

Applying Novel Technologies and Methods to Inform the Ontology of
Self-Regulation: Aim 4

Statistical Analysis Plan

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Statistical Analysis Plan (SAP)

Objective: The primary objective of the analyses is to assess changes across time in various measures in binge eaters and smokers. Specifically, we aim to determine if there is a significant effect of time (day 1 to 28 of EMA responses) on each of the outcome measures.

1. Data Management:

Raw data will be cleaned and any inconsistencies will be resolved. Any missing data will be identified and excluded.

2. Descriptive Statistics:

Generate summary statistics (mean, standard deviation, frequency, and percentages) for all outcomes of interest, stratified by day.

3. Outcome Measures:

a. Binge eaters: a23 (Loss of Control over Eating)

Question: When you ate most recently, did you lose control over your eating?

Yes (Score: 1)

No (Score: 0)

b. Binge eaters: a22 (Overeating)

Question: Since the last prompt, when you ate most recently, did you overeat?

Yes (Score: 1)

No (Score: 0)

c. Smokers: a15 (Cigarette Consumption)

Question: Since the last prompt, how many cigarettes have you smoked?

4. Statistical Analysis Methods:

For a23 (Loss of Control over Eating) and a22 (Overeating): A generalized linear mixed model (GLMM) with a binomial distribution using a logit link function will be employed. This will account for the repeated measures design, where participants provide multiple responses over days.

Primary Predictor: Day (representing days 1 through 28 of EMA collected responses).

Random Effect: Participant ID (id).

For a15 (Cigarette Consumption): A generalized linear mixed model (GLMM) with a Poisson distribution using a log link function will be used.

Primary Predictor: Day (representing days 1 through 28 of EMA collected responses).

Random Effect: Participant ID (id).

5. Hypothesis Testing:

Null Hypothesis: There is no effect of day on the outcome measure.

Alternative Hypothesis: There is a significant effect of day on the outcome measure.

The significance level will be set at $\alpha = 0.05$. Any p-value below this threshold will lead to rejection of the null hypothesis in favor of the alternative.

6. Assumptions and Limitations:

The models for a23 and a22 assume a binomial distribution of the outcome.

The model for a15 assumes a Poisson distribution of the outcome.

7. Reporting:

Interpretation of the results will focus on the effect of day on the outcome measures. A significant effect would imply that the respective behavior changes across the time period observed.