



Perceived Stress and the Trier Social Stress Test in an Online Virtual Reality

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Abstract

The Trier Social Stress Test (TSST) is commonly used to elicit a physiological reaction to stress. Although the standardized procedure increases the validity of the TSST, there are many potential differences across laboratory settings. These limitations may be reduced by conducting the TSST in virtual reality thus allowing for a more controlled environment. Previous research has used an expensive first-person virtual reality headset and has examined primarily physiological reactions to the TSST in a virtual world^{1,2,3}. We expand on previous research by

- (a) examining self-reported measures of stress
- (b) using a freely available virtual reality environment,
- (c) using third person in the virtual reality so the participant is portrayed as an avatar, and
- (d) examining how loss events may contribute to subjective measures of stress.

Objective

To examine how self-reported stress changes at 4 time points during the virtual TSST.

Demographics

Participant Information		
	Mean/N	SD/%
Gender (Female)	27	60.0%
Age	18.93	1.5
Marital Status (Single)	31	68.9
Ethnicity (White)	25	55.6
College year (fresh/soph)	40	88.9%
Roommates (1 or more)	40	88.9%
CES-D Score	8.62	4.67
ECR-R Anxiety	56.73	21.01
ECR-R Avoidance	52.04	21.77

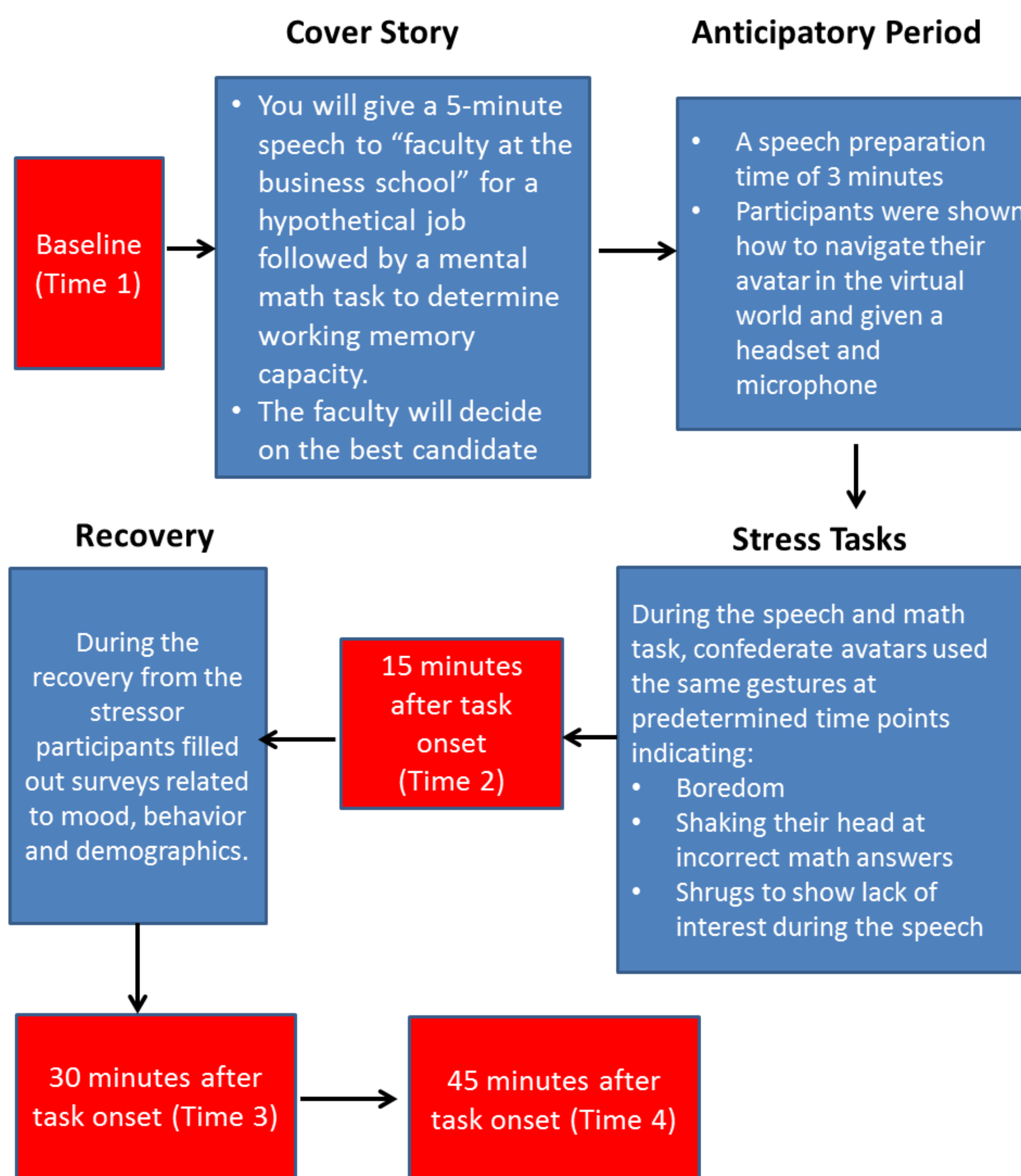
Continuous variables: Mean (±SD), Categorical Variables: N(%)

CES-D = Centers for Epidemiological Studies Depression Scale; ECR-R = Experiences in Close Relationships-Revised

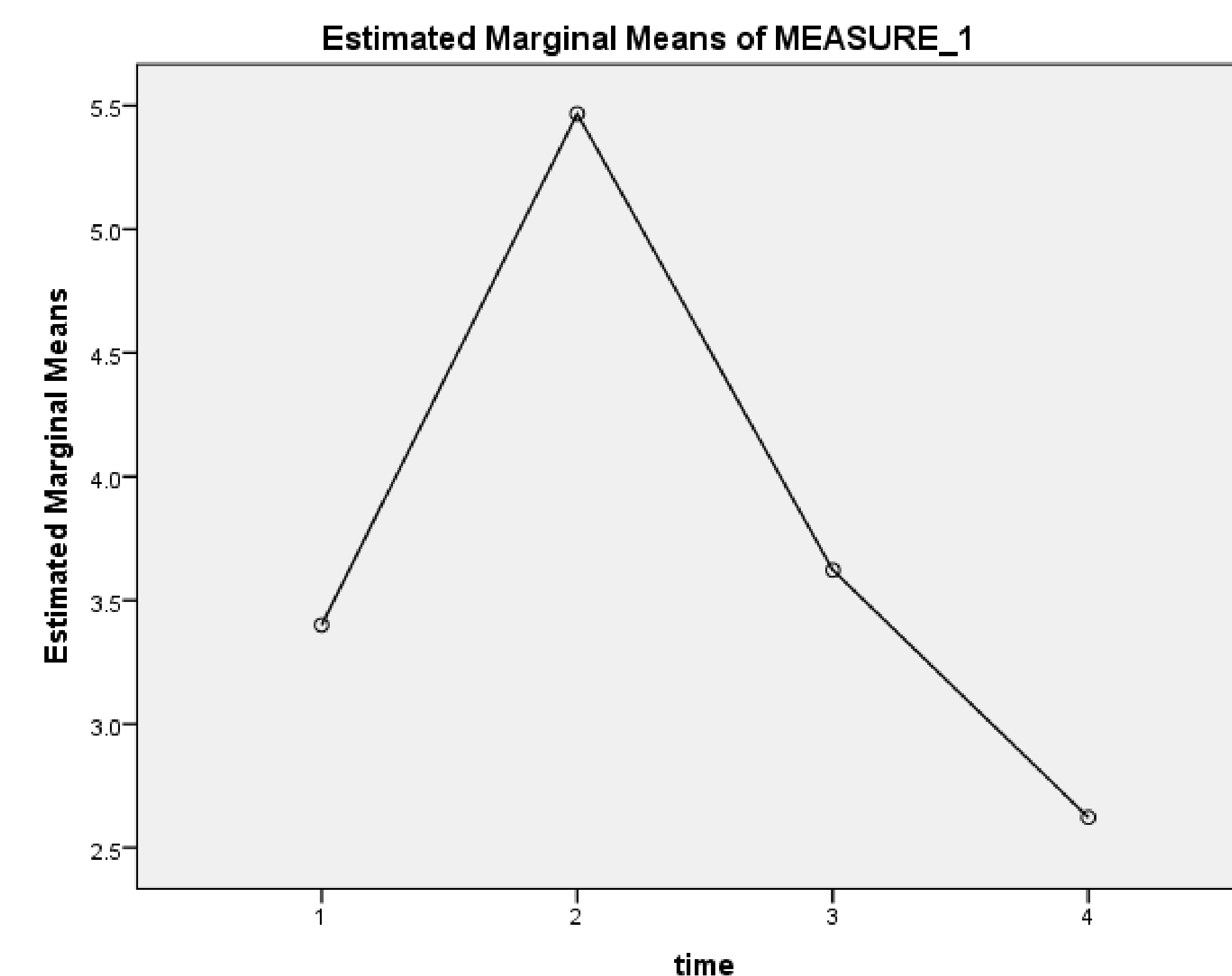
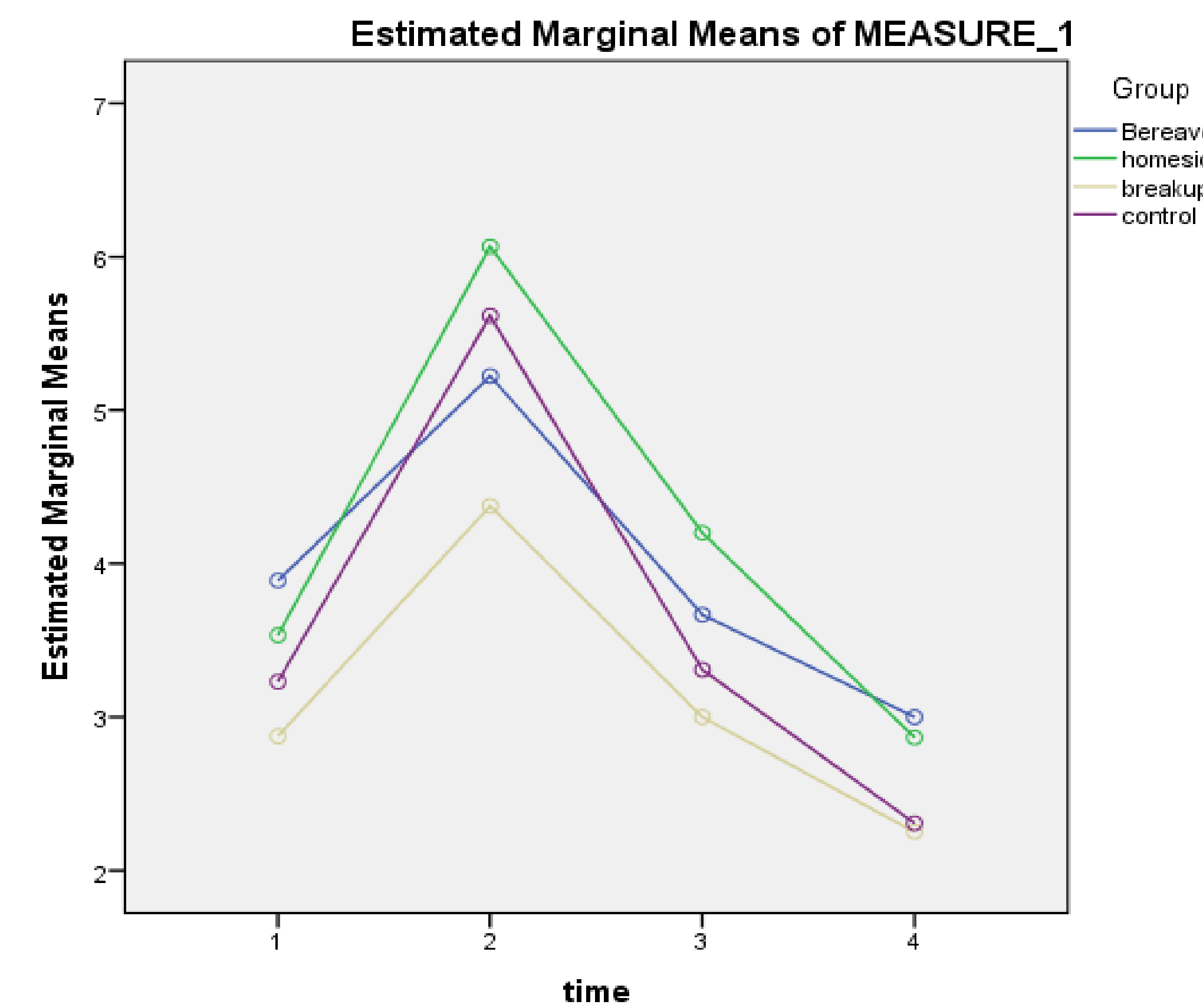
Methods

45 students were recruited from the Introduction to Psychology subject pool during the Fall 2013 semester. The task was administered through Second Life, using live audio. Participants gave measures of their perceived stress at 4 time points during the TSST (baseline, 15, 30, and 45 minutes after the task onset). A visual analog scale from 1-10 was used to measure perceived stress.

Virtual TSST Design



Results:



Repeated measures ANOVA was used to examine differences between yearning groups and subjective stress across time. The slopes of subjective stress did not differ significantly between yearning groups ($F(1, 45) = 0.50, p=0.69$). However, when looking at the slope of the line across time in all groups combined subjective stress is significantly different at the 4 time points ($F(1, 45) = 21.95, p<0.001$). CES-D and ECR-R scores did not have a significant effect on the slope of subjective stress responses.

Conclusion

- The present study found that the TSST can be conducted in virtual reality with perceived subjective stress responses comparable to a TSST administered in the real world.
- Through subjective measures of stress, perceived stress increases at 15 minutes after the onset of the stressful task. Furthermore, the slope across time shows that subjective stress differs significantly at all four time points.
- Although the loss group, depression scores and attachment scores did not show a significant effect on subjective stress responses, further analyses will include examining their effect on cortisol secretion during the virtual TSST.
- Using a virtual TSST could improve the reliability of the test through a more standardized procedure through consistency in laboratory settings and feedback from the confederates.

References

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³Ruiz, A., et al. (2010). Adaptation of the Trier Social Stress Test to virtual reality: psycho-physiological and neuroendocrine modulation. *Journal of CyberTherapy & Rehabilitation* 3(4), 405-415.

