Replication of Cheon and Hong, 2017
"Mere experience of low subjective socioeconomic status stimulates appetite and food intake"
PNAS 114(1), 72-77.
http://www.pnas.org/content/114/1/72

The original paper includes several studies but only one on MTurk. In this between-subject experiment (study 2), participants are randomly assigned to either a low or a high subjective socioeconomic status (SSES) treatment. Participants are asked to indicate their position on a ladder consisting of 10 rungs and are asked to make a direct comparison between themselves and people who are either relatively better off (low SSES treatment) or relatively worse off (high SSES treatment). Following either SSES treatment, participants complete an Implicit Association Test (IAT) in which images of low and high calorie foods are shown and which participants have to associate with pleasant and unpleasant connotations such as tasty, delicious, wonderful, disgusting, nasty, awful, etc. Participants in the low SSES treatment exhibit a trend for stronger implicit preferences for calorie-dense foods over fruits/vegetables compared with those in the high SSES treatment.

Hypothesis to replicate and bet on: Participants in the low SSES condition exhibit stronger implicit preferences for calorie-dense foods over fruits/vegetables compared with those in the high SSES condition. The paper only reports a 2 (SSES: low or high) × 2 (gender) ANOVA, with a significant main effect for SSES ($F(1, 79) = 4.92$, $p = 0.03$). As the replication only focuses on the effect of the subjective socioeconomic status manipulation, but neither on the effect of gender nor the interaction of gender and SSES, the authors kindly provided us with the result of a direct comparison of the implicit preferences for calorie-dense foods over fruits/vegetables between the two SSES conditions ($n_1 = 87$, $n_2 = 80$) based on an independent samples t-test: $t(165) = 2.07$, $p = 0.04$.

Criteria for replication: The criteria for replication are an effect in the same direction as the original study and a p-value < 0.05 in a two-sided independent-samples t-test.

Power analysis: The original study had 167 participants. The standardized effect size (Cohen's d) was $d = 0.320$. To have 90% power to detect 67% of the original effect size, a sample size of $n = 922$ is required.

Sample: As in the original study, we will only include US-based nondieters (i.e., only participants who report no restriction of food intake are allowed to take part in the experiment). In particular, participants will be asked whether they are currently dieting or trying to regulate their food intake. Participants who answer this question with "yes" will be excluded from the analysis. We will make sure that participants can only participate once from the same account in this specific study, and we will only recruit participants with a HIT approval rate of 95% or above. We will also check all IP addresses via https://www.ipqualityscore.com/; and we will remove any participants where one or more of the following is true: fraud score >= 85; TOR = True; VPN = True; Bot = True; abuse velocity = high. The replication sample size is the sample size after any exclusions of participants.

Materials: We will use the same material as in the original study, kindly provided by the original authors. In particular, we will use the original *Qualtrics* survey, the original *Inquisit* script (for the Implicit Association Test; IAT), and the same stimuli (food images and words used for attributes in the IAT).

Procedure: We will closely follow the procedure of the original experiment. The following summary of the experimental procedure is therefore largely based on the description of the experiment in the Materials and Methods section (pp. 75–76). Additionally, we will closely follow the specifications provided through our direct communication with the original authors.

Participants will first be shown a Captcha, and will thereafter provide informed consent. After this we will include an attention check that participants will need to pass to continue to the study. This attention check is in addition to any other potential attention check(s) used in the original study. Participants will then rate their current state of hunger on a six-point Likert scale and fill out the three factor eating questionnaire (TFEQ). Next, participants are randomly assigned to complete a low or high subjective socioeconomic status (SSES) manipulation (which was adapted for American respondents). In particular, participants are shown an image of a ladder consisting of 10 rungs and asked to make a direct comparison between themselves and people who are either relatively better off (low SSES condition) or relatively worse off (high SSES condition). After selecting a rung, we will ask participants to write a description of what it would be like to have an interaction with the person they have just compared themselves with.

After the SSES manipulation, participants will complete the positive and negative affect schedule (PANAS). Following a filler decision making tasks unrelated to food, participants will complete an implicit association test (IAT) assessing automatic preferences for high-calorie foods relative to low-calorie foods (fruits and vegetables). In the IAT, participants will have to categorize images of high-calorie foods (e.g., pizza, hamburger, fried chicken) and low calorie foods (e.g., fruits and vegetables) into categories using words with pleasant (e.g., tasty, delicious, wonderful) and unpleasant (e.g., disgusting, nasty, awful) connotations that are descriptive of food.

As in the original study, we will implement two versions of the IAT, which only differ in the ordering of the presented blocks (pictures/traits are compatible/incompatible). In the middle of the *Qualtrics* survey, a link to the IAT on the *Inquisit* platform will be provided. Participants will have to install a plugin before staring the IAT. The IAT will be scored according to the improved scoring algorithm (Greenwald et al., 2003). After completing the IAT, participants will be instructed to return to the *Qualtrics* survey to complete the remainder of the survey questions.

After returning to the main survey, participants will fill out another series of filler tasks, after which we will measure participants' general demographics and self-reported financial socioeconomic status (SES) using a measure of perceived personal insecurity of financial resources consisting of three statements.

Analysis: The analysis will be performed as in the original paper. Participants' implicit preferences for calorie-dense foods over fruits/vegetables revealed in the implicit association test (IAT) will be compared between the two treatments using a two-sided independent samples *t*-test with equal variances.

Subject payments: We are standardizing payments across all replications so that studies have a certain show-up fee depending on the expected length of the study, with an hourly wage from the show-up fee of $8 and a minimum payment of $1 (for studies with incentive payment we use the same incentive payment as in the original study; and this payment is paid in addition to the show-up fee). If we have problems recruiting, we will increase the show-up fee.