sadness, surprise, etc.).

**03**

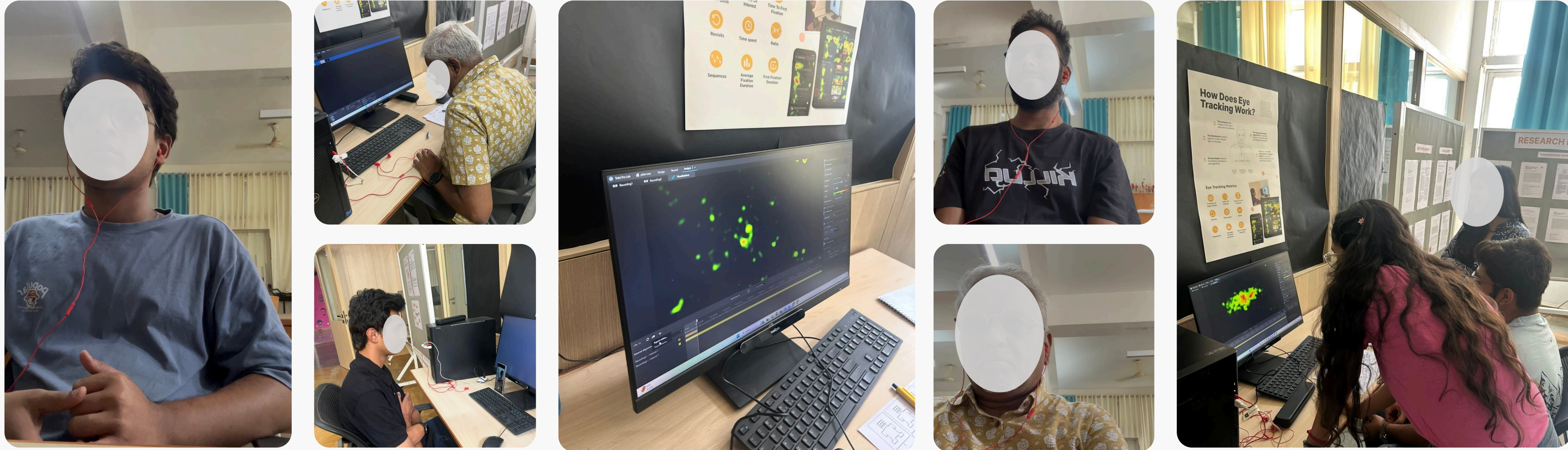
Analyze the SAM form data to perform statistical tests and do genre-wise as well as generation-wise analysis.

**04**

Correlate the SAM responses with the gaze and emotion data to evaluate emotional engagement and cognitive responses to the movie genres.



# Pilot Study



The primary objective of this study to investigate and understand the **emotional and cognitive responses of Gen Z and Gen X participants to different movie genres** (happy, sad, and thriller) by analyzing gaze patterns, self-reported emotional responses (via the Self-Assessment Manikin), and facial expressions (using an emotion analyzer). This study aims to explore how these responses differ across generations and professional backgrounds (movie buffs vs. film-making professionals), providing insights into the relationship between visual attention, emotional engagement, and film content.

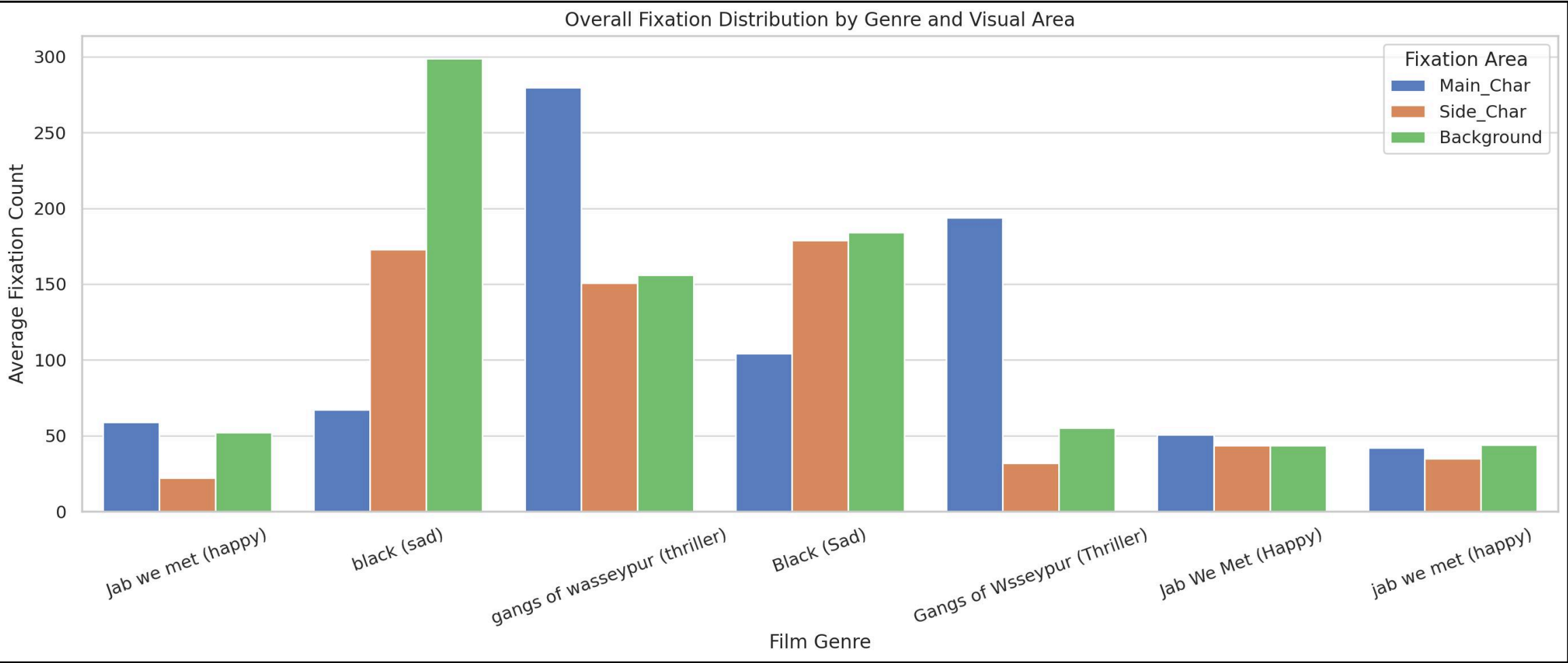


# Eye Tracking Data Analysis

This table presents the average number of eye fixations on three visual elements: **main characters, side characters, and the background** categorized by generation (Gen X vs. Gen Z), profession (Expert vs. Movie Buff), and film genre (Sad, Happy, Thriller). The fixation counts reflect where viewers concentrated their visual attention during film clips, offering insights into their cognitive and emotional engagement patterns across demographic groups and narrative styles.

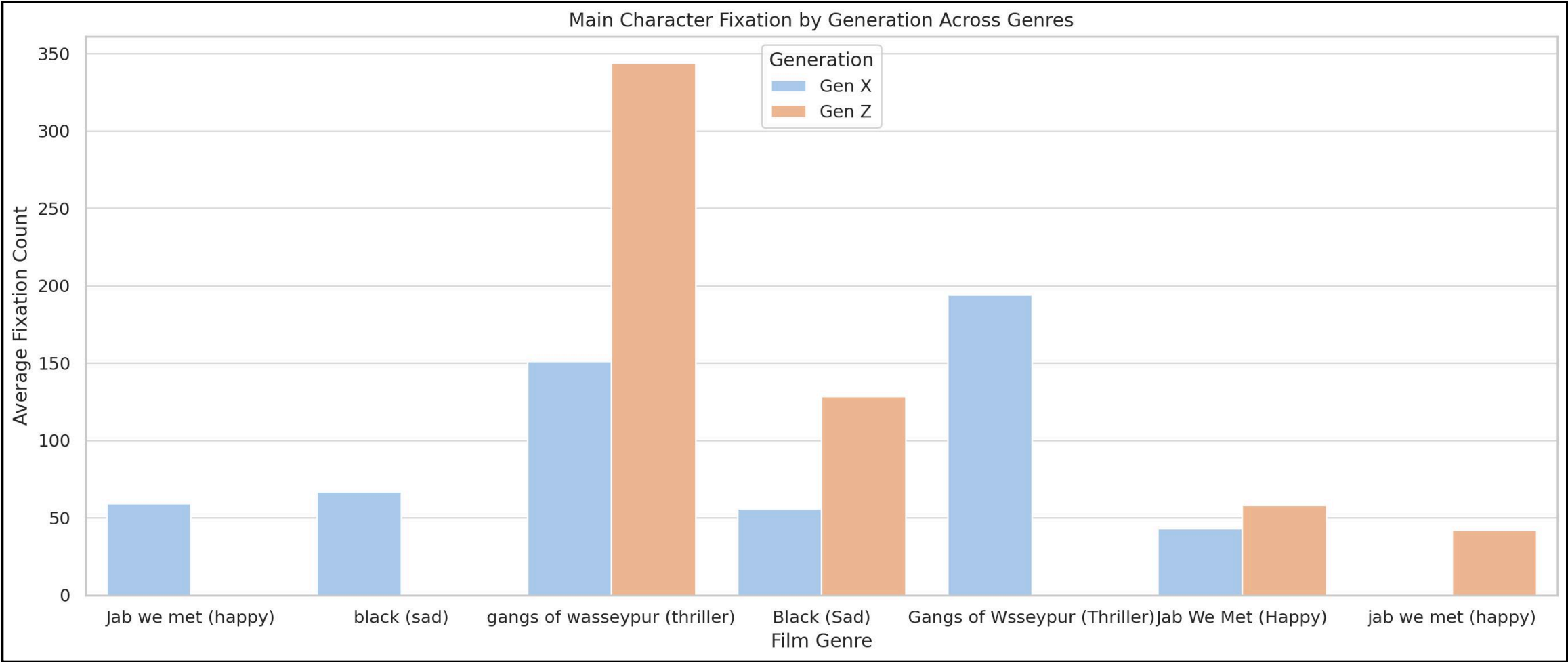
Generation	Profession	Genre	Main Char	Side Char	Background
Generation X	Expert	Happy	59	22	52
		Sad	67	173	299
		Thriller	151	38	77
	Movie Buff	Happy	43	45	42
		Sad	56	172	164
		Thriller	194	32	55
Generation Z	Expert	Happy	42	35	44
		Sad	195	262	197
		Thriller	342	216	194
	Movie Buff	Happy	58	42	45
		Sad	62	103	191
		Thriller	346	198	197

# Eye Tracking Data Analysis



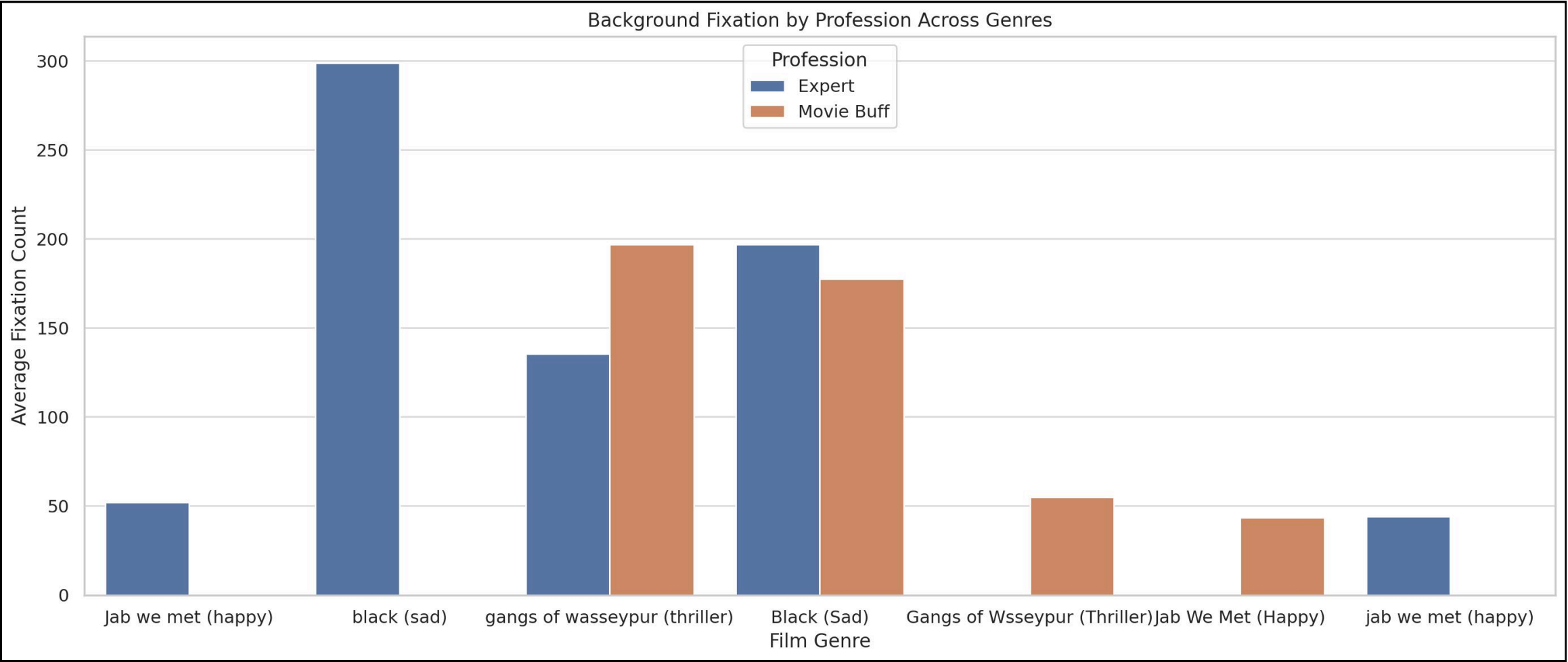
## Overall Fixation Distribution by Genre

- **Thrillers** show a **dominant** fixation on main characters, indicating **focused narrative engagement**.
- **Sad** films have a more **evenly distributed attention**, with notable engagement in background and side characters.
- **Happy** films trigger the **least intense fixation** across all areas, suggesting **relaxed or aesthetic viewing**.



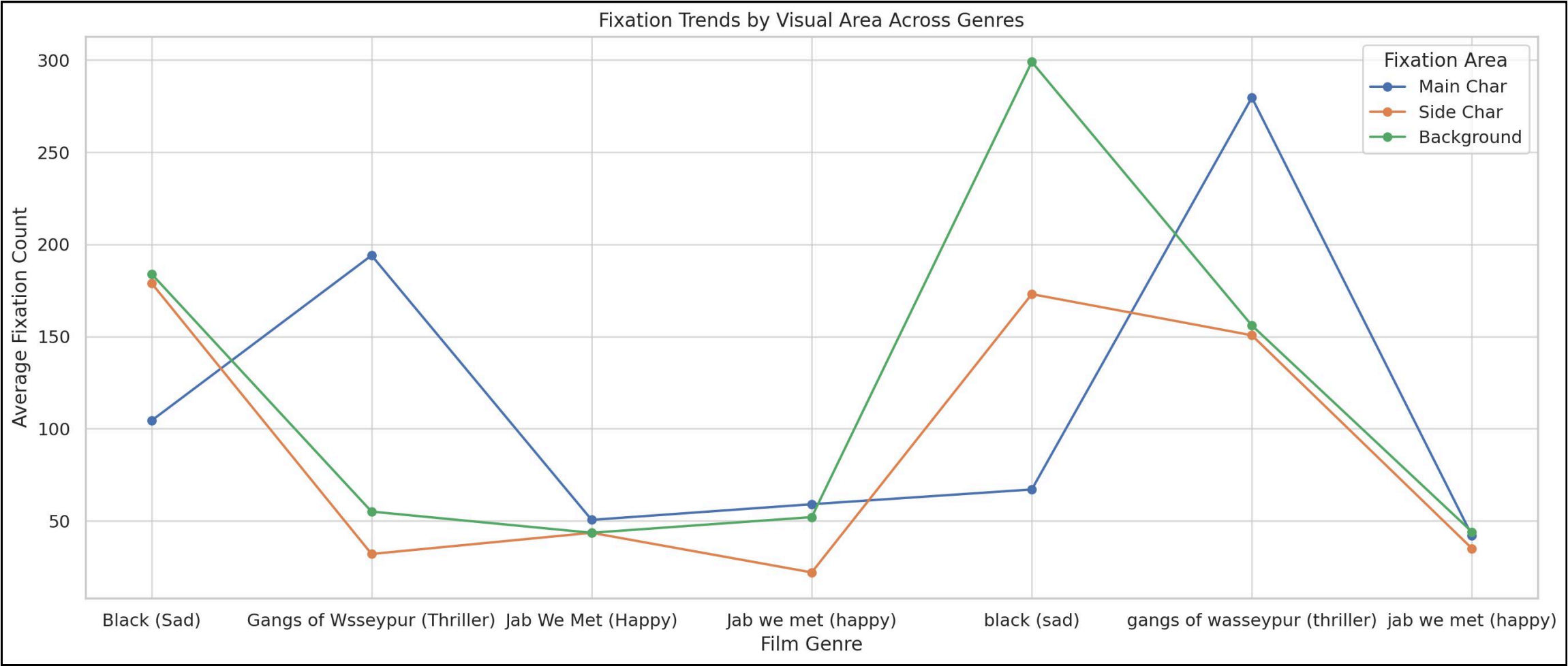
## Main Character Fixation by Generation

- **Gen Z** consistently fixates more on main characters across genres, especially thrillers, **highlighting stronger narrative tracking**.
- **Gen X** has **lower fixation on main characters**, particularly in thrillers, possibly **due to broader relational or contextual processing**.



### Background Fixation by Profession

- **Experts** (filmmakers) show **higher background attention** in **sad films**, reflecting **visual literacy** and awareness of placement on stage.
- **Bufs** show **more focus on main elements**, with minimal background attention, especially in thrillers, **suggesting emotionally reactive viewing**.



### Genre-Based Fixation Trends

- **Thrillers** draw **peak fixation** on **main characters**.
- **Sad** films result in **higher fixation** on **side characters** and **background**, indicating **emotionally layered viewing**.
- **Happy** films show the **most balanced and evenly spread attention**.



# Eye Tracking Results

## Main Character Fixation (Narrative Engagement)

Gen Z Experts and Movie Buffs showed the highest fixations on main characters, especially in thriller films (342 and 346 fixations).

This suggests stronger narrative engagement and possibly more active cognitive tracking in younger viewers.

Gen X Experts focused more on main characters in the sad genre, indicating a preference for emotional nuance over action.

## Side Character Attention (Relational Focus)

Gen Z Experts had the highest fixation on side characters in sad films (262), suggesting deeper processing of social and emotional cues.

Gen X Movie Buffs also engaged heavily with side characters in sad films (172), reinforcing the genre's emphasis on interpersonal drama.



## Background Fixation (Visual Scanning / Aesthetic Attention)

Gen X Experts fixated most on the background in sad films (299), possibly indicating attentiveness to setting or cinematography.

Gen Z participants showed more balanced fixation patterns, suggesting they absorbed both character and environmental information effectively.

## Genre-Based Trends

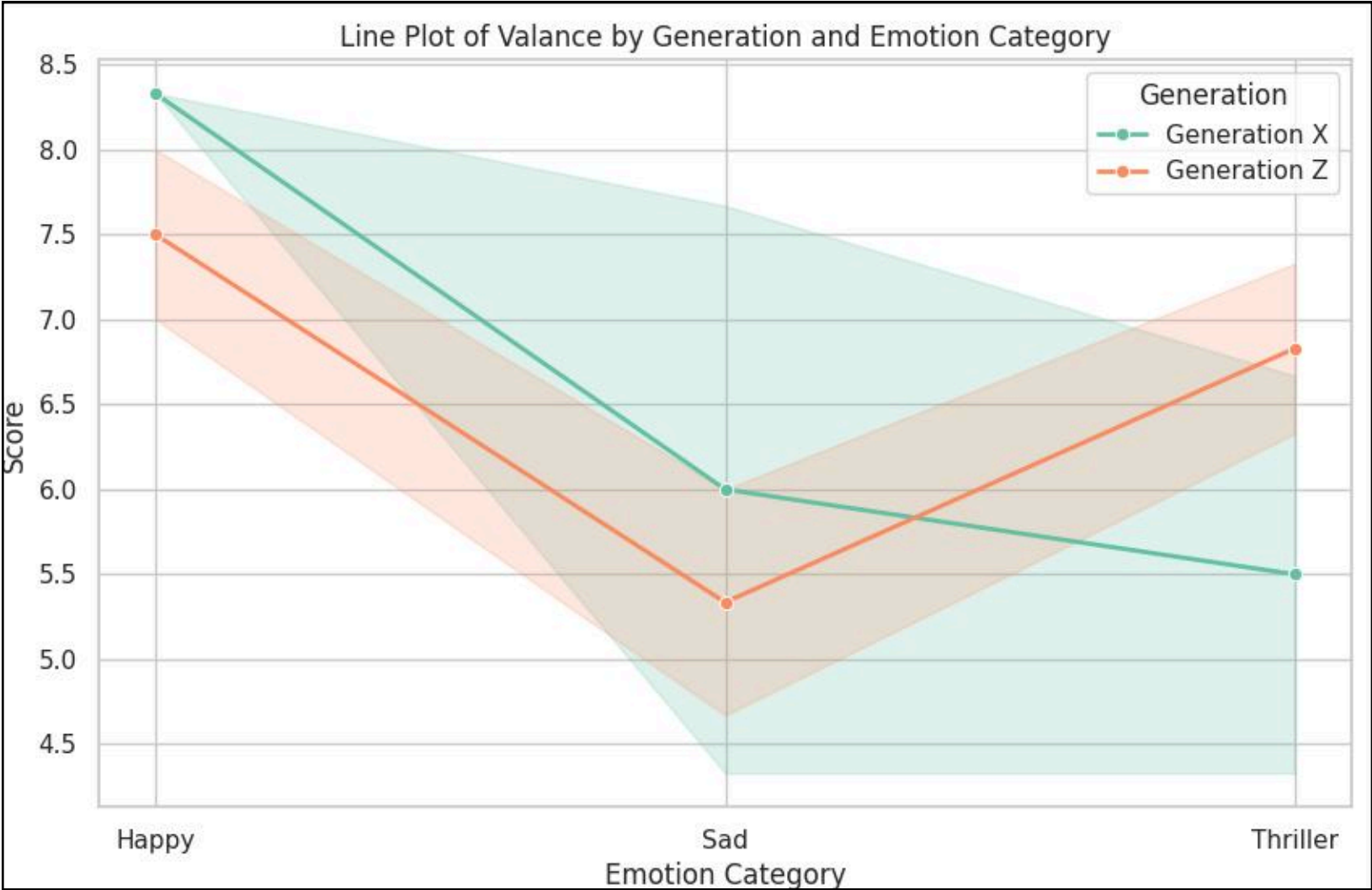
Thrillers commanded the highest main character fixation across all groups, showing that suspense and action draw focused attention.

Happy films received more diffused attention, with fixations spread more evenly between background and side characters, especially in Gen Z buffs.

# SAM Form Analysis

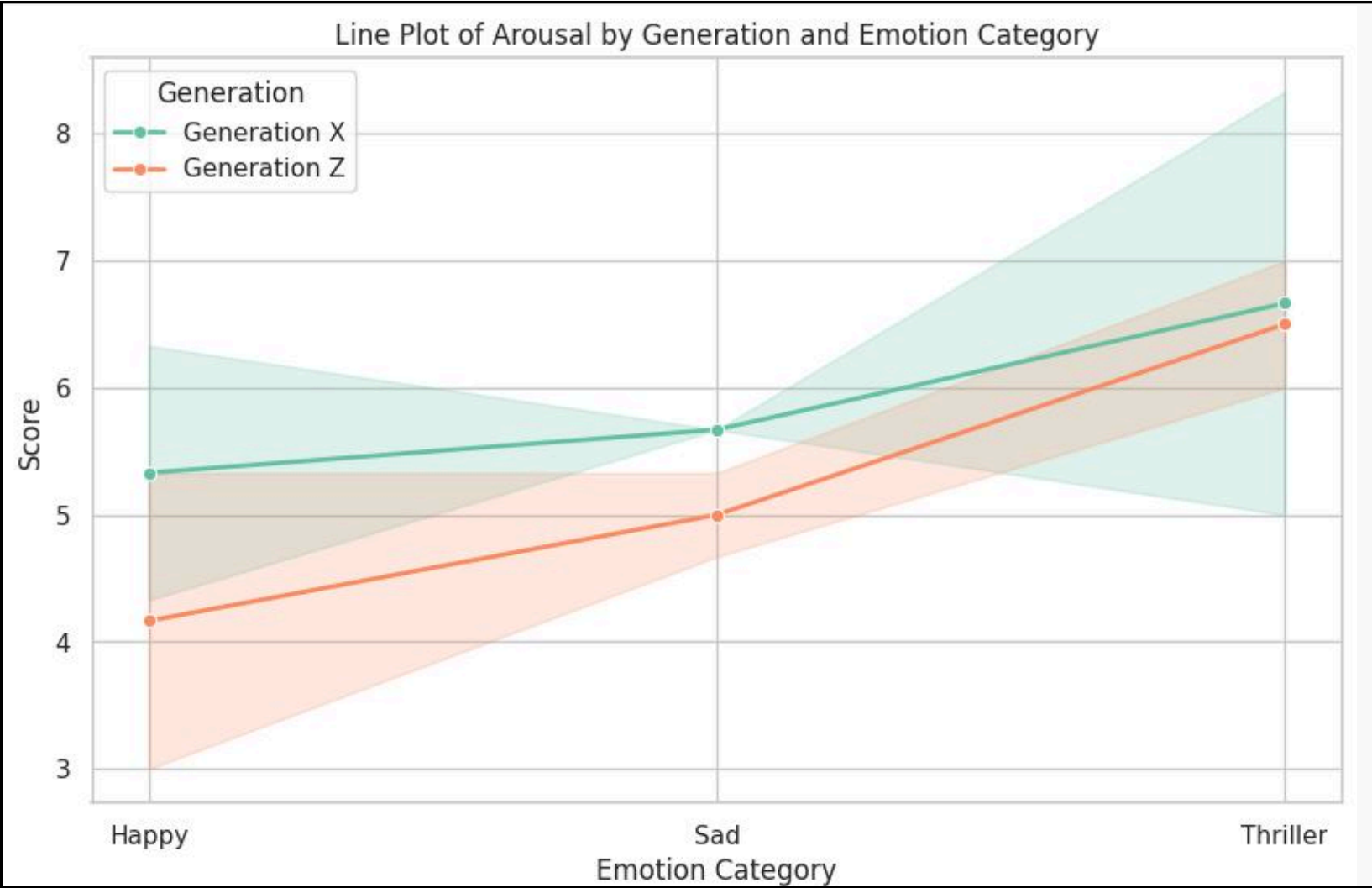
Generation	Category	Emotion Category	Mean Valence	Mean Arousal	Mean Dominance
Generation X	Expert	Happy	8.33	4.33	6.33
		Sad	7.67	5.67	5.67
		Thriller	6.67	5	6
	Movie Buff	Happy	8.33	6.33	5
		Sad	4.33	5.67	4.33
		Thriller	4.33	8.33	7
Generation Z	Expert	Happy	7	3	8.67
		Sad	4.67	4.67	5.67
		Thriller	7.33	6	7
	Movie Buff	Happy	8	5.33	5.67
		Sad	6	5.33	4.67
		Thriller	6.33	7	6.67

# SAM Form Results



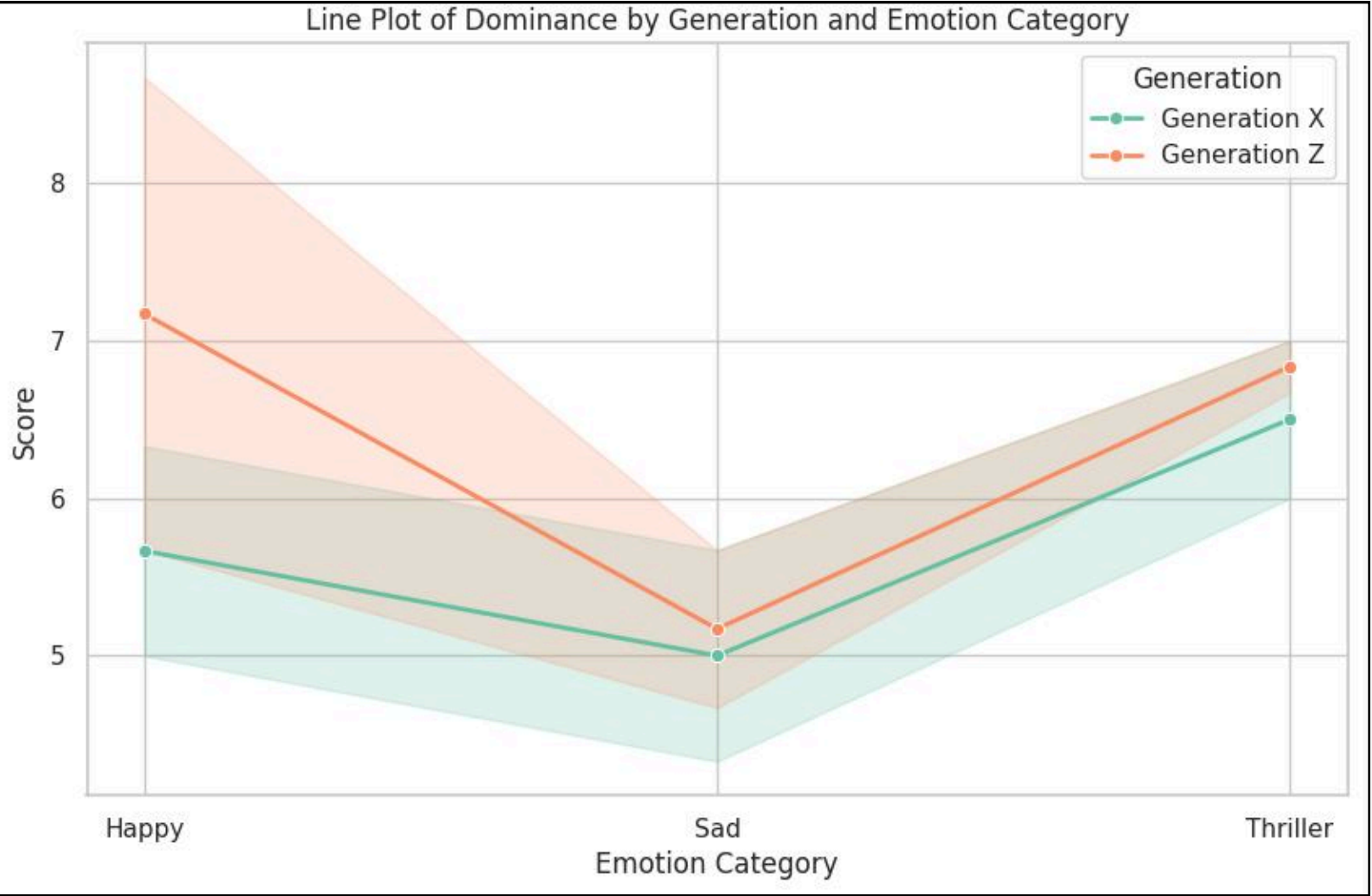
## Insight from Valence Score Graph

- **Gen X** felt more positive emotions than **Gen Z** while watching happy and sad movies.
- The emotional response to happy and sad movies was quite similar for both generations.
- But there's a clear difference when it comes to thrillers, **Gen Z seemed to enjoy thrillers more than Gen X.**



## Insight from Arousal Score Graph

- **Gen X** felt more emotionally charged than **Gen Z** for all three genres.
- The biggest difference was seen in **happy movies: Gen X felt much more excited or uplifted than Gen Z.**
- For sad movies, the difference was small, meaning both generations felt nearly the same level of emotional intensity.
- For thrillers, both generations had almost equal levels of excitement.



## Insight from Dominance Score Graph

- **Gen Z** felt more in control during all three types of movies compared to **Gen X.**
- The biggest difference was seen in happy movies : **Gen Z felt much more confident and in charge than Gen X.**
- For sad and thriller movies, Both generations feel similarly affected.



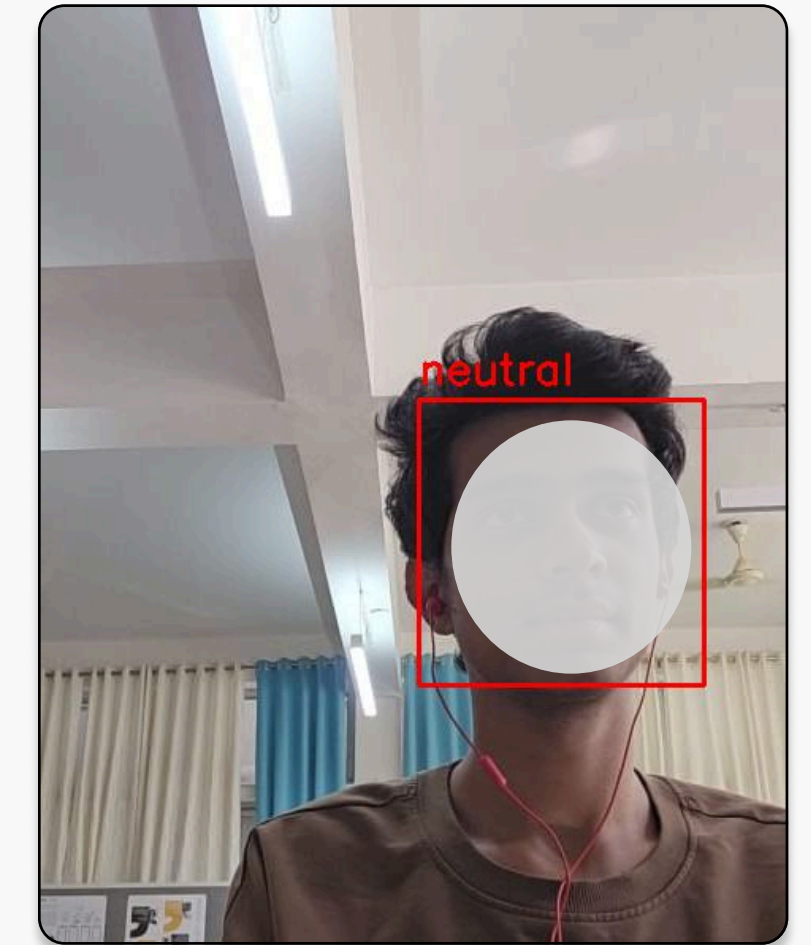
# Emotion Analysis

- A coded emotion analyzer was used to study participants' facial expressions during the experiment.
- It detected emotions like happy, sad, neutral, and angry from recorded video frames.
- The tool generated image-based results showing detected emotions.
- Due to low accuracy, **these results were not included in the final analysis.**
- **Future goal:** Improve the tool using video-based analysis for higher accuracy and better emotion tracking.

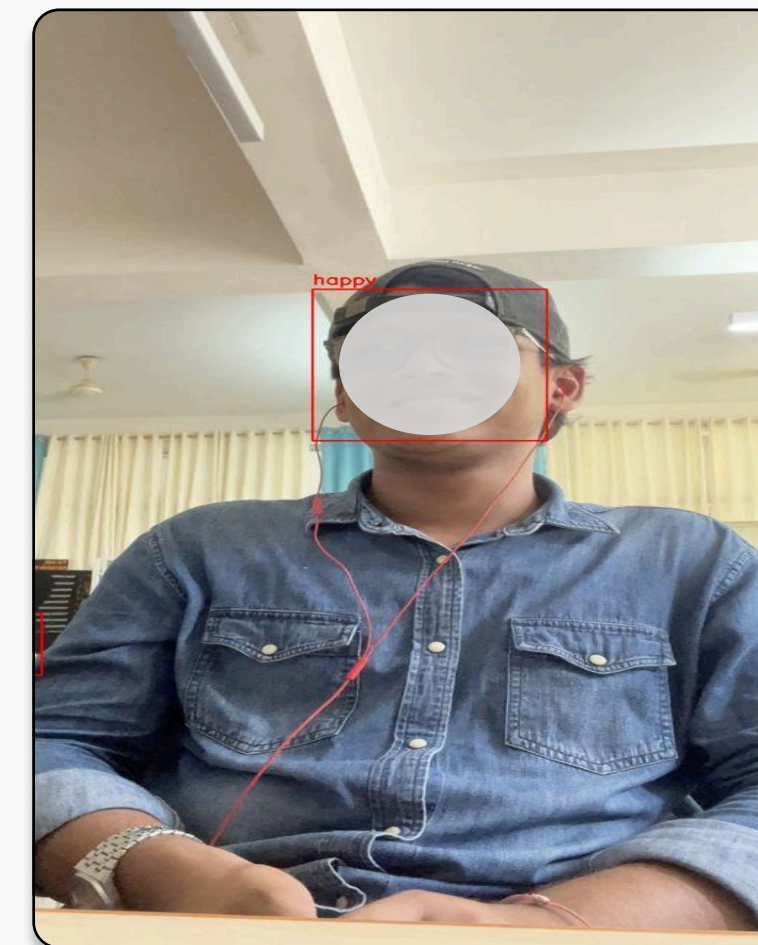
[link of code : Emotion Analysis](#)



**SAD**



**NEUTRAL**



**HAPPY**



**SAD**

# Overall Analysis: Emotion–Eye Tracking Correlation

## Happy Movie

- Gen X felt more excited and emotionally uplifted (higher arousal score) but showed less intense fixation across areas—indicating emotional involvement without visual focus.
- Gen Z, though emotionally less excited, had stronger main character fixation, reflecting visual tracking even if emotional response was lower.
- **Suggests Gen X experiences joy more internally, while Gen Z stays visually focused.**

## Dominance

- Gen Z felt more in control in all genres, correlating with their consistent visual focus on main characters.
- This may suggest that **feeling in control boosts attention and engagement with central narrative elements.**

## Thriller Movie

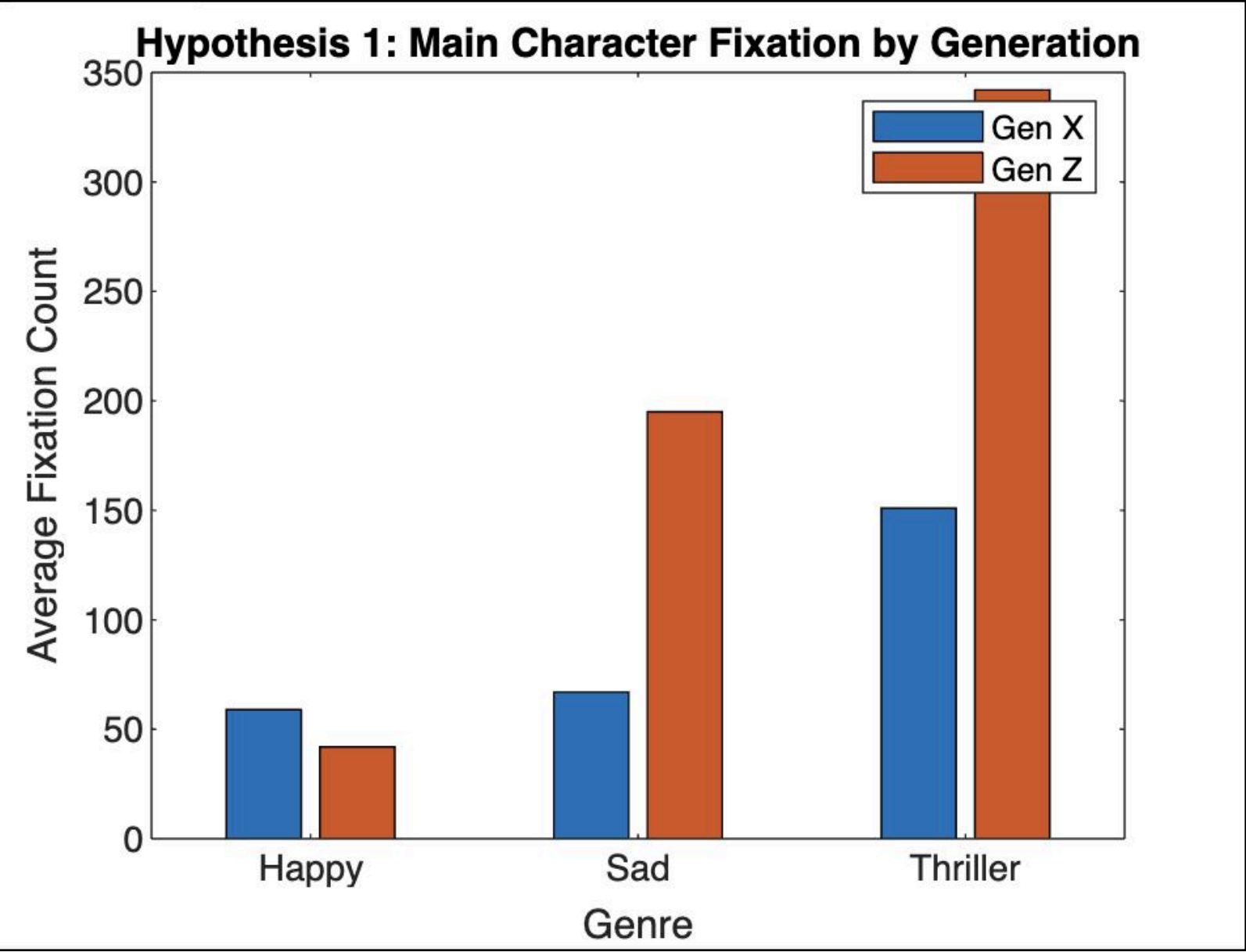
- Gen Z enjoyed thrillers more (higher valence score) and showed strong fixation on main characters, **indicating high engagement with the storyline.**
- Gen X had lower emotional response and less main character fixation, suggesting broader contextual viewing.

## Sad Movie

- Both generations showed similar emotional intensity (valence and arousal), aligning with even attention distribution in eye tracking.
- Indicates shared engagement and emotional processing style, possibly reflecting empathy or reflection.



# Data-Driven Validation of Hypotheses

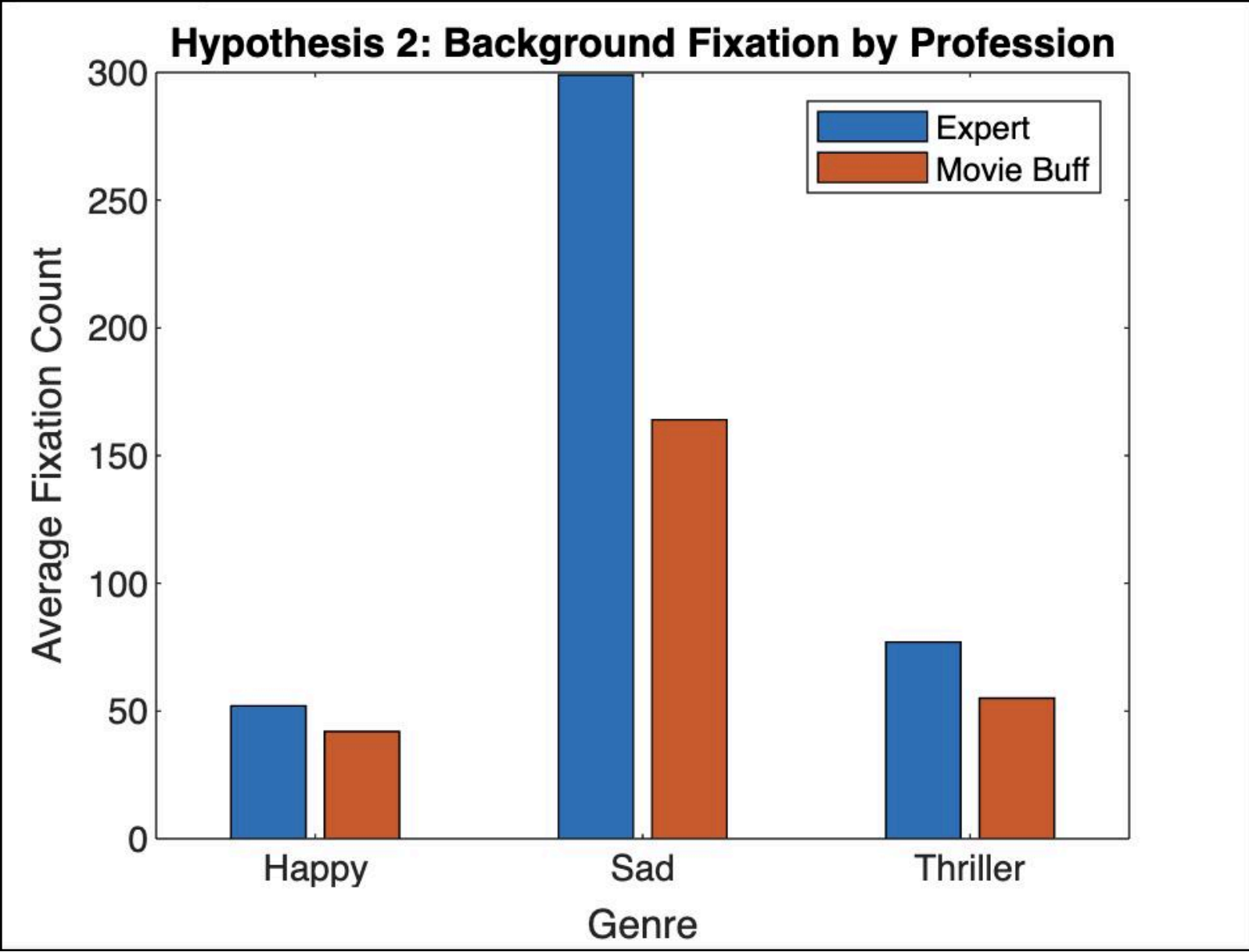


## Insights

- Gen Z had dramatically higher main character fixation in thrillers (342–346 vs Gen X: 151–194).
- Gen Z’s focus was sharper and more concentrated.

## Conclusion

Gen Z is more visually locked into primary subjects, especially in intense genres, confirming  $H_1$ .

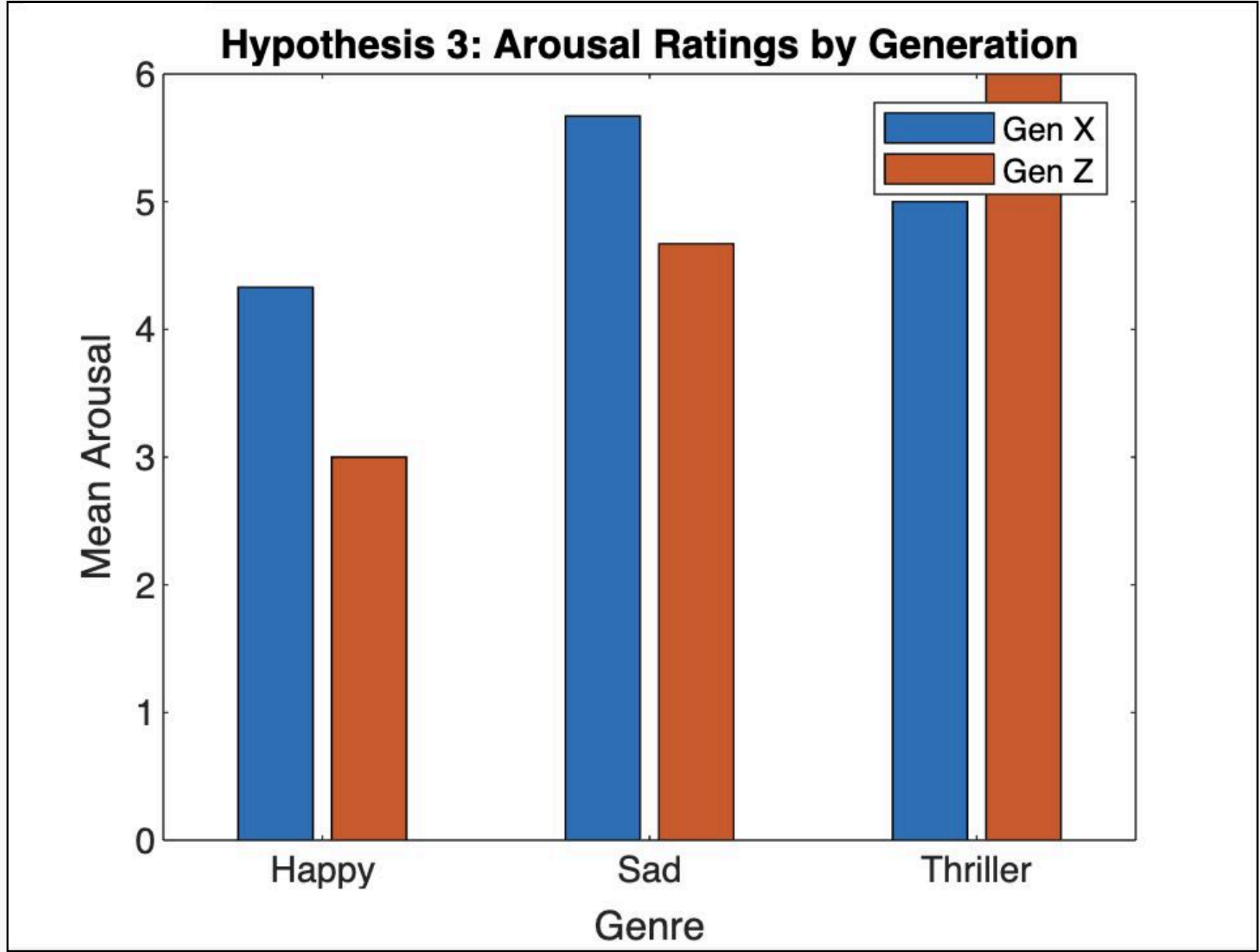


## Insights

- Experts had higher background fixations in sad films (e.g., 299), suggesting attention to mise-en-scène.
- Buffs showed tighter focus on characters (more narrative-driven).

## Conclusion

Experts scan the full scene (cinematic analysis), while buffs stay character-focused—supporting structured gaze theory.

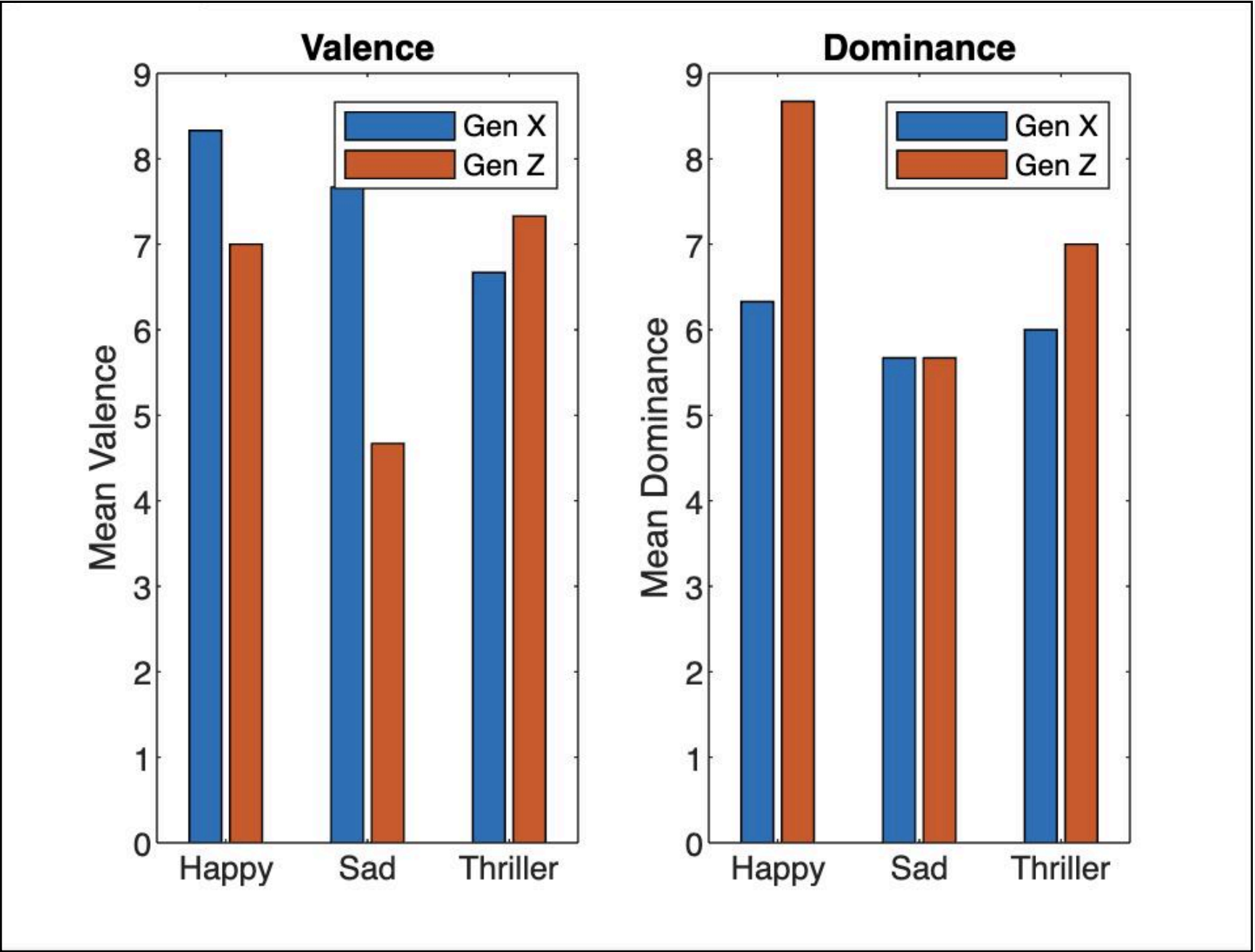


### Insights

- Thriller arousal values peaked for Gen Z Movie Buff (7.0) and Gen X Buff (8.33).
- Happy and Sad genres had generally lower arousal.

### Conclusion

Arousal is consistently highest for thrillers across all groups, proving this hypothesis with SAM data.

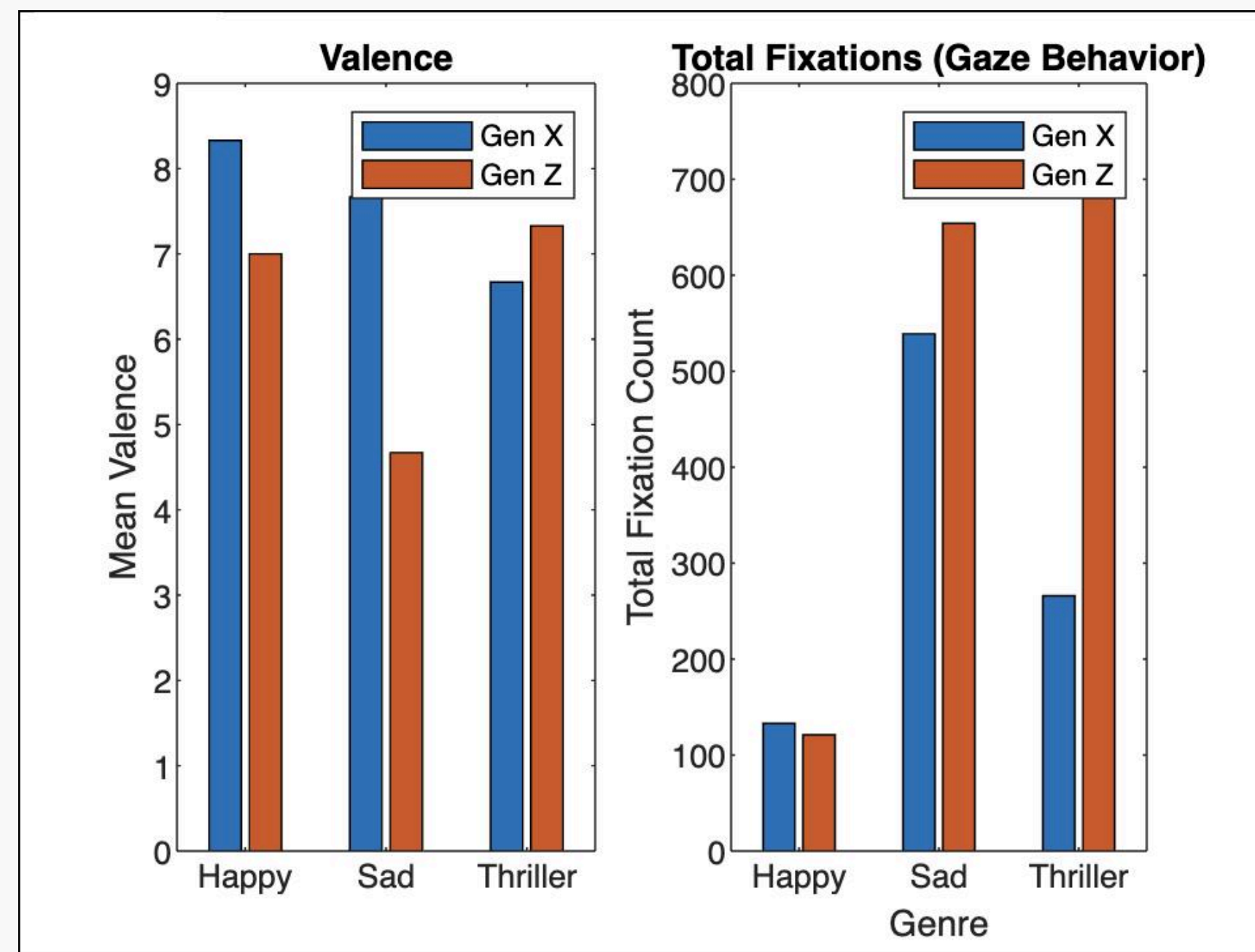


### Insights

- Gen Z showed higher dominance in thrillers (7.0) compared to Gen X (6.0), and higher valence for thrillers (7.33 vs 6.67).
- Gen X had more consistent scores across genres, while Gen Z showed greater emotional fluctuation.

### Conclusion

Generational differences in emotional response across genres are clear, supporting the hypothesis.



## Insights

- Gen Z showed much higher total fixations in thrillers (741–752 vs Gen X: 266–281), indicating faster gaze shifts.
- Gen Z's SAM scores varied more widely across genres, especially in arousal (range: 3.0–7.0).

## Conclusion

**Gen Z demonstrates more dynamic gaze and emotional responses, supporting the hypothesis.**

# Key Takeaways & Conclusion

We learned about:

Generational Differences

Professional Impact

Genre-Specific Engagement

Multi-Modal Insights

This study offers **compelling evidence that emotional and visual engagement with cinematic content is not uniform across user groups**. Understanding how generational cohorts and professional backgrounds interact with visual stimuli provides invaluable insights for designing more inclusive and emotionally resonant media experiences. By leveraging eye-tracking and emotional response data, we can begin to craft user-centric storytelling frameworks that cater to both intuitive, emotionally driven viewers and analytically inclined experts. **This research highlights the importance of designing for diverse cognitive** and affective processing styles an approach that extends far beyond cinema and into interactive media, streaming platforms, and immersive environments, **where user engagement must be both intentional and empathetically informed**.



Thank *you*