

Penn Undergraduate Research Mentoring Program (PURM)

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Background

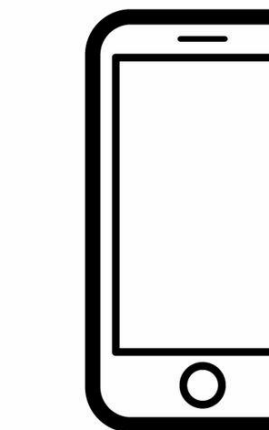
- Cigarette smoking is the leading cause of preventable illness and death in the United States, responsible for over 480,000 deaths annually, which is approximately 20% of all deaths (CDC, 2021).¹
- Recent statistics reveal that while 68% of smokers express the intention to quit annually, with 55.4% attempting to do so, only a mere 7.4% succeed in their cessation endeavors (Babb, Malarcher, Schauer, Asman & Jamal, 2017).²
- Craving and withdrawal symptoms such as negative affect are key components in smoking dependence because they drive the cycle of addiction (Buchmann, *et al.*, 2010).³
- Smokers often encounter daily stressors that may trigger the urge to reach for cigarettes in an attempt to alleviate the negative emotions and cravings elicited by stressor exposure (Buchmann, *et al.*, 2010).⁴

Hypotheses

- Cigarette craving will be higher after exposure to a stressor as compared to no stressor exposure.
- Negative affect will be higher after exposure to a stressor as compared to no stressor exposure.
- Individuals will be more likely to smoke after stressor exposure as compared to no stressor exposure.

Method

Daily cigarette smokers (n=155) recruited from Philadelphia completed an ecological momentary assessment protocol.



Participants used a smartphone application to report on their cravings, negative emotions, daily stressors, and smoking 10 times per day for 10 days while attempting to stay abstinent from smoking.

Analysis

The repeated measures data (12908 prompts nested in 155 participants) were analyzed using multilevel models.

Three separate models tested the association between within-person fluctuations in stressor exposure and 1) cigarette craving; 2) negative affect; 3) smoking.

Models included the following covariates: time of day, day of study, person-level indicators of the proportion of prompts throughout the study with reports of stressor exposures and the number of prompts completed.

Models with craving and negative affect as outcomes also controlled for smoking.

Conclusions

- Exposure to daily stressors is associated with increases in craving, negative affect, and smoking during quit attempts.
- Interventions designed to help people quit smoking should focus on addressing responses to everyday stressors to enhance cessation outcomes.

Results

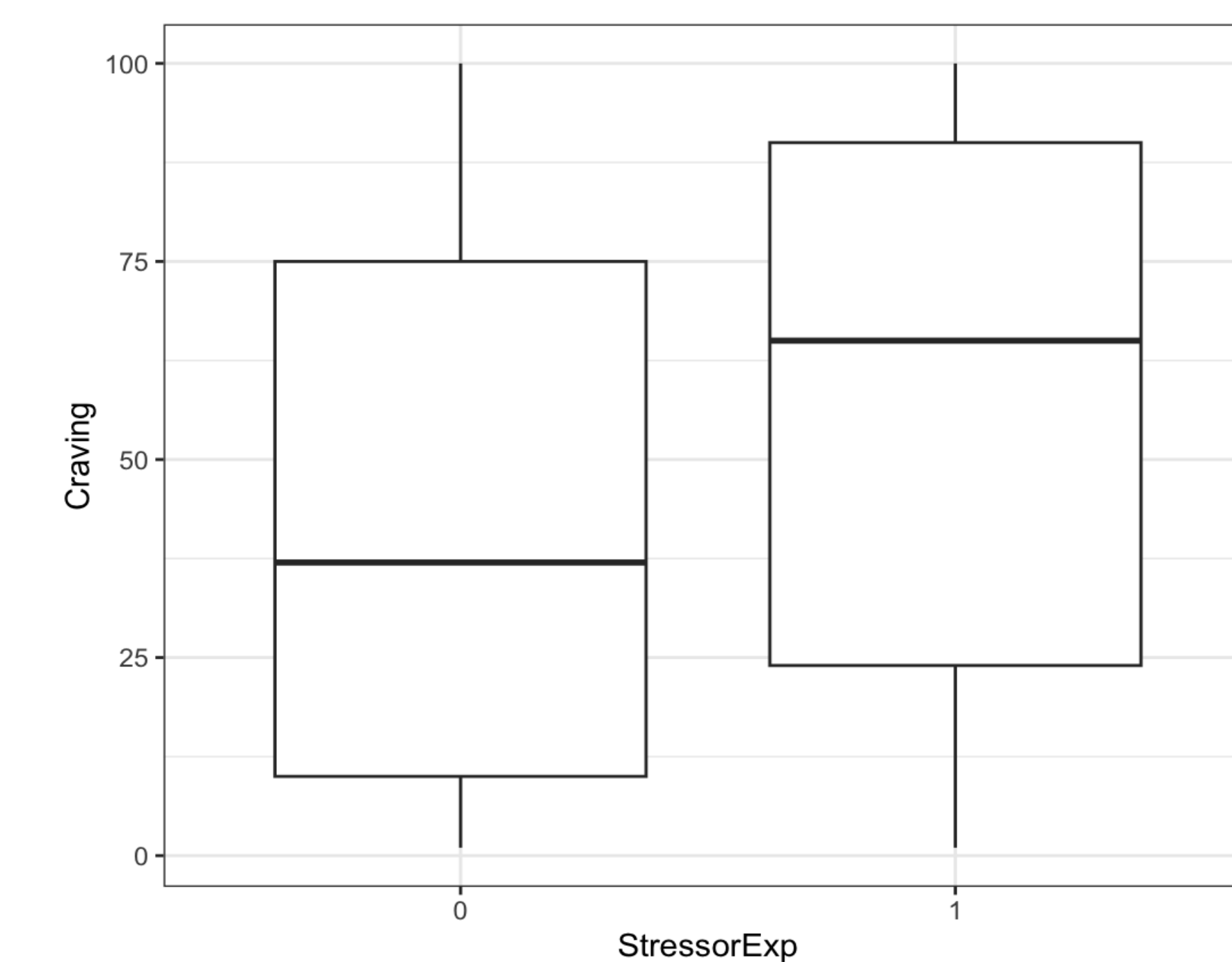


Figure 1. This boxplot shows 12908 craving (y-axis) reports across prompts following reports of no stressor exposure vs stressor exposure. Craving was higher when stressor exposure was reported as compared to prompts during which no stressor exposure was reported, $b=4.88$, $p<0.001$.

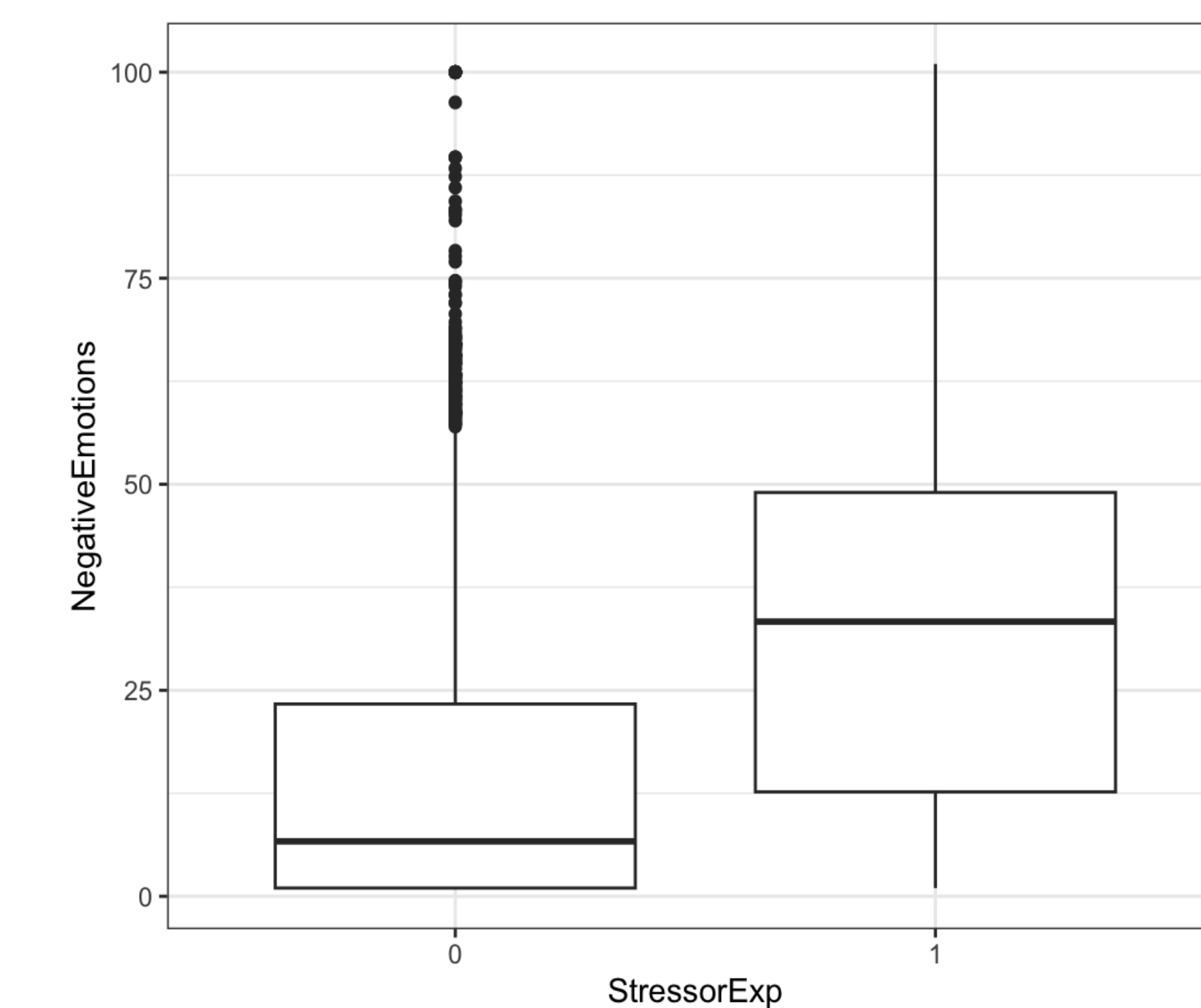


Figure 2. This boxplot shows 12908 negative affect (y-axis) reports across prompts following reports of no stressor exposure vs stressor exposure. Negative affect was higher when stressor exposure was reported as compared to prompts during which no stressor prompts reported, $b=5.51$, $p<0.001$.

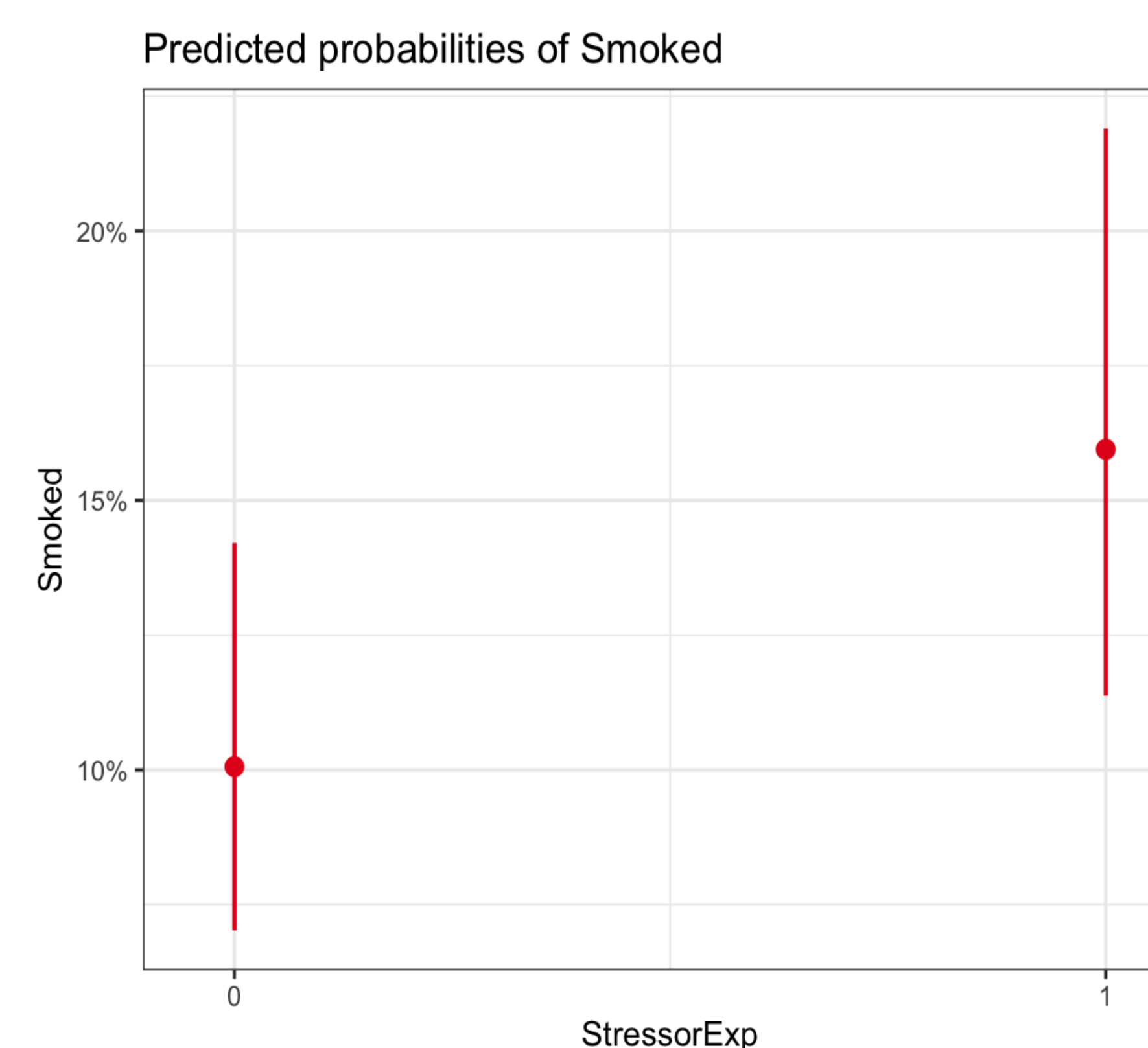


Figure 3. This plot shows the predicted probability of smoking (y-axis) depending on whether participants were exposed to a stressor or not (x-axis). The likelihood of smoking a cigarette was higher when stressor exposure was reported as compared to prompts during which no stressor exposure was reported, $b=0.53$, $p<0.001$.

References:

- 1-https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm
- 2-Babb S, Malarcher A, Schauer G, Asman K, Jamal A. Quitting Smoking Among Adults — United States, 2000–2015. *MMWR Morb Mortal Wkly Rep* 2017;65:1457–1464. DOI: <http://dx.doi.org/10.15585/mmwr.mm652a1>
- 3,4-Buchmann, A. F., Laucht, M., Schmid, B., Wiedemann, K., Mann, K., & Zimmermann, U. S. (2010). Cigarette craving increases after a psychosocial stress test and is related to cortisol stress response but not to dependence scores in daily smokers. *Journal of psychopharmacology (Oxford, England)*, 24(2), 247–255. <https://doi.org/10.1177/0269881108095716>