

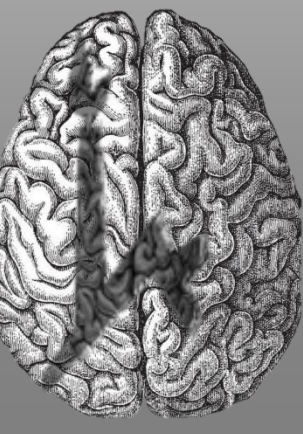
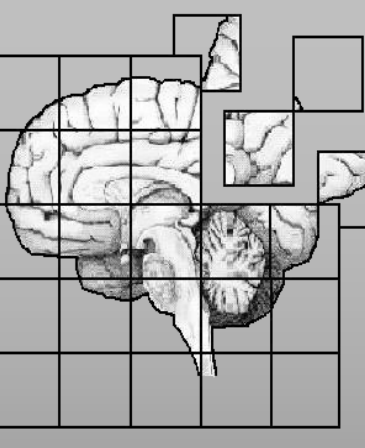


# The Effect of Smoking-Related Photos on Inhibitory Control among Smokers and Non-Smokers

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## Introduction

- Inhibitory control is the ability to suppress or stop irrelevant information. It is commonly measured using the stop-signal task (SST). In this task, participants respond to a cue (go process) and inhibit response usually due to an auditory signal (stop process) [1].
- The 'horse race model' suggests the two processes—go and stop—compete with each other and thus they are generally independent. The **SSRT** (stop-signal reaction time) represents the stop process, while the **nsRT** (no-stop reaction time) represents the go process [2].
- Several influential models of addiction have suggested that loss of control over craving is at the root of compulsive drug taking. In the same vein, craving has been found to be correlated with inhibitory control deficits [3].



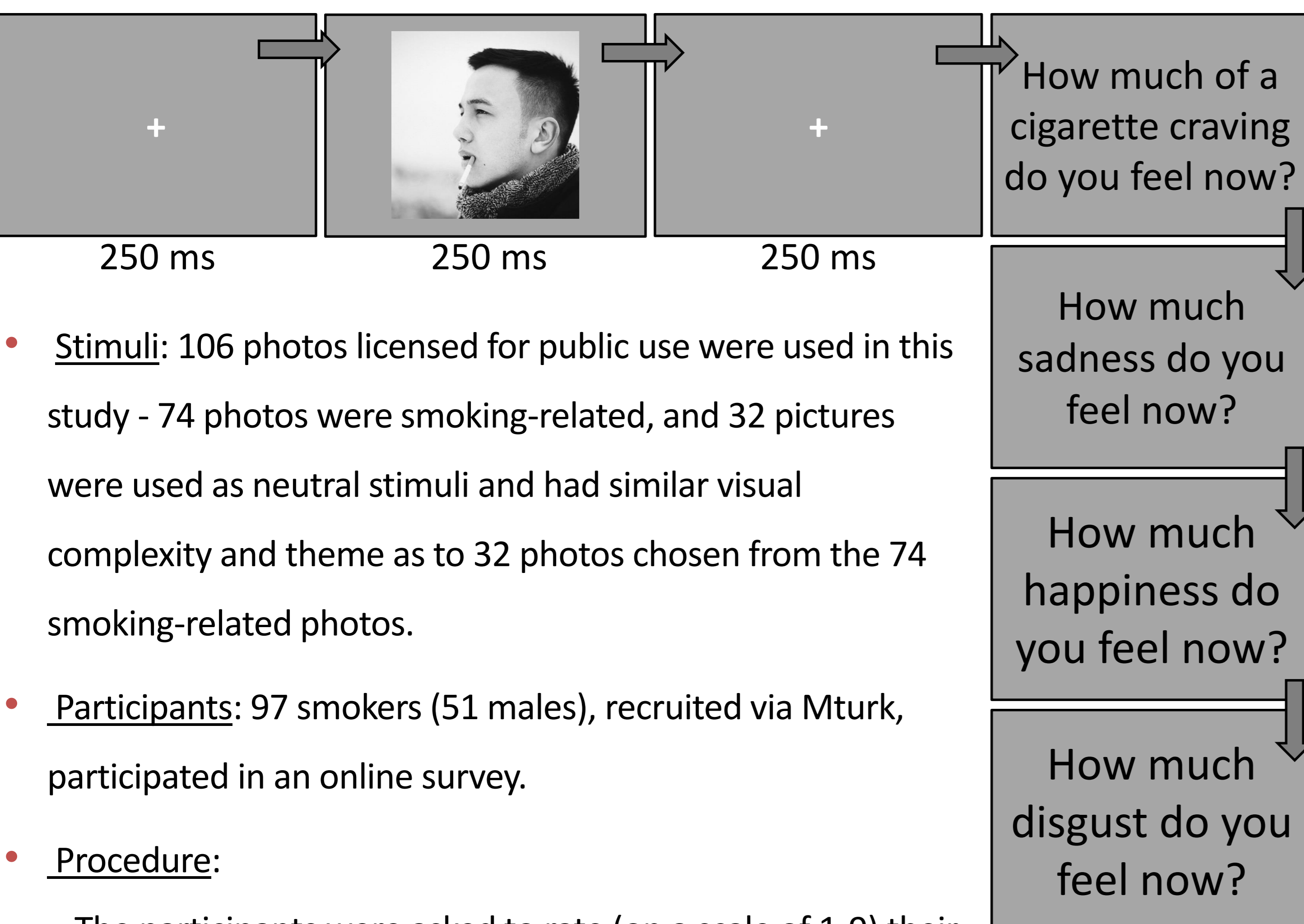
## Current Study

- Our main goal in the current study is to achieve a better understanding of inhibitory mechanisms by using strong craving-inducing photos (SCIP) related to smoking in conjunction with the SST.
- First, we administered an online survey to create an inventory of pictures from which SCIP would be chosen.
- Second, we conducted a pilot study administering the SCIP stimuli in the SST.

## Validating the SCIP Inventory

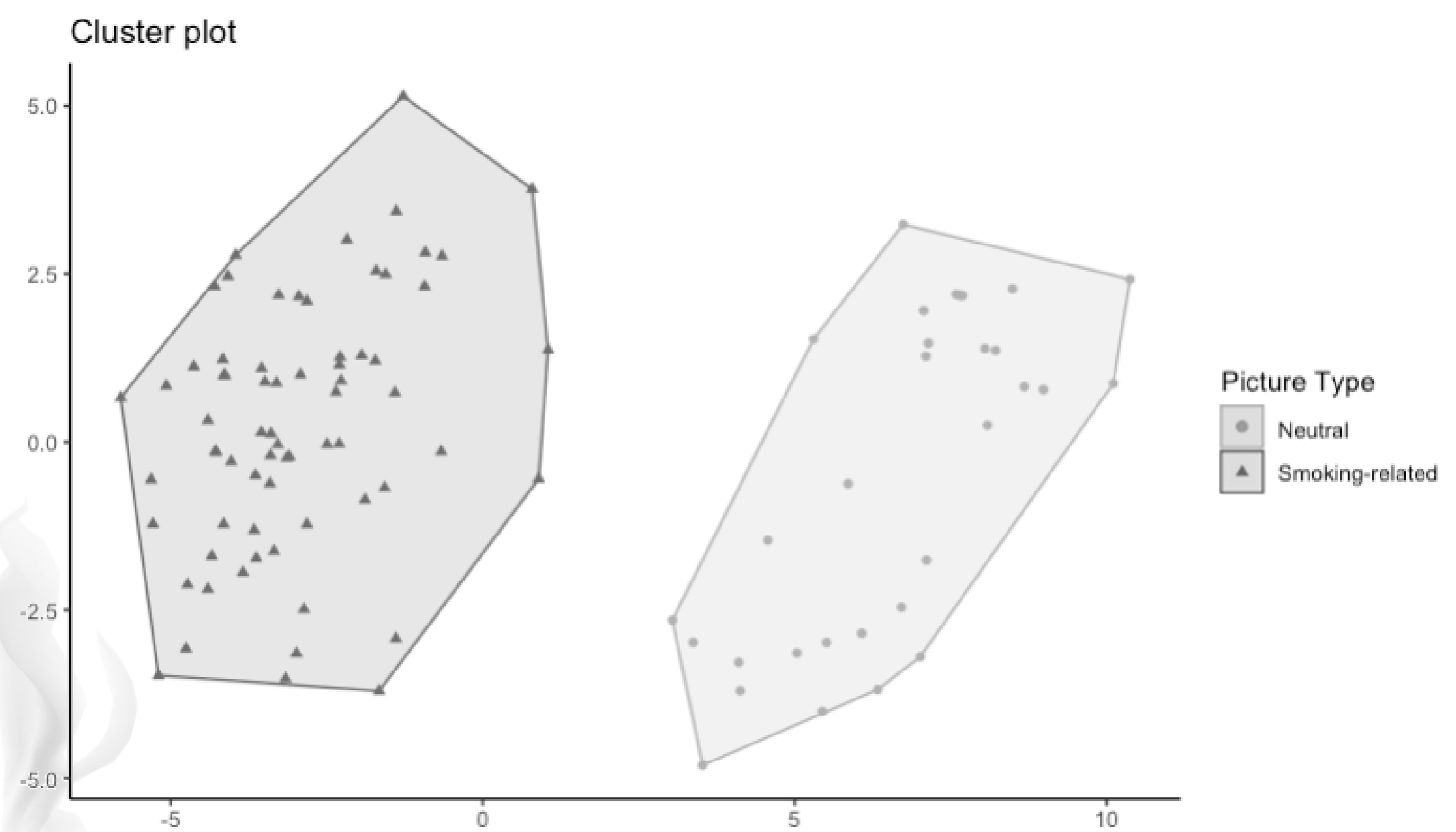


24 photos of smoking-related objects      27 photos of smoking men      23 photos of smoking women      32 matched neutral photos



- **Stimuli:** 106 photos licensed for public use were used in this study - 74 photos were smoking-related, and 32 pictures were used as neutral stimuli and had similar visual complexity and theme as to 32 photos chosen from the 74 smoking-related photos.
- **Participants:** 97 smokers (51 males), recruited via Mturk, participated in an online survey.
- **Procedure:**
  - The participants were asked to rate (on a scale of 1-9) their immediate feeling of craving, sadness, happiness and disgust, after being exposed to a smoking-related or neutral photo.
  - After completing the rating task, participants answered a demographic questionnaire, the Fagerström Test for Nicotine Dependence and the Wisconsin Inventory of Smoking Dependence Motives.

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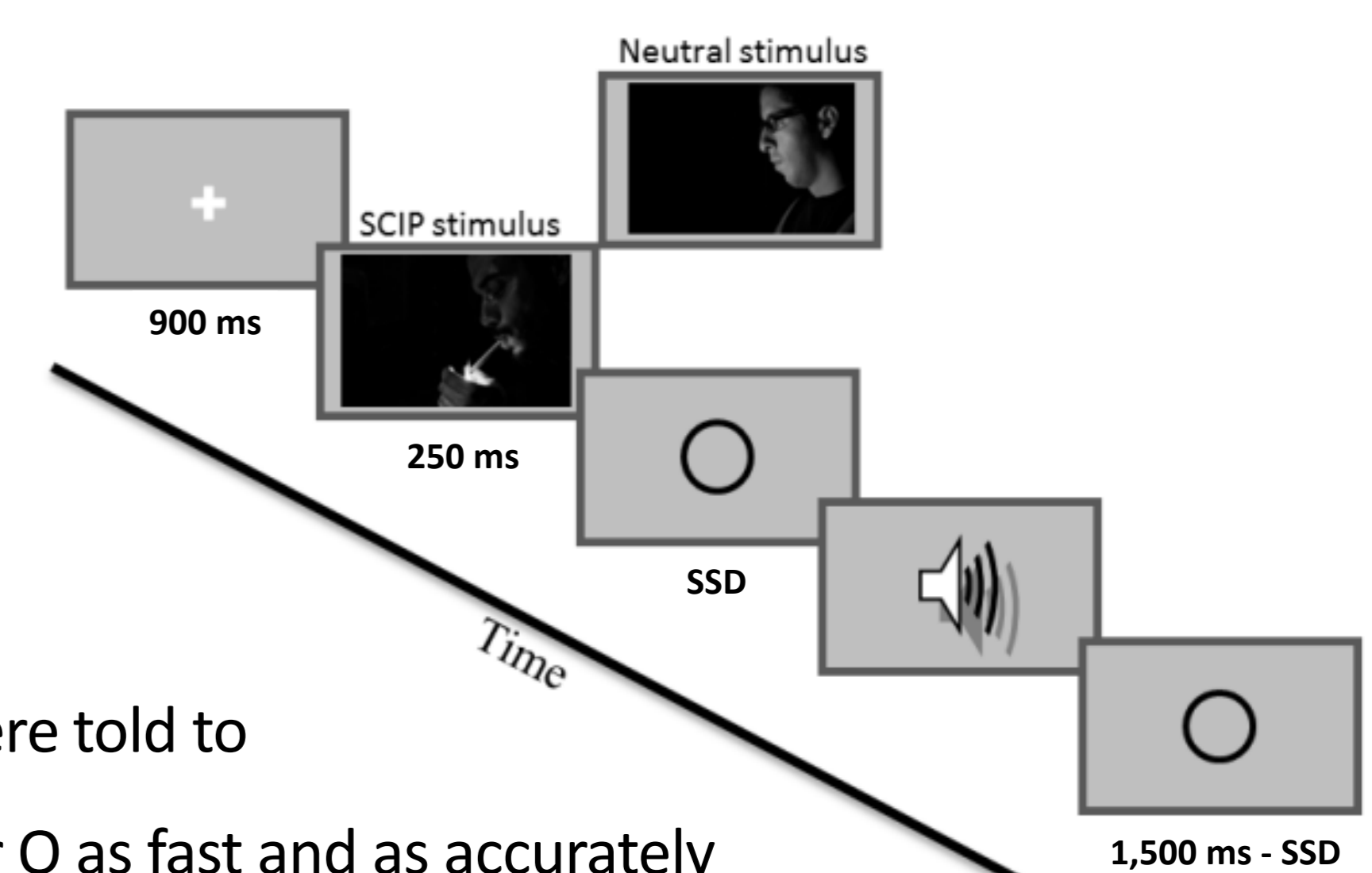


## Manipulation Check

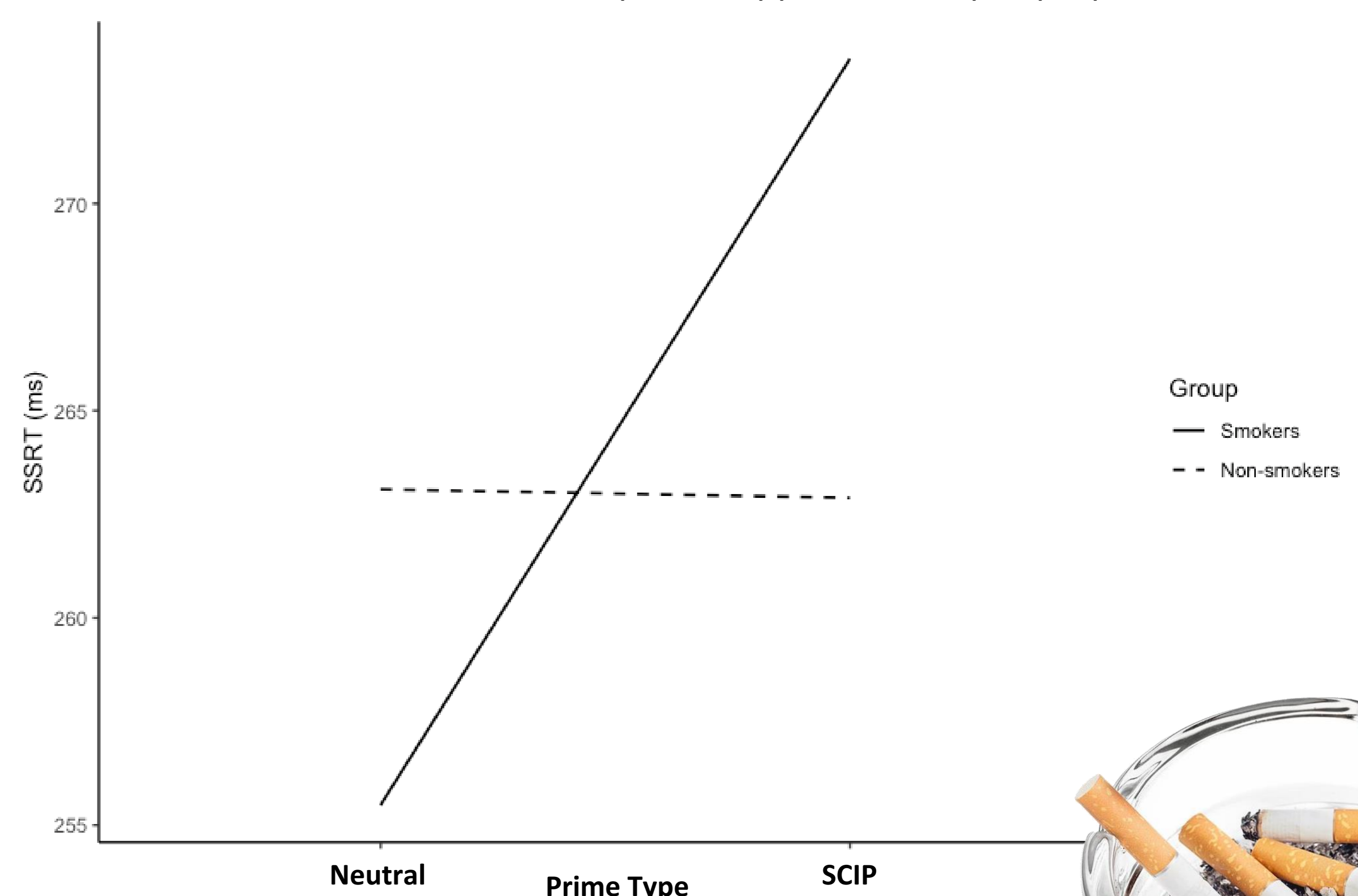
- K-means clustering analysis was conducted on the craving rating of the stimuli.
- As predicted, the analysis suggested two distinct groups: neutral stimuli and smoking-related stimuli.
- The stimuli with the highest craving rank and the lowest standard deviation were chosen to be used as SCIP. Neutral stimuli were matched to each SCIP stimuli.

## Implementing SCIP in SST - SSRT Preliminary Results

- **Participants:** 6 non-smokers and 10 smokers, all students of Ben-Gurion University of the Negev.



- **Procedure:** The participants were told to respond with a keypress to X or O as fast and as accurately as possible. An auditory stop signal was presented in a random selection of 25% of the trials and the different primes appeared in equal proportions.



## Discussion

- An inventory of strong craving-inducing photos has been validated.
- The preliminary results suggest it takes smokers more time to inhibit response after being exposed to SCIP stimuli compared to neutral stimuli. In addition, the non-smokers group showed similar SSRT for both prime types.
- Our results demonstrate an influence of smoking-related stimuli on complex cognitive operations, such as inhibition of a prepotent response among smokers. Future studies should examine whether associating SCIP stimuli with stopping will lead to changes in smokers' craving experience.

## References:

1. Verbruggen, F., & Logan, G. D. (2008). Response inhibition in the stop-signal paradigm. *Trends Cogn Sci*, 12, 418-424.
2. Verbruggen, F., & Logan, G. D. (2009). Models of response inhibition in the stop-signal and stop-change paradigms. *Neurosci Biobehav Rev*, 33, 647-661.
3. Berkman, E. T., Falk, E. B., & Lieberman, M. D. (2011). In the trenches of real-world self-control: neural correlates of breaking the link between craving and smoking. *Psychological science*, 22(4), 498-506.

