



Background

- **Chronic and daily stress** among college students is linked to **maladaptive health** behaviors; lower stress is associated with better health habits.¹
- **Positive Affect Journaling (PAJ)** is a feasible, cheap, and flexible stress relief technique compared to alternatives like exercise, meditation, and therapy.
- Studies demonstrate journaling benefits, including a 5% reduction in mental health measures² and **positive changes in cognition and emotion**.³
- PAJ **improves mental health** metrics i.e lower anxiety and mental distress scores.⁴
- **Salivary cortisol** and **perceived stress scores** were measured to assess the impact of journaling on stress management and mental health practices in undergraduate students.



Figure 1. Study Demographics

Hypotheses

1. Based on existing literature findings, we hypothesize **cortisol levels will decrease** when participants **engage in independent journaling** about the **positive aspects of their day**.
2. We predict that overall **demeanor and social relationships will improve** after journaling.

Conclusions & Implications

Impact

- Saw no statistical significance but saw need for more research with different experimental parameters
- Examined a **low-cost & effective** stress relief method
- PAJ allows for **reflection** on common stressors
- Explore how behavioral endocrinology and behavior bidirectionally affect each other

Limitations

- **Shorter intervention** relative to similar studies; 7 days compared to > 3 weeks
- **Confounds:** other measurements were recorded including sunlight exposure and sleep quality
- Errors in self-reporting and participant honesty (**Hawthorne effect** and **social desirability bias**)

Future Directions

- Conduct a study with **different types of journaling**
- Use external tools to improve **adherence**
- Include **in-person interviews** to gauge physical symptoms of anxiety compared to cortisol levels

Results

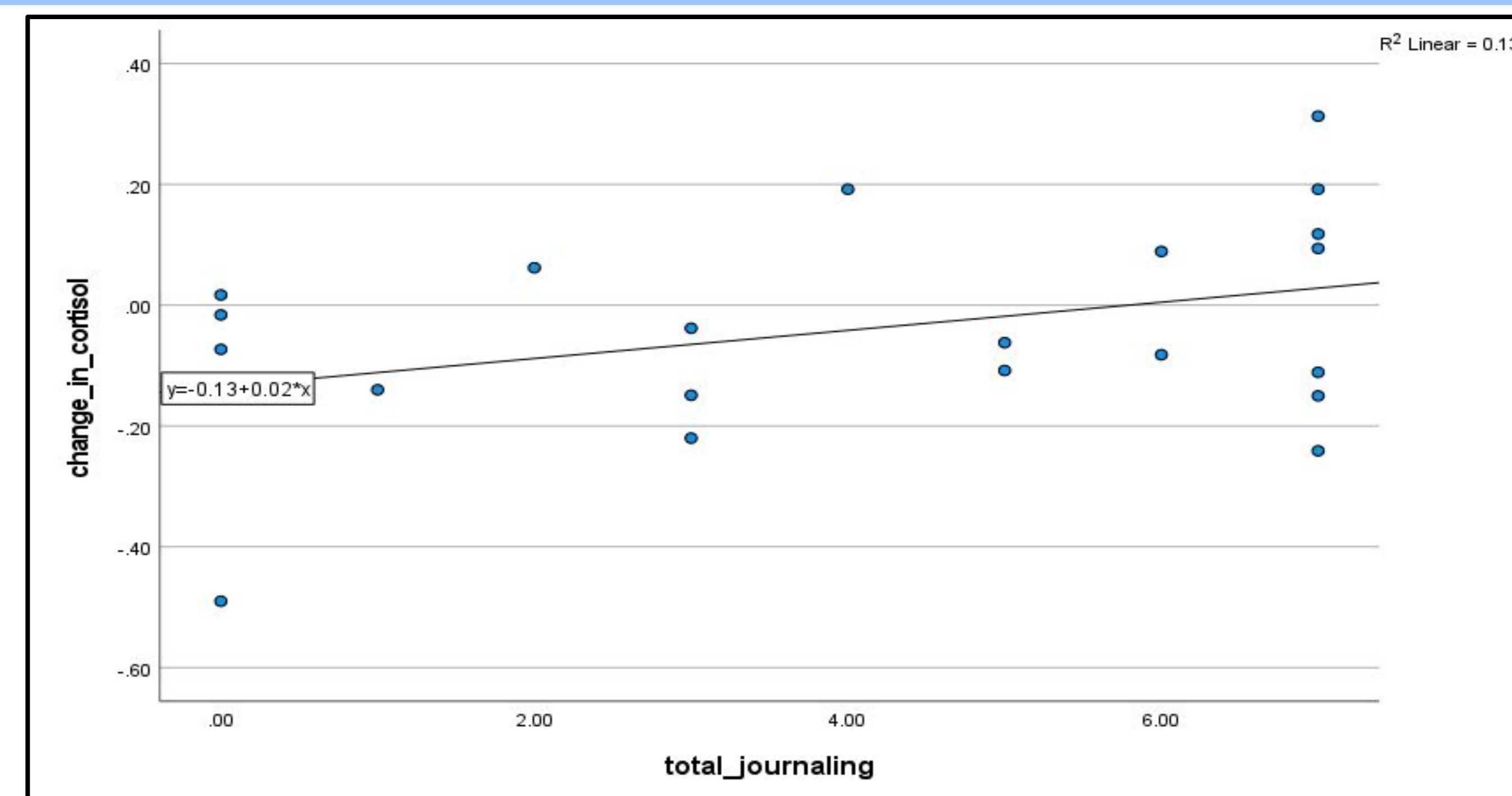


Figure 2. Association between journaling score and change in cortisol level. Journaling score vs. change in cortisol level (paired, two-tailed $t(21) = -0.288, p = 0.206$).

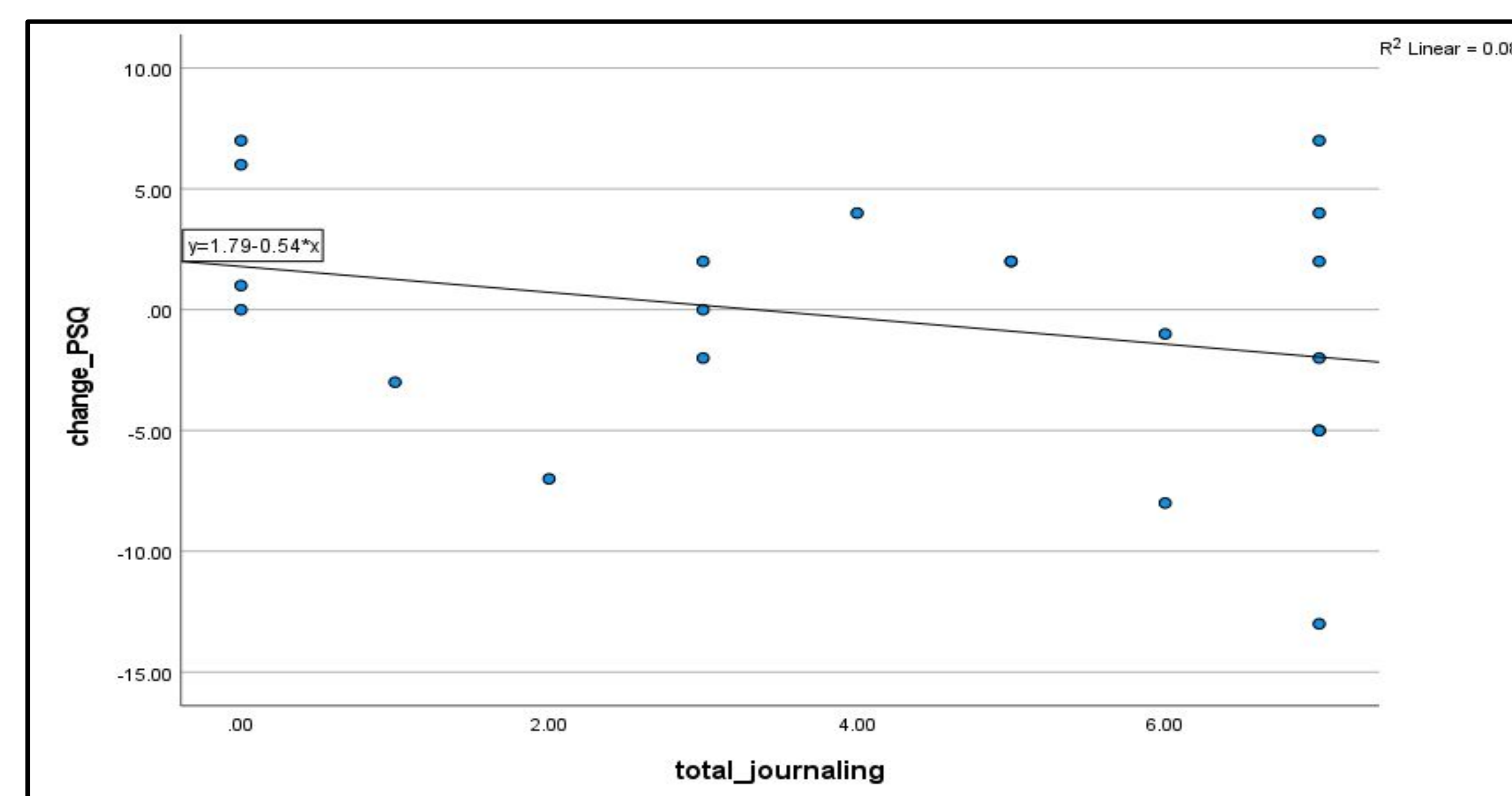


Figure 3. Association between journaling score and change in PSQ score. Journaling score vs. change in PSQ score (paired, two-tailed $t(21) = -0.288, p = 0.206$).

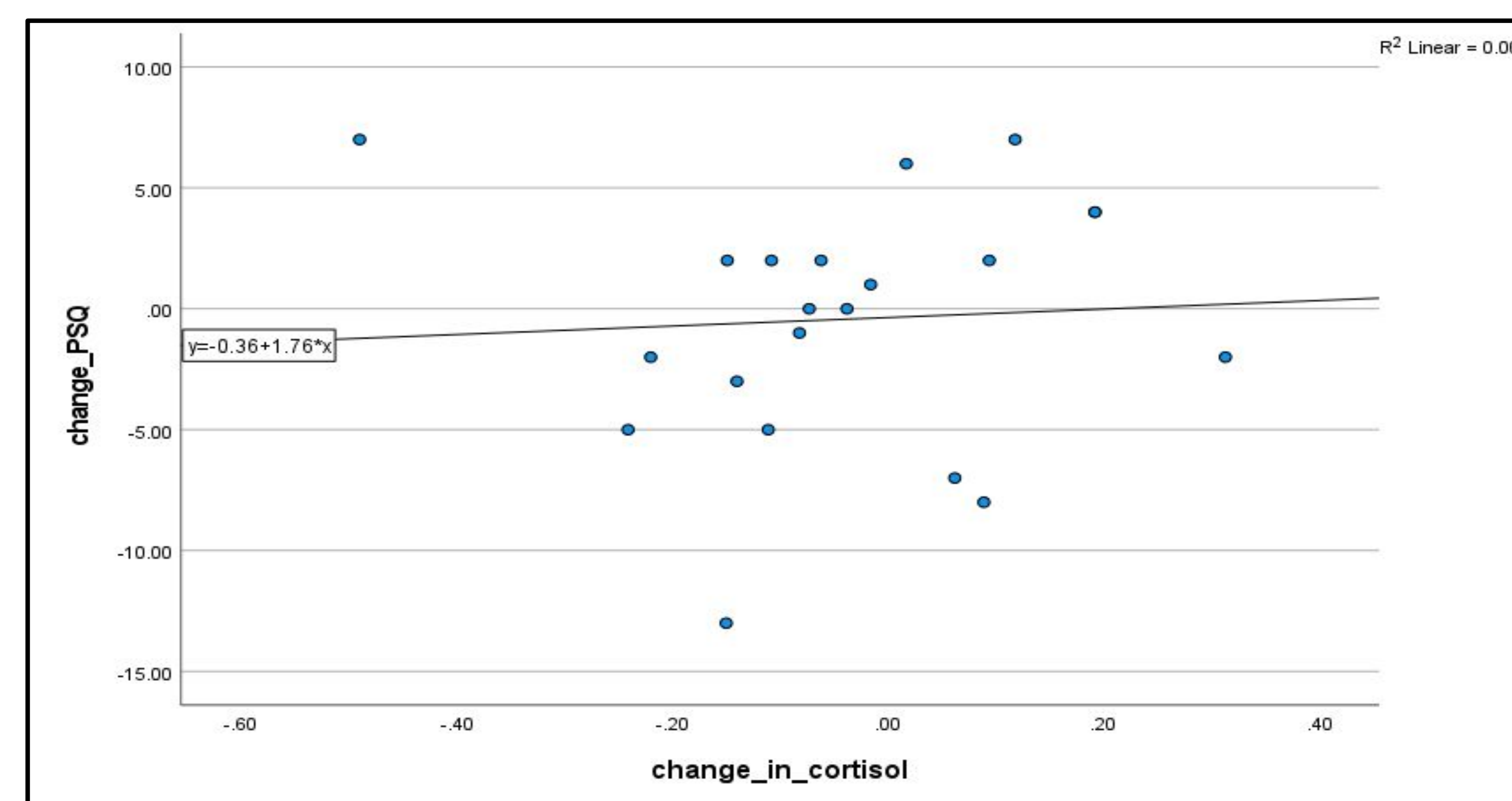


Figure 4. Association between change in cortisol level and change in PSQ score. Change in cortisol level vs. change in PSQ score (paired, two-tailed $t(21) = 0.061, p = 0.794$).

Study Course and Methods

- 32 undergraduate students in the NSCI 419 cohort; final cohort was 21 participants
- Pre- and Post-intervention assessments of salivary cortisol levels and perceived stress and stress management survey (PSS and PSQ) and 1 week of PAJ
 - **PSS:** 10-item questionnaire that measures symptoms of stress, lack of control, and unpleasant affective reactions
 - **PSQ:** 30-item measure of assessing stressful events and general quality of life.
- **Cortisol:** measured through collection of saliva and analyzed through Competitive ELISA (enzyme-linked immunoassay by R&D Systems)
 - Pre- and Post-intervention measurements taken at similar times to control for daily fluctuations

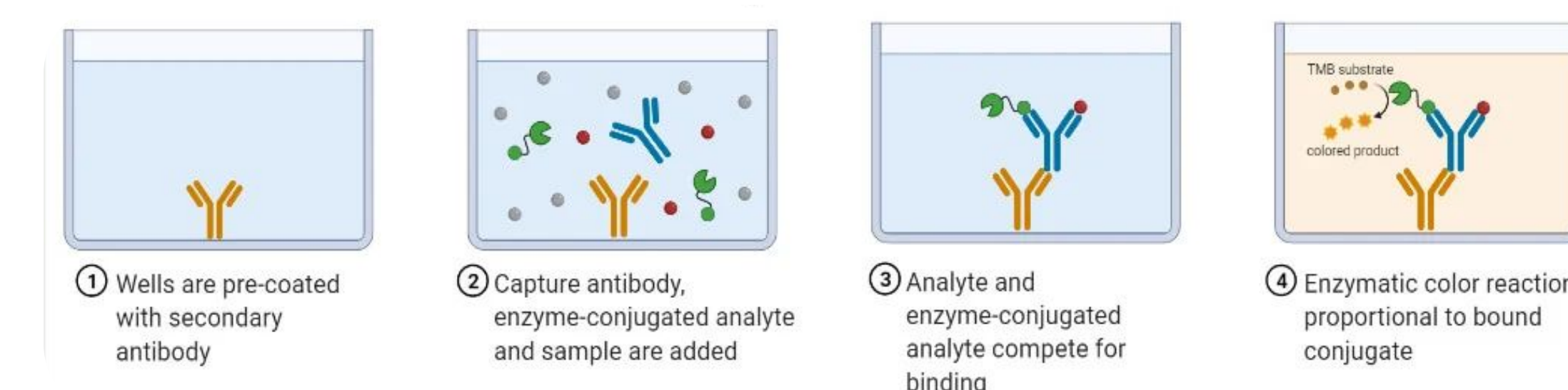


Figure 5. Competitive ELISA Analysis

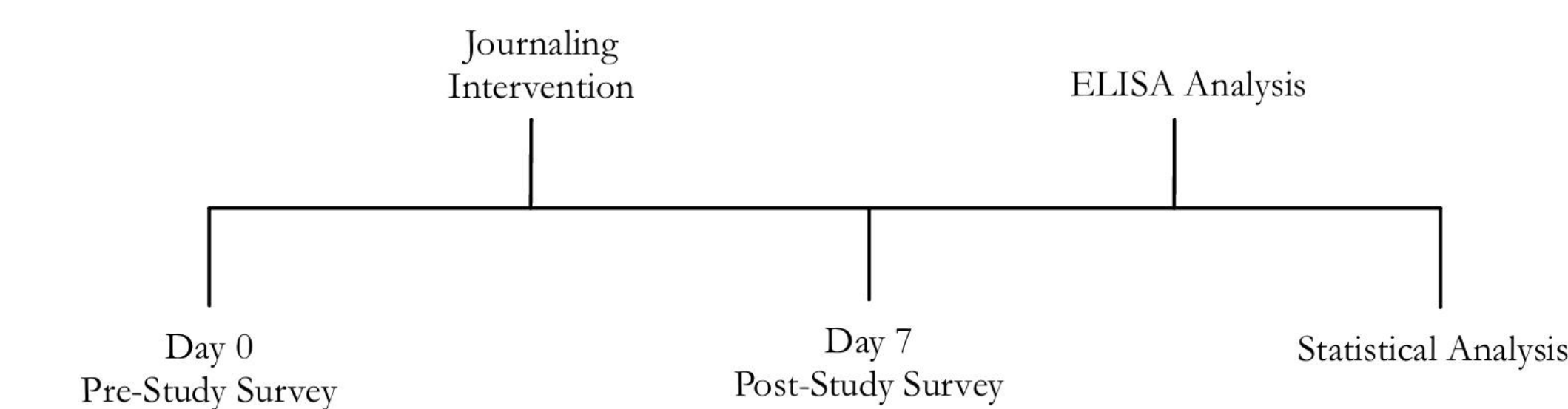


Figure 6. Study Methods Timeline

Results Interpretation

- Statistical Analysis conducted in SPSS. PSQ scores reverse coded for some participants. PSQ and PSS scores were compared to cortisol levels using t-tests.
- P-levels for the differences in means between variables were 0.206 (Figure 2), 0.206 (Figure 3), and 0.794 (Figure 5).
- This suggests **no significant relationship** between journaling, physiological cortisol levels and perceived stress levels, within this experiment results.

References

1. Dalton ED, Hammen CL (2018) Independent and relative effects of stress, depressive symptoms, and affect on college students' daily health behaviors. *J Behav Med* 41:863–874.
2. Sohal M, Singh P, Dhillon BS, Gill HS (2022) Efficacy of journaling in the management of mental illness: a systematic review and meta-analysis. *Fam Med Community Health* 10:e001154.
3. Ullrich PM, Lutgendorf SK (2002) Journaling about stressful events: Effects of cognitive processing and emotional expression. *Annals of Behavioral Medicine* 24:244–250.
4. Smyth JM, Johnson JA, Auer BJ, Lehman E, Talamo G, Sciamanna CN (2018) Online Positive Affect Journaling in the Improvement of Mental Distress and Well-Being in General Medical Patients With Elevated Anxiety Symptoms: A Preliminary Randomized Controlled Trial. *JMIR Mental Health* 5:e11290.