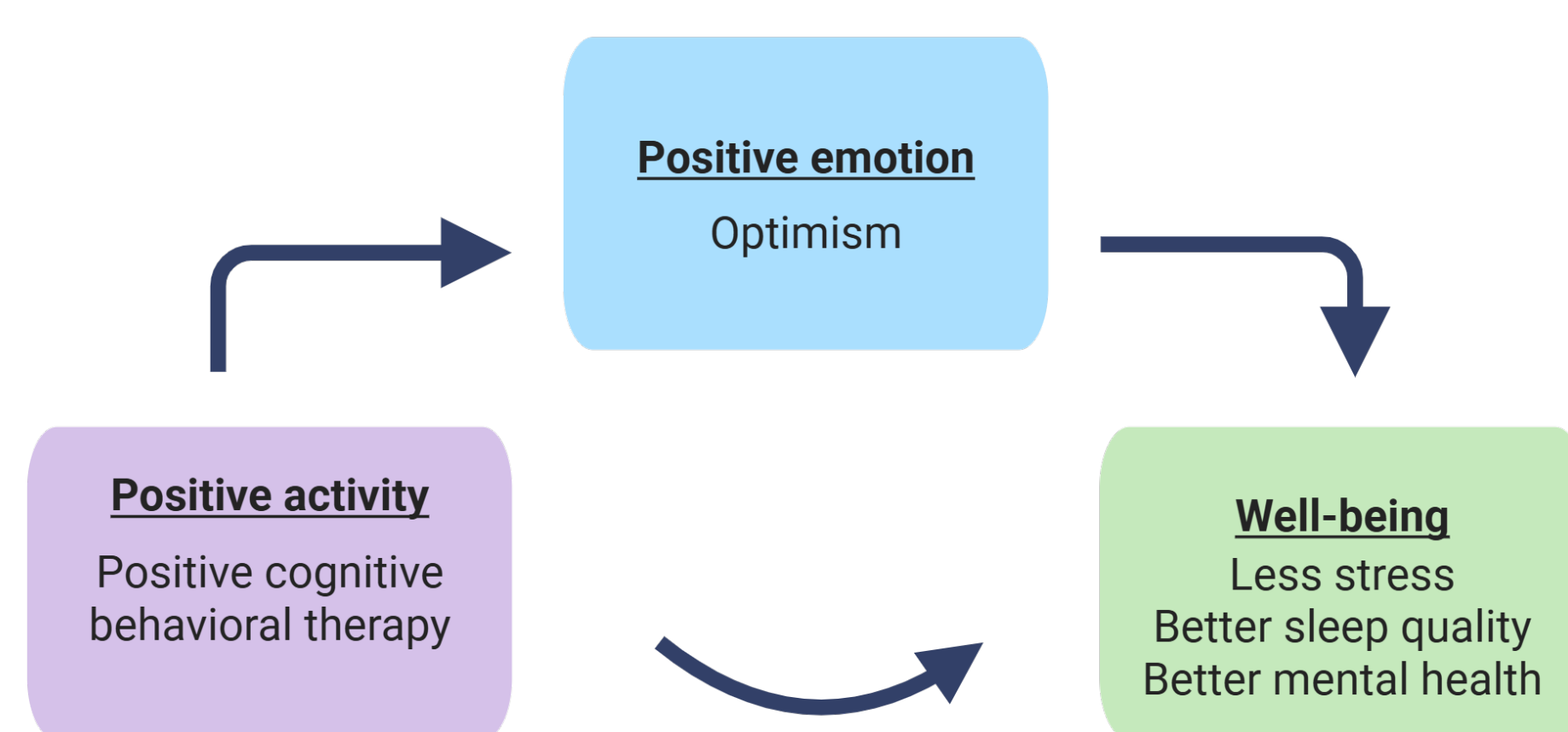


## BACKGROUND & GOAL

- ❖ The mental well-being and academic performance of college students are often negatively impacted by stress, anxiety, and depression.
- ❖ A virtual reality (VR) intervention based on Positive Cognitive Behavioral Therapy (PCBT) presents a promising approach, yet its effectiveness in fostering optimism and improving mental health remains underexplored.
- ❖ **Goal:** To evaluate the effectiveness of a PCBT-based VR intervention in enhancing optimism and reducing stress, anxiety, and depression among college students compared to a task-oriented VR control.

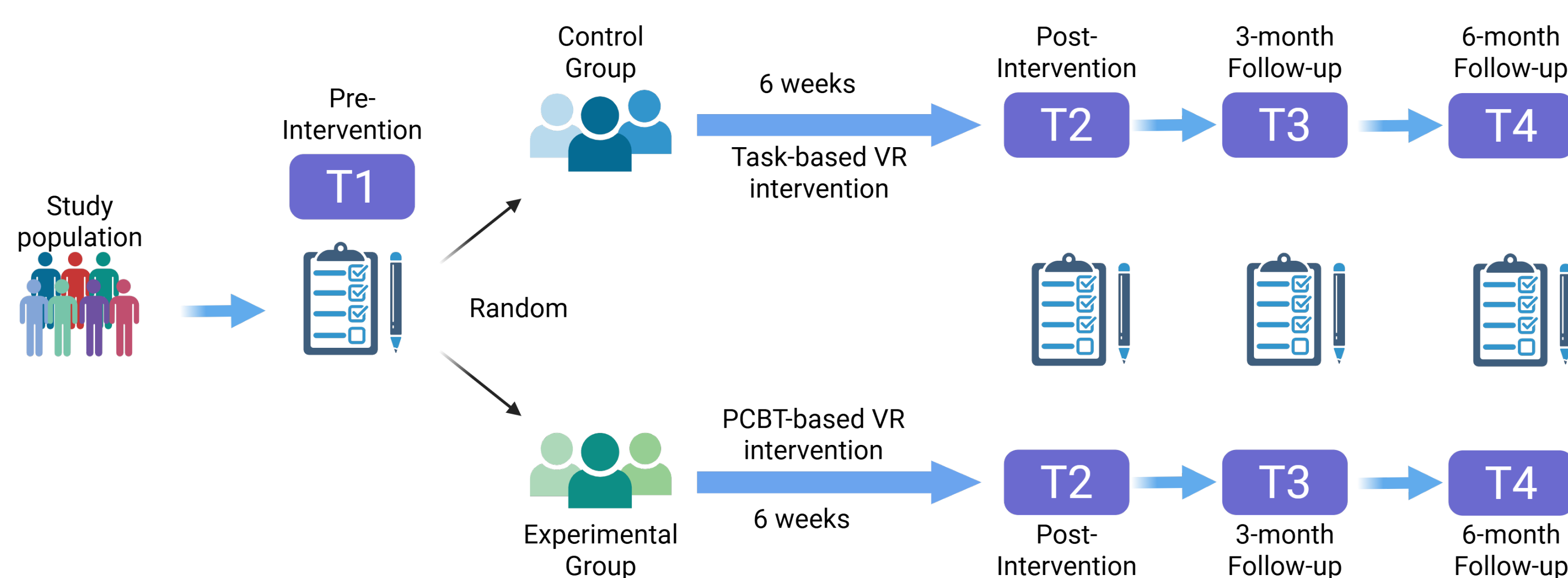
## Conceptual Framework



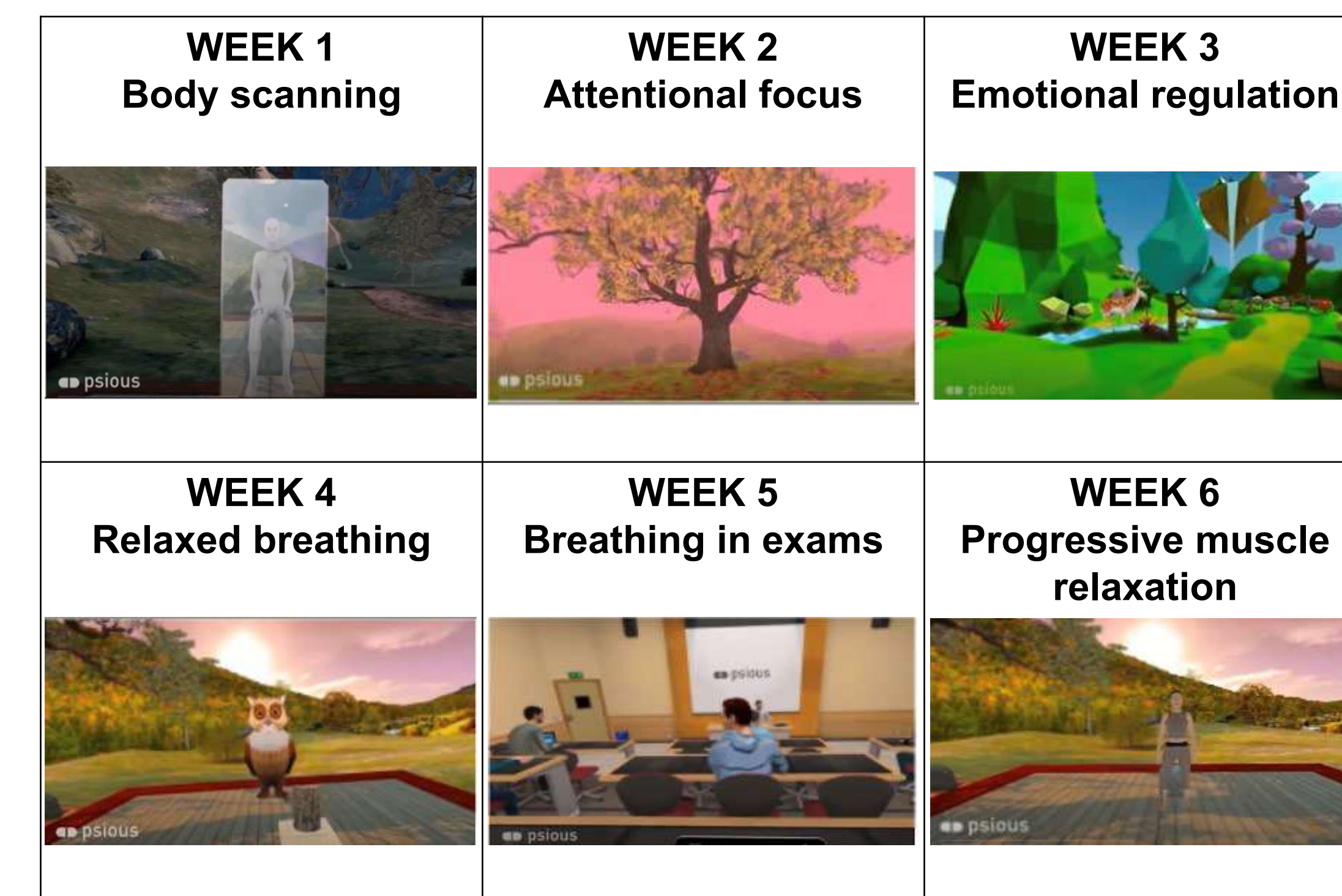
## METHODS

- ❖ Study design: a two-arm RCT.
- ❖ Six weekly 30-minute PCBT-based VR sessions focused on positivity and mindfulness, or the control group, which engaged with a task-oriented VR game.
- ❖ Using validated measures, optimism (LOT-R), stress (PSS), anxiety (GAD-7), and depression (PHQ-9) were assessed pre- and post-intervention.
- ❖ Statistical analyses included descriptive statistics and a mixed-effects model to evaluate within-group changes over time.

## A Two-Arm Randomized Controlled Trial (RCT) Study Design

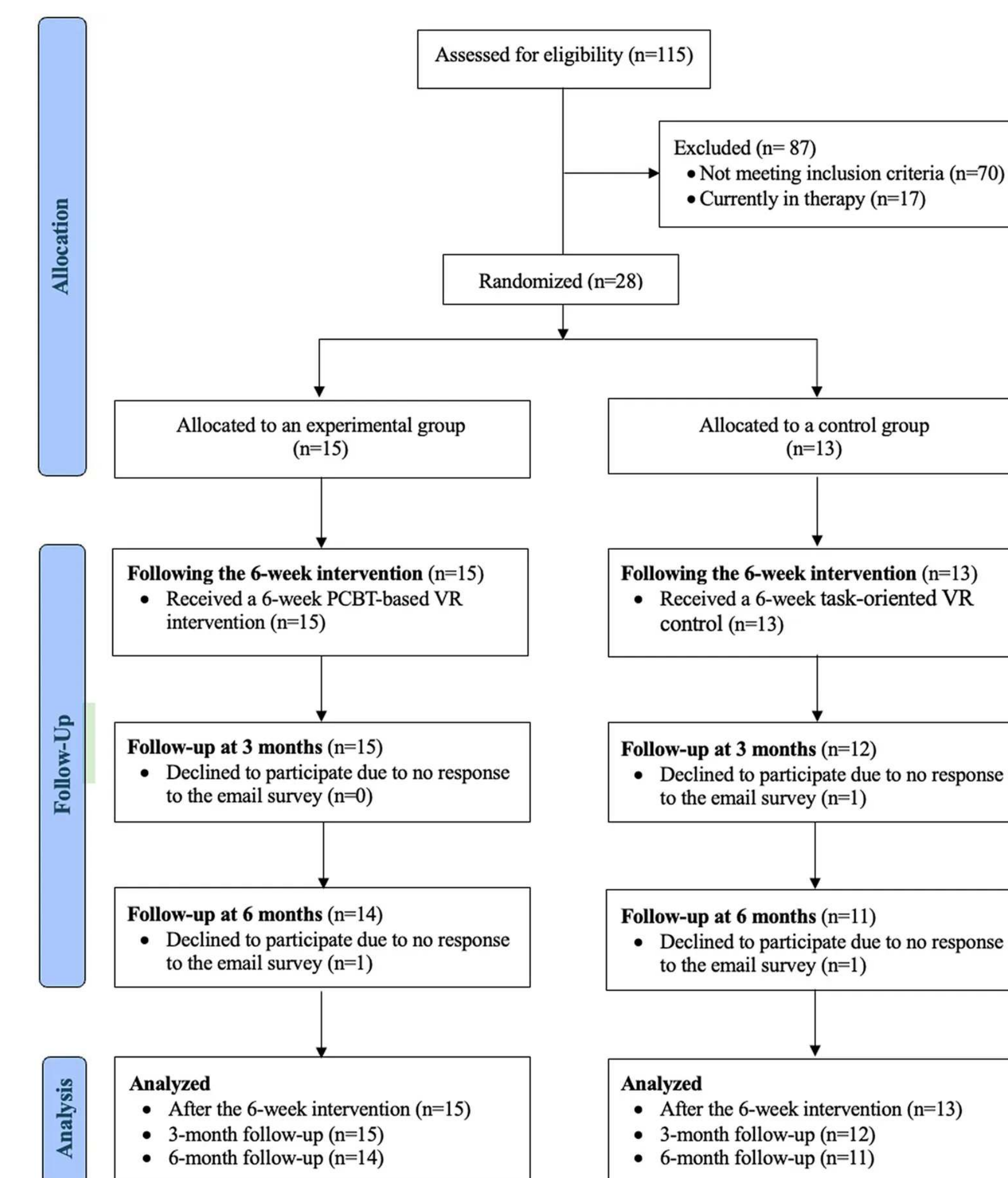


## The PCBT-Based VR Intervention



## RESULTS

- ❖ A total of 28 participants were randomly assigned to an experimental group (n = 15) or a control group (n = 13), with no baseline differences in optimism (p = 0.89).
- ❖ **Short-term effects:**
  - PCBT-based VR led to significant short-term increases in optimism ( $\beta = 2.02$ ,  $p = 0.01$ ) and reductions in depressive symptoms ( $\beta = -3.04$ ,  $p = 0.01$ ).
  - Anxiety showed a non-significant decreasing trend ( $\beta = -1.55$ ,  $p = 0.07$ ), while stress remained unchanged ( $\beta = -0.75$ ,  $p = 0.56$ ).
- ❖ **Long-term effects:**
  - Optimism did not significantly differ between groups.
  - Optimism scores increased over time for participants in both groups ( $\beta = 0.38$ ,  $p = 0.02$ ). The long-term trajectories did not significantly differ between the intervention and control groups.



## Long-term Effects Between Groups

Outcomes	Beta ( $\beta$ )	Standard Error	P value
LOT-R	-0.32	0.20	0.12
PSS	0.53	0.34	0.12
GAD-7	0.33	0.21	0.13
PHQ-9	0.51	0.30	0.09

This work has been previously published: Lai et al., 2026, *Frontiers in Psychology*

## CONCLUSIONS

- ❖ The PCBT-based VR intervention produced significant short-term improvements in optimism and depressive symptoms, but no significant long-term between-group effects.

## IMPLICATIONS FOR PRACTICE

- ❖ The results highlight VR's potential as a scalable mental health intervention, warranting further longitudinal research to assess sustained benefits.