Parsons Interior Design Studio 2

Neurodivergence and Accessibility Research

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Agenda

01 Introduction

02 What is Human Subjects Research?

03 PAPER ADHD and Video Accessibility 💻

04 PROJECT The Neurodiverse City 🏙️

05 Takeaways

06 Q & A

Introduction

Lucy Jiang

Currently

PhD Student @ University of Washington

Previously

BS in Computer Science ‘22 @ University of Washington
MS in Computer Science ‘24 @ Cornell University

Current Work

- 🎨 Investigating how to make urban art (e.g., murals, mosaics, sculptures) accessible to blind and low vision people

Prior Work

- 🎬 Exploring video accessibility with and for neurodivergent / ADHD audiences
- 🌆 Understanding how technology can improve neurodivergent accessibility in urban environments

What is Human Subjects Research?

Human Subjects Research

Research which obtains data about human participants, either through intervention or interaction [Code of Federal Regulations]

- ➔ **Intervention** : includes both physical procedures by which information or biospecimens are gathered and manipulations of the subject / the subject's environment performed for research purposes
- ➔ **Interaction** : includes communication or interpersonal contact between investigator and subject

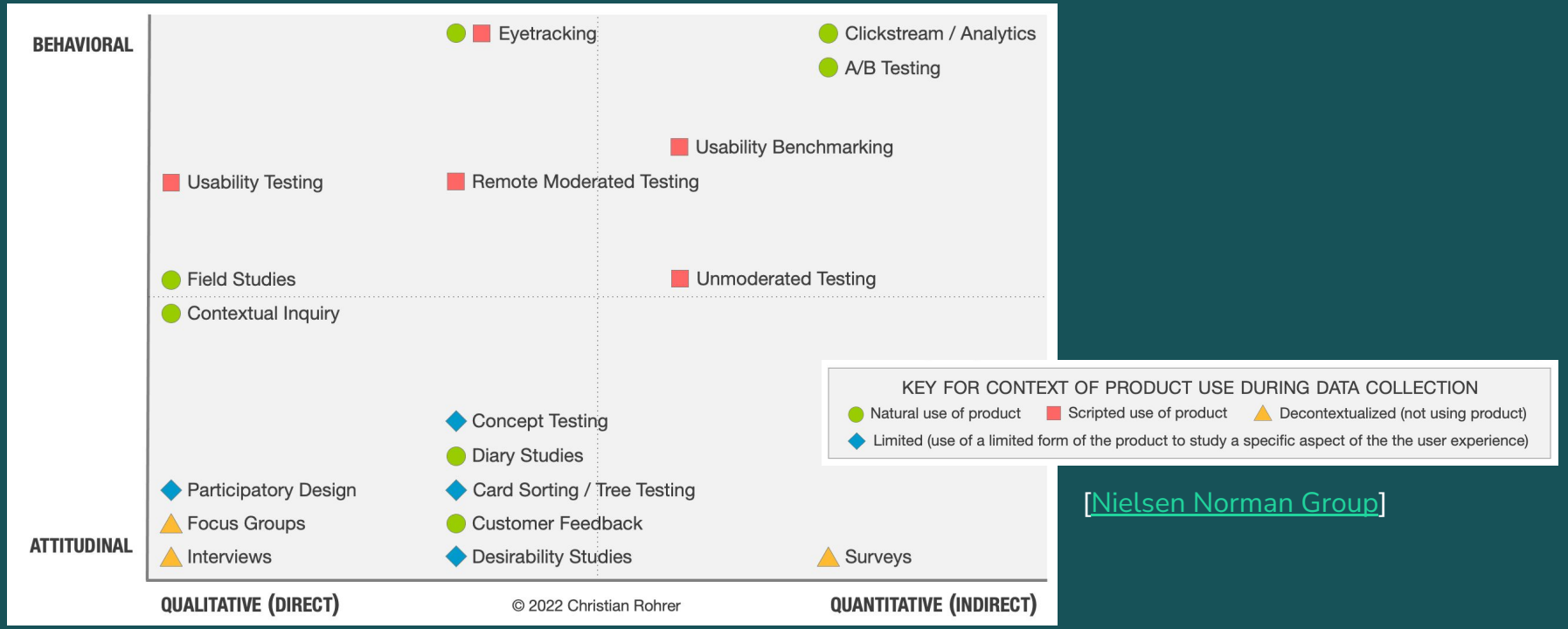
Human-Computer Interaction

A multidisciplinary field of study focusing on the design of computer technology; in particular, the interaction between humans (the users) and computers [IxDF]

Some User Research Methods

- **Interviews** (structured or semi-structured)
  - Helpful for understanding and following up on individual experiences
  - Avoid leading questions (e.g., “do you like this?” → “what do you think about this?”)
- **Surveys**
  - Helpful for gathering quantitative data
  - Typically allows for collecting more responses than other methods, thus reaching a wider audience
- **Focus groups**
  - Helpful for triangulating multiple perspectives
  - Can also be used for co-designing with participants
- **Contextual inquiry**
  - Helpful for understanding actions in context
  - Consists of observations and interviews

Landscape of User Research Methods



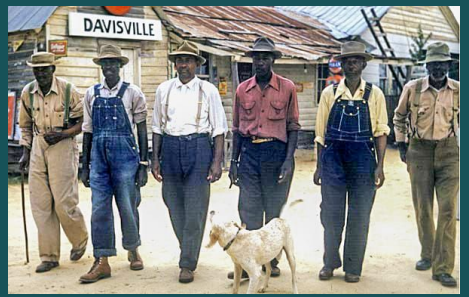
[Nielsen Norman Group]

Ethics and Institutional Review

- **Milgram Experiment (1960s)**: a study on how willing participants were to obey an authority figure
  - Lacked clarity on if participants were fully informed about the study before giving consent
  - Allowed participants to experience significant distress without researcher intervention

[Britannica]

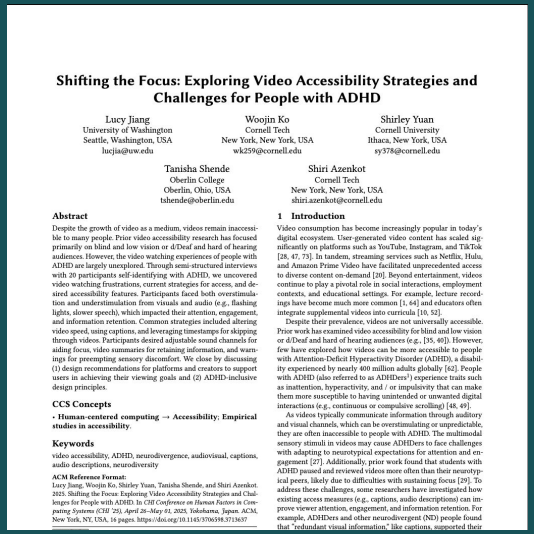
- **Tuskegee Syphilis Study (1932-1972)**: a study to observe the effects of untreated syphilis
  - Withheld existing and proven treatment, over 100 deaths
  - Had misleading study materials
  - Lacked informed consent
  - Took advantage of impoverished African American communities



[Encyclopedia of Alabama]

PAPER

ADHD and Video Accessibility



Shifting the Focus: Exploring Video Accessibility Strategies and Challenges for People with ADHD

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Abstract

Despite the growth of video as a medium, videos remain inaccessible to many people. Prior video accessibility research has focused primarily on blind and low vision or d/Deaf and hard of hearing audiences. However, the video watching experiences of people with ADHD are largely unexplored. Through semi-structured interviews with 20 participants self-identifying with ADHD, we uncovered video watching frustrations, current strategies for access, and desired accessibility features. Participants faced both overstimulation and understimulation from visuals and audio (e.g., flashing lights, slower speech), which impacted their attention, engagement, and information retention. Common strategies included altering video speed, using captions, and leveraging timestamps for skipping through videos. Participants desired adjustable sound channels for aiding focus, video summaries for retaining information, and warnings for preempting sensory discomfort. We close by discussing (1) design recommendations for platforms and creators to support users in achieving their viewing goals and (2) ADHD-inclusive design principles.

CCS Concepts

• **Human-centered computing** → **Accessibility**; **Empirical studies in accessibility**.

Keywords

video accessibility, ADHD, neurodivergence, audiovisual, captions, audio descriptions, neurodiversity

ACM Reference Format:

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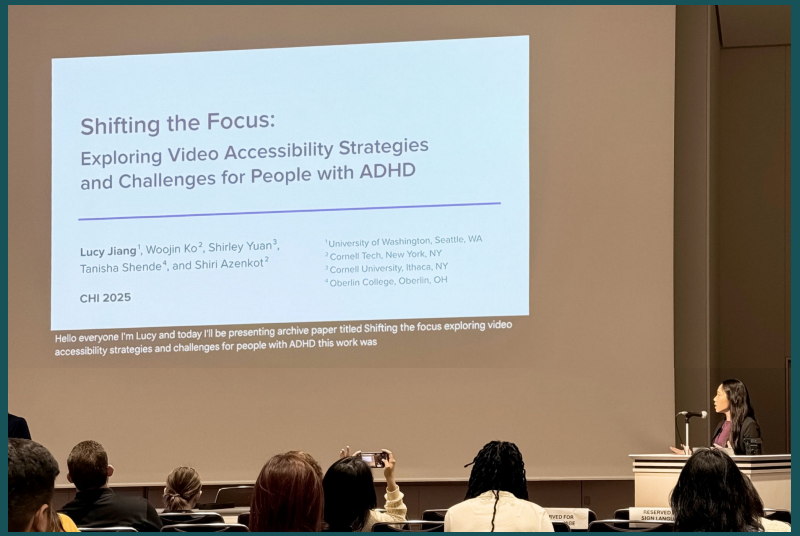
1 Introduction

Video consumption has become increasingly popular in today's digital ecosystem. User-generated video content has scaled significantly on platforms such as YouTube, Instagram, and TikTok [28, 47, 73]. In tandem, streaming services such as Netflix, Hulu, and Amazon Prime Video have facilitated unprecedented access to diverse content on-demand [20]. Beyond entertainment, videos continue to play a pivotal role in social interactions, employment contexts, and educational settings. For example, lecture recordings have become much more common [1, 64] and educators often integrate supplemental videos into curricula [10, 52].

Despite their prevalence, videos are not universally accessible. Prior work has examined video accessibility for blind and low vision or d/Deaf and hard of hearing audiences (e.g., [35, 40]). However, few have explored how videos can be more accessible to people with Attention-Deficit Hyperactivity Disorder (ADHD), a disability experienced by nearly 400 million adults globally [62]. People with ADHD (also referred to as ADHDers[1]) experience traits such as inattention, hyperactivity, and / or impulsivity that can make them more susceptible to having unintended or unwanted digital interactions (e.g., continuous or compulsive scrolling) [48, 49].

As videos typically communicate information through auditory and visual channels, which can be overstimulating or unpredictable, they are often inaccessible to people with ADHD. The multimodal sensory stimuli in videos may cause ADHDers to face challenges with adapting to neurotypical expectations for attention and engagement [27]. Additionally, prior work found that students with ADHD paused and reviewed videos more often than their neurotypical peers, likely due to difficulties with sustaining focus [29]. To address these challenges, some researchers have investigated how existing access measures (e.g., captions, audio descriptions) can improve viewer attention, engagement, and information retention. For example, ADHDers and other neurodivergent (ND) people found that "redundant visual information," like captions, supported their



PAPER

Background

Attention-Deficit Hyperactivity Disorder (ADHD)

~ 366 million adults

Characterized by:

- Inattention
- Hyperactivity
- Impulsivity

PAPER

Research Question

What **challenges** do people with ADHD experience when watching videos, and what **patterns and practices** do they develop as a result?

PAPER

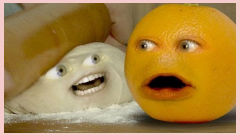
Methodology

- Interviewed **20 participants** self-identifying as having ADHD
  - Did not exclude people with additional disability identities (e.g., Autistic, anxiety)
- Participants were **compensated $25** for their time
- **Three-part interview**
  - **Investigating participants' prior experiences** to understand how ADHDers currently watch videos
  - **Watching videos chosen by the researchers** to explore reactions to current access measures: closed captioning and audio description
  - **Watching videos chosen by the participants** to identify how participants navigated video platforms and uncover subconscious practices

Liked Videos



Frustrating Videos




PAPER

Findings: Frustrations and Strategies

Auditory Content

Captions

Visual Content

Speed and Pacing

PAPER

Findings: Common Conceptions

Posted on r/ADHDmemes

PROJECT

The Neurodiverse City

DESIGN TRUST FOR PUBLIC SPACE

PhD Fellowship Summer 2024

PROJECT

Overall Aim

How can technology help make public spaces more **neuroinclusive** and **accessible**?

PROJECT

Methodology & Initial Findings

- ➔ Interviewed design partners, **Verona Carpenter Architects (VCA)** and **WIP Collective**
  - ◆ Aimed to understand the findings from their existing user research efforts (e.g., in-person audits with neurodivergent community members)
- ➔ Interviewed neurodivergent self-advocate, **Jezz Chung** (they / them)
  - ◆ Aimed to understand their firsthand experiences and preferences with regard to public space
  - ◆ Explored sensory experiences and the role of technology in supporting access or engagement
  - ◆ Key point: making public spaces more accessible **goes beyond making the place itself more accessible** – we must consider how to support and encourage ND people to go to public spaces since staying indoors may feel more predictable and safe

VERONA CARPENTER ARCHITECTS

PROJECT

Designing the Evaluation Tool

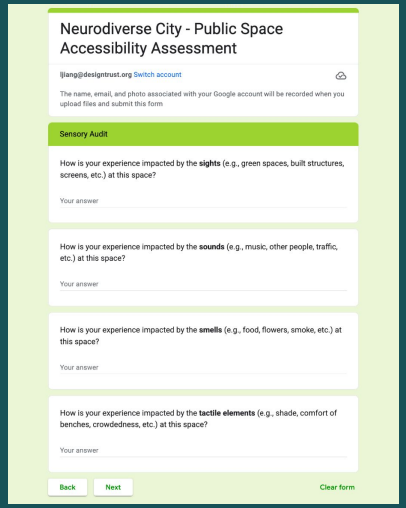
How can we support ND people in understanding what a place is like before they actually go there?

➔ Designed **four binary design dimensions** for the evaluation tool

- **Synchronous and asynchronous** feedback collection: both organizations wished to support data collection in the moment and on-site as well as when someone was not at a public space
- **Multimodal** feedback methods were better than just text-based: both organizations preferred multimodal feedback, including photos, videos, audio recordings, etc. as it could support ND people in communicating in their preferred method
- **Unguided exploration** was preferred over guided evaluations: both organizations felt this was important to avoid researcher bias
- **Group vs. individual** differences: the organizations had different preferences (e.g., VCA worked more with children on playgrounds, which made individual assessments easier)

PROJECT

Piloting the Evaluation Tool



Neurodiverse City - Public Space Accessibility Assessment

ljiang@designtrust.org Switch account

The name, email, and photo associated with your Google account will be recorded when you upload files and submit this form

Sensory Audit

How is your experience impacted by the **sights** (e.g., green spaces, built structures, screens, etc.) at this space?

Your answer

How is your experience impacted by the **sounds** (e.g., music, other people, traffic, etc.) at this space?

Your answer

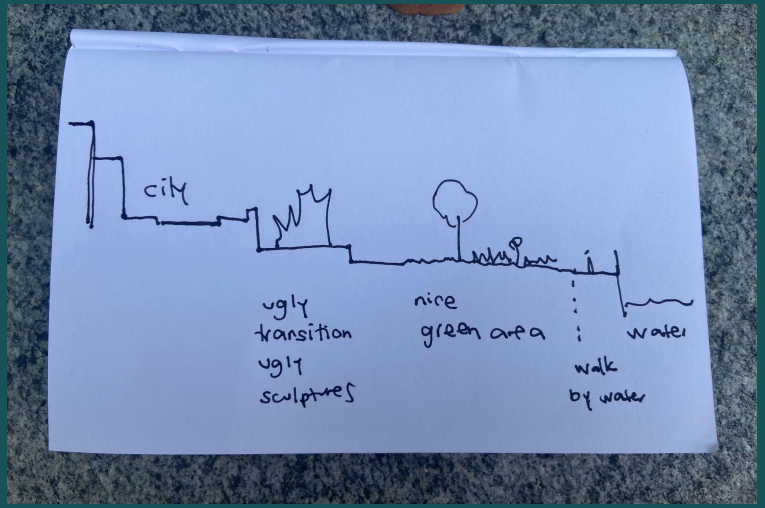
How is your experience impacted by the **smells** (e.g., food, flowers, smoke, etc.) at this space?

Your answer

How is your experience impacted by the **tactile elements** (e.g., shade, comfort of benches, crowdedness, etc.) at this space?

Your answer

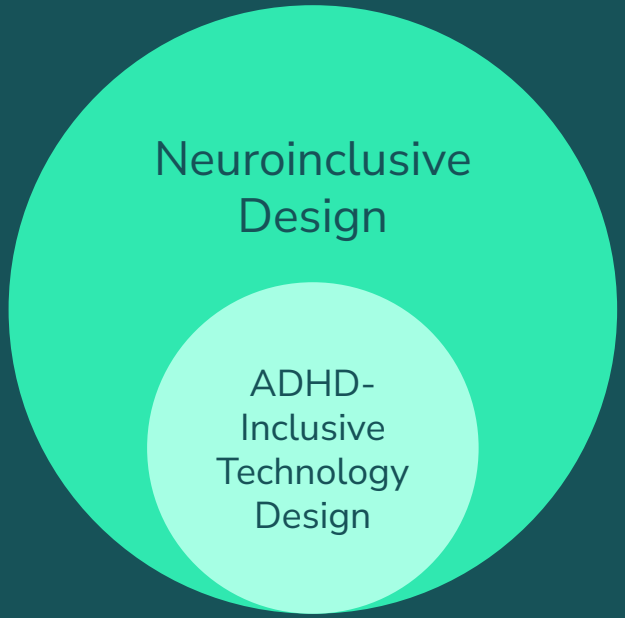
Back Next Clear form



Takeaways

ADHD-Inclusive Design Principles

1. Designs should adapt to ADHDers' levels of focus
2. Designs should utilize multisensory elements to support engagement
3. Designers should involve people with ADHD throughout the design process



Thank you!

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Don’t hesitate to reach out if you have any additional questions or if you would like to connect! 🤗

ADHD & Video Accessibility Research Paper

https://tinyurl.com/ADHDVideoA11yPaper

The Neurodiverse City Written Report

https://tinyurl.com/NDCWrittenReport