Describing Epilepsy-Related Anxiety to inform the Design of Virtual Reality Exposure Therapy Scenarios

Results from Phase 1 & 2 of the AnxEpiVR Clinical Trial

AUTHORS

D. Tchao[2], S. Lewis-Fung[2], H. Gray[1], S. Pardini[3], E. Nguyen[2], L. Harris[1], L. Appel[1,2]

[1] York University
[2] OpenLab, University Health Network
[3] University of Padova, Italy

INTRODUCTION

- Anxiety is the most common psychiatric co-morbidity in people with epilepsy.
- Over 28% of PwE struggle from at least one anxiety disorder, yet epilepsy/seizure-specific (ES) interictal anxiety has received little research attention and often goes untreated.
- Exposure therapy (ET) is helpful in decreasing anxiety in PwE and virtual reality (VR) is a helpful tool for delivering ET.
- Despite this evidence, VR-ET has not yet been investigated in PwE.

OBJECTIVES

- Identify scenarios (*situations, locations, or environments*) that are most strongly associated with ES-interictal anxiety.
- Describe factors within these scenarios that contribute to increasing ES-interictal anxiety.
- Design graded exposure hierarchies that would suit a variety of individuals, considering feasibility of design, safety, and opportunities for tailoring the intervention.

STUDY DESIGN

Phase 1: Online survey promoted through Epilepsy Toronto. Included open- and closed-ended questions intentionally designed to collect information relevant for creating graded VR-ET exposure hierarchies (*e.g., "What do you see, hear, and feel?"*).
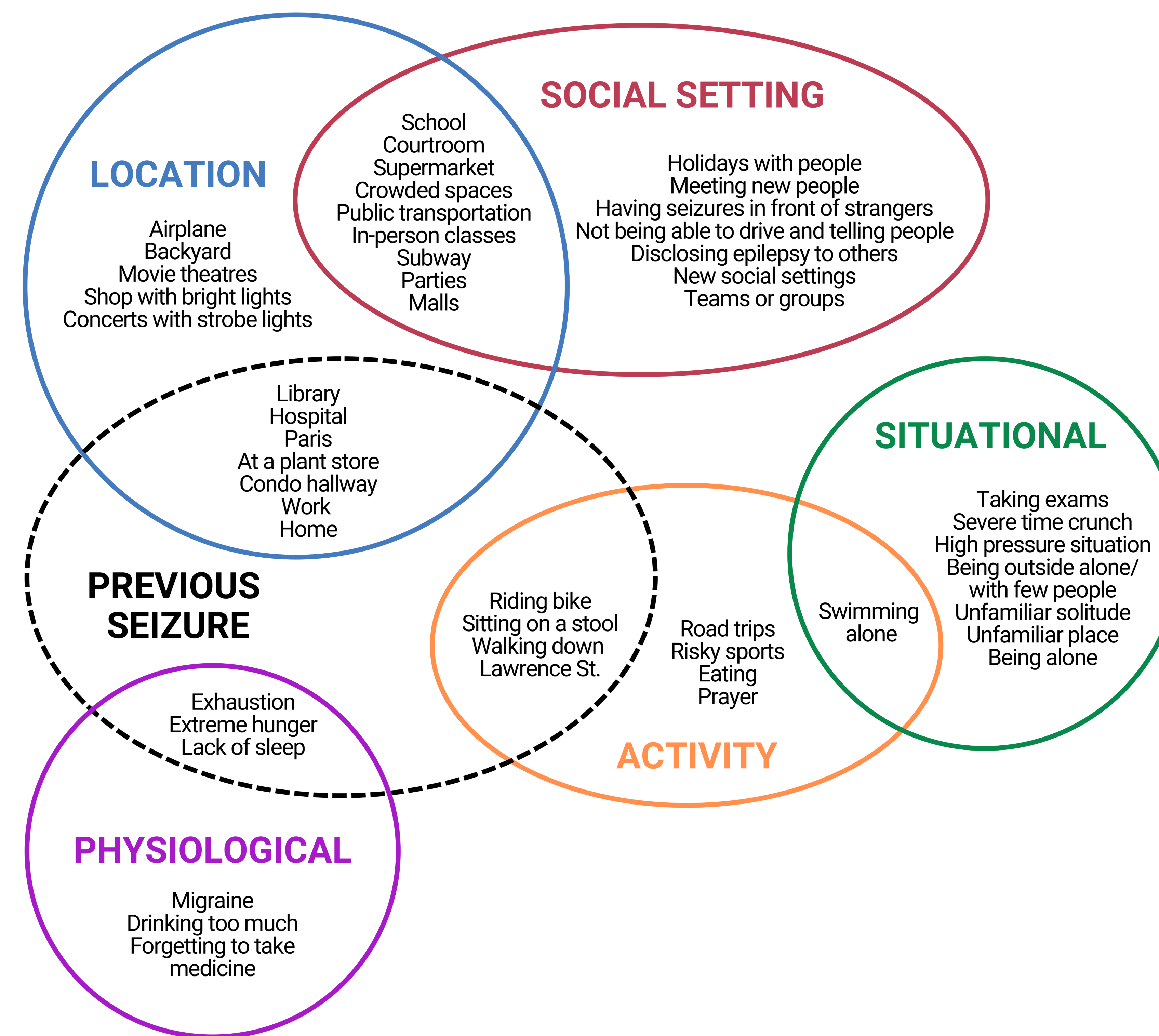
Phase 2: Design phase, involving creating VR scenarios (locations), based on the results of Phase 1. Each scenario comprises scene variations designed to provoke different levels of ES-interictal anxiety. Gathered and iteratively incorporated feedback on an initial prototype from individuals with lived experience (1 PwE, 1 family member, 2 professionals).

Phase 3: Pilot clinical trial: prospective 2-week study evaluating the impact of VR-ET on ES-interictal anxiety in PwE. The intervention will involve daily exposure sessions using a VR head-mounted device.

PHASE 1 RESULTS

- **n=18** responses (n=14 PwE, n=4 people affected by epilepsy) were analyzed using grounded theory and the constant comparison method.
- **Feared Scenarios**:
  - Locations tied to previous seizures were often highly personalized and idiosyncratic (*e.g., condo hallway, specific store*).
  - Public settings and social situations were commonly reported fears, regardless of association with a previous seizure.
- **Factors** consistently found to increase ES-interictal anxiety:
  - Potential for danger
    - Physical injury or inability to get help
  - Social factors
    - Increased # unfamiliar people, social pressures
  - Specific triggers
    - Stress, sensory, confined space, physiological, alcohol, medication-related

Figure 1: Thematic Analysis of Anxiety-Provoking Scenarios

LOCATION
Airplane
Backyard
Movie theatres
Shop with bright lights
Concerts with strobe lights

SOCIAL SETTING
School
Courtroom
Supermarket
Crowded spaces
Public transportation
In-person classes
Subway
Parties
Malls
Holidays with people
Meeting new people
Having seizures in front of strangers
Not being able to drive and telling people
Disclosing epilepsy to others
New social settings
Teams or groups

PREVIOUS SEIZURE
Library
Hospital
Paris
At a plant store
Condo hallway
Work
Home

SITUATIONAL
Taking exams
Severe time crunch
High pressure situation
Being outside alone/ with few people
Unfamiliar solitude
Unfamiliar place
Being alone

ACTIVITY
Riding bike
Sitting on a stool
Walking down
Lawrence St.
Road trips
Risky sports
Eating
Prayer
Swimming alone

PHYSIOLOGICAL
Exhaustion
Extreme hunger
Lack of sleep
Migraine
Drinking too much
Forgetting to take medicine

PHASE 2 RESULTS

Filmed 3 exposure scenario hierarchies in 4k using a 360° camera. Each scenario has 7 x 5-min scenes of varying fear intensity.

Subway Scenario
Dinner Party Scenario
Shopping Centre Scenario

Scenes incorporate varying numbers of people, social interaction, potential for danger, stress, and other factors. Seizures simulated through camera perspective (from floor) and actor reactions.