



Technology and Therapeutic Interventions. VR-based Therapy for Anxiety

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- ▶ The study examines a VR-based therapy protocol for anxiety.
- ▶ **Objective** and **subjective** data were collected to measure the effect of the VR-based intervention.
- ▶ Participant age ranged from 14 to 19 years old.
- ▶ Two groups were tested. **Experimental** (N=32, 18 females, 11 males, and 3 non-binary) and **Control** (N=21, 9 females, 10 males, and 2 non-binary)
- ▶ Consent to participate in this study was obtained from either participants' parents/caregivers (if under 18 years old) or from the participants (if 18+ years old).



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All subjects had an elevated level of anxiety.

The inclusion criteria for the subjects was a reported score on the anxiety self-report scale **above 7** (on 10-point Likert scale).

Examples of the symptoms included:

- ▶ *Excessive worrying about current or future events*
- ▶ *Fearfulness of events and/or aspects of their environment (social situations, animals, dark, or others)*
- ▶ *Physical symptoms (headaches, nausea, muscle tension, sweating, and difficulty falling asleep)*
- ▶ *Avoidant behaviors (avoidance of school, social gatherings, or other activities)*



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Phase-1

“PRE”- data collection

- Attention Tasks
- Hand-Eye Coordination
- Stress Index
- Psychological States Scales

Phase-2



1. Control (no VR) Group

10-12 min
small talk

OR



2. Experimental (VR) Group

10-12 min
VR-session

Phase-3

“POST”- data collection

- Attention Tasks
- Hand-Eye Coordination
- Stress Index
- Psychological States Scales

Fig.-1 Experimental design

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- To collect **objective data**, each subject performed four cognitive tasks measuring attention, one motor task measuring hand/eye coordination, and a heart-rate (HR)-based test to measure Stress Index.
- All tasks were performed on an iPad. The following apps were used for the cognitive tasks: ***IQ-1, IQ-2, IQ-3, and Schulte Table***. These tasks were aimed to measure selective and sustained attention and visual scanning speed.
- The ***motor task was performed*** using the app “Hand-Eye Test” to measure the participants’ ability to coordinate the information received visually with hand movements.
- To measure the ***“Stress Index”*** the StressScan App was utilized. This app measures heart rate by tracking color changes on the fingertip when placed over the iPad camera. The app then analyzes the variance between each heartbeat to calculate the person’s current stress level. The “Stress Index” ranges from 1 to 100. Lower values represent more relaxed states, and higher values are associated with a higher level of stress.
- For **subjective data**, participants rated the following states on 10-point Likert scale at the time of measurement: ***“upset,” “restless,” “happy,” “depressed,” “relaxed,” “bored,” “calm,” “worried,” “tense,” “focused,” “distracted,” “tired,” “angry,” and “annoyed”***

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- Objective data and subjective evaluations were collected twice, including “PRE” (before VR session or small talk session) and “POST” (after VR session or small talk session) conditions in each group.
- In the **Experimental Group**, “PRE” measurements were taken at the beginning of the session, followed by a 10 to 12-minute VR-based intervention. After the VR-based intervention, measurements were repeated (“POST”; Fig.1)
- In the **Control group**, participants were offered a 10 to 12-minute conversation on general topics with the experimenter instead of a VR-based intervention (Fig.1)

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Results

Data from the four tasks that were assessing attention were combined.

The differences in each measurement (including the combined variable) between “PRE” and “POST” were calculated for each participant. Two-sample (Experimental vs Control groups) t-tests were run for each of the computed differences.

The calculated differences included:

- **3 objective measurements** (“combined attention index”, “hand/eye coordination index,” and “stress index”), and
- **14 subjective evaluations** (“upset,” “restless,” “happy,” “depressed,” “relaxed,” “bored,” “calm,” “worried,” “tense,” “focused,” “distracted,” “tired,” “angry,” and “annoyed”).

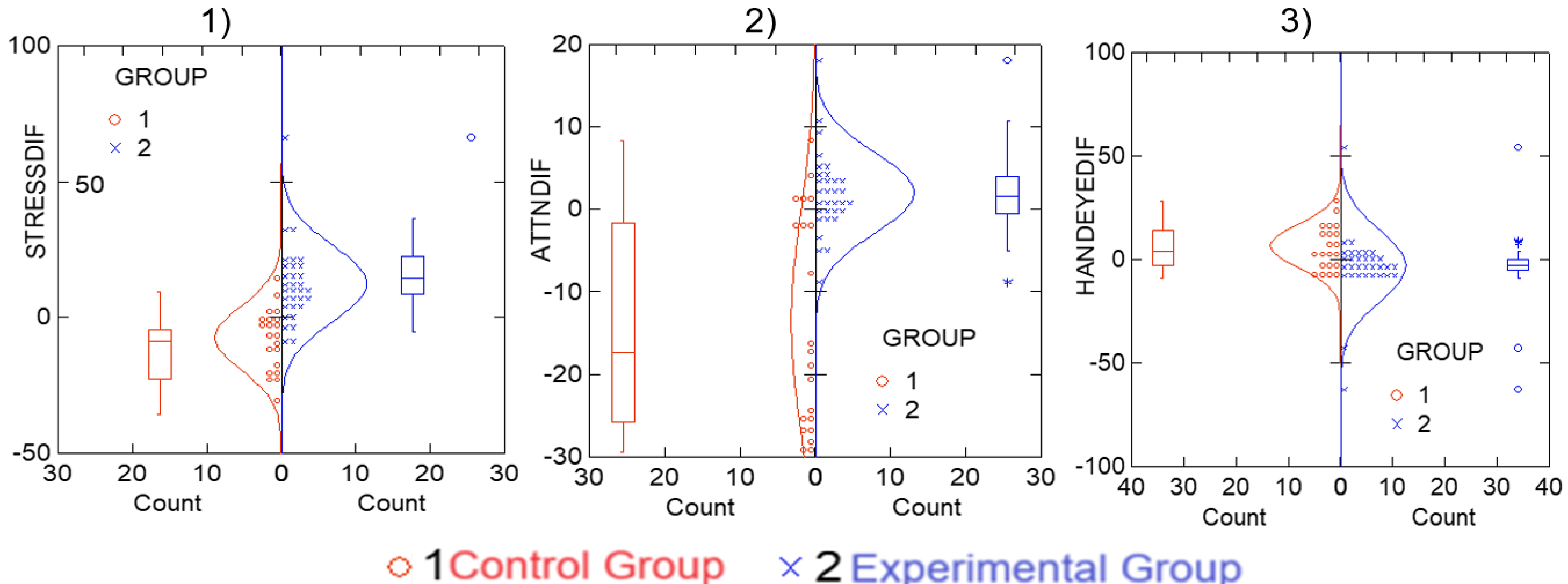
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Results

The results revealed significant differences between the Experimental and Control groups in the objective measurements.

- 1) **Stress Index** $t(51)=-5.448, p<0.01$
- 2) **Combined Attention Index** $t(51)=-6.134, p<0.01$
- 3) **Hand/Eye Coordination Index** $t(51)=2.328, p<0.05$



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Results

For subjective evaluations, significant differences were found for:

4) **“Relaxed”** $t(51)=2.933, p<0.01$

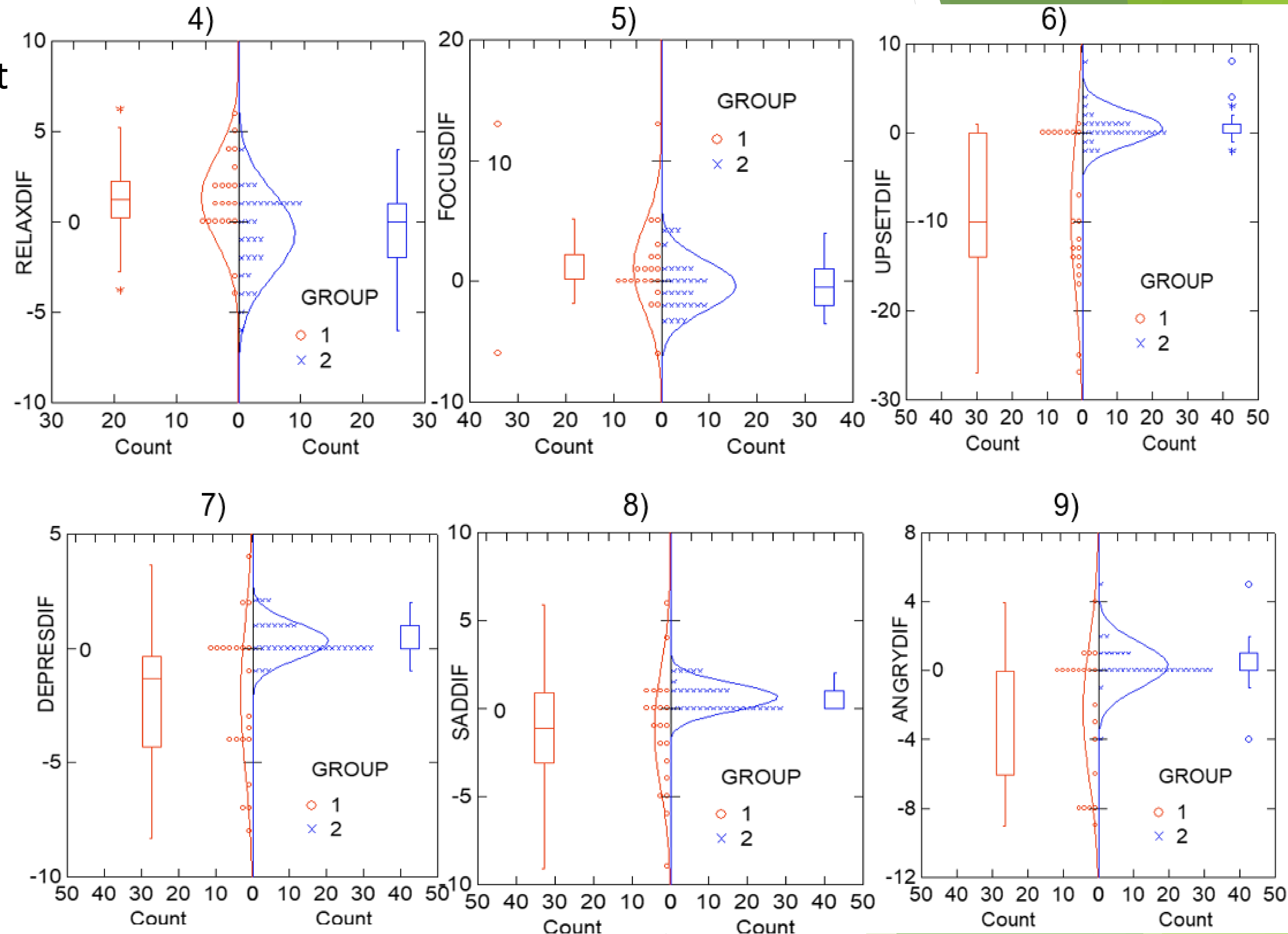
5) **“Focused”** $t(51)= 1.873, p<0.05$

6) **“Upset”** $t(51)= -6.189, p<0.01$

7) **“Depressed”** $t(51)= -3.938, p<0.01$

8) **“Sad”** $t(51)= -2.961, p<0.01$

9) **“Angry”** $t(51)= -3.548, p<0.01$



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Thank you!

Questions?

