Title (required)

**Provide the working title of your study. It may be the same title that you submit for publication of your final manuscript, but it is not a requirement.**

Ambiguous words: Quantifying dual valence representation and individual differences in a novel stimulus set

Authors:

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Description (optional)

**Please give a brief description of your study, including some background, the purpose of the study, or broad research questions.**

The goal of this study is to develop a new stimulus set to generalize *valence bias* across interpretations of faces, scenes, and words. Valence bias refers to an individual difference measure in which one’s propensity to interpret emotionally ambiguous faces (e.g., a surprised expression) or scenes (e.g., unhealthy food) as either positive or negative (Neta, Norris, & Whalen, 2009; Neta, Kelley, & Whalen, 2013).

Hypotheses (required)

**List specific, concise, and testable hypotheses. Please state if the hypotheses are directional or non-directional. If directional, state the direction. A predicted effect is also appropriate here. If a specific interaction or moderation is important to your research, you can list that as a separate hypothesis.**

1. We predict larger variability (i.e., standard deviation) of interpretations (i.e., positive or negative judgment) for ambiguous, compared to clearly valenced, words.
2. We predict a positive correlation between percent negative ratings of ambiguous words and ambiguous facial expressions (controlling for age and gender).
3. We predict a positive correlation between percent negative ratings of ambiguous words and ambiguous scenes (controlling for age and gender).
4. As in prior work, we predict a positive correlation between percent negative ratings of ambiguous faces and ambiguous scenes (controlling for age and gender).

In this section, you will be asked to describe the overall design of your study. Remember that this research plan is designed to register a single study, so if you have multiple experimental designs, please complete a separate preregistration.

Study type (required)

**Please check one of the following statements**

**\*\*\*\* Experiment** - **A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.**

 Observational Study - Data is collected from study subjects that are not randomly assigned to a treatment. This includes surveys, “natural experiments,” and regression discontinuity designs.

 Meta-Analysis - A systematic review of published studies.

 Other

Blinding (required)

**Blinding describes who is aware of the experimental manipulations within a study. Mark all that apply.**

No blinding is involved in this study.

**\*\*\* For studies that involve human subjects, they will not know the treatment group to which they have been assigned.**

 Personnel who interact directly with the study subjects (either human or non-human subjects) will not be aware of the assigned treatments. (Commonly known as “double blind”)

 Personnel who analyze the data collected from the study are not aware of the treatment applied to any given group.

Is there any additional blinding in this study? (optional)

**Blinding (Other)**

Study design (required)

**Describe your study design. Examples include two-group, factorial, randomized block, and repeated measures. Is it a between (unpaired), within-subject (paired), or mixed design? Describe any counterbalancing required. Typical study designs for observation studies include cohort, cross sectional, and case-control studies.**

This will be a within-subjects repeated measures design. Counter-balancing is described below in the “Randomization” section.

You may attach up to 5 file(s) to this question. You may attach files that you already have in this OSF project, or upload a new file from your computer. Uploaded files will automatically be added to this project so that they can be registered.

File(s) selected for upload:

Attach File

Randomization (optional)

**If you are doing a randomized study, how will you randomize, and at what level?**

We will use within-subjects randomization (i.e., counterbalancing). There will be several components to our randomization. First, subjects will be randomly assigned to an order of stimulus blocks; that is, the words, faces, or scenes blocks will be presented in different orders (randomly) across participants. We will also pseudorandomly present the items within each block, such that positive and negative stimuli precede ambiguous stimuli equally (but stimuli within each valence condition will be randomized).Further, we will counterbalance response sides (i.e., “A” is positive and “L” is negative or vice-a-versa) across participants.

In this section we’ll ask you to describe how you plan to collect samples, as well as the number of samples you plan to collect and your rationale for this decision. Please keep in mind that the data described in this section should be the actual data used for analysis, so if you are using a subset of a larger dataset, please describe the subset that will actually be used in your study.

Existing Data (required)

**Preregistration is designed to make clear the distinction between confirmatory tests, specified prior to seeing the data, and exploratory analyses conducted after observing the data. Therefore, creating a research plan in which existing data will be used presents unique challenges. Please select the description that best describes your situation. Please see https://cos.io/prereg for more information.**

**Registration prior to creation of data**

 Registration prior to any human observation of the data

 Registration prior to accessing the data

 Registration prior to analysis of the data

 Registration following analysis of the data

Explanation of existing data (optional)

**If you indicate that you will be using some data that already exist in this study, please describe the steps you have taken to assure that you are unaware of any patterns or summary statistics in the data. This may include an explanation of how access to the data has been limited, who has observed the data, or how you have avoided observing any analysis of the specific data you will use in your study.**

We piloted a large set (i.e., 629) of words were piloted in a previous study in order to determine which word stimuli we expect to be ambiguous in the present work. Creation of the present data will occur *after* submission of this preregistration. To be transparent,

Data collection procedures (required)

**Please describe the process by which you will collect your data. If you are using human subjects, this should include the population from which you obtain subjects, recruitment efforts, payment for participation, how subjects will be selected for eligibility from the initial pool (e.g. inclusion and exclusion rules), and your study timeline. For studies that don't include human subjects, include information about how you will collect samples, duration of data gathering efforts, source or location of samples, or batch numbers you will use.**

We will collect data through the experiment builder website Gorilla. Participants for the study will be recruited through Amazon Mturk and then routed to the Gorilla website. Specifically, we will recruit from the U.S. adult population (i.e., over 18 years old). We will only recruit through postings on Amazon Mturk and all participants will be compensated $2.25 for completion of the study. After data collection, some participants may be excluded for failing to provide above chance correct ratings for stimuli with clear positive or negative valence as done in our previous work (Neta, Kelley, & Whalen, 2013; Neta, Norris, & Whalen, 2009; Neta & Tong, 2016).

You may attach up to 5 file(s) to this question. You may attach files that you already have in this OSF project, or upload a new file from your computer. Uploaded files will automatically be added to this project so that they can be registered.

File(s) selected for upload:

Attach File

Sample size (required)

**Describe the sample size of your study. How many units will be analyzed in the study? This could be the number of people, birds, classrooms, plots, interactions, or countries included. If the units are not individuals, then describe the size requirements for each unit. If you are using a clustered or multilevel design, how many units are you collecting at each level of the analysis?**

Sample size rationale (optional)

**This could include a power analysis or an arbitrary constraint such as time, money, or personnel.**

Given that the observed correlation between valence bias measured with faces compared to scenes is typically small to medium (i.e., r = .3 to .5; e.g., Neta, Kelley, and Whalen, 2013), we plan to collect a sample of 100 participants with complete data to guarantee above 90% power (92 participants necessary for 90% power, 5% Type I error risk, r = .3; g\*power) given a potentially “small” effect size.

Stopping rule (optional)

**If your data collection procedures do not give you full control over your exact sample size, specify how you will decide when to terminate your data collection.**

In this section you can describe all variables (both manipulated and measured variables) that will later be used in your confirmatory analysis plan. In your analysis plan, you will have the opportunity to describe how each variable will be used. If you have variables that you are measuring for exploratory analyses, you are not required to list them, though you are permitted to do so.

Manipulated variables (optional)

**Describe all variables you plan to manipulate and the levels or treatment arms of each variable. This is not applicable to any observational study.**

We will manipulate stimulus type (faces, scenes, and words) as well as stimulus valence within each type (positive, negative, and ambiguous).

Measured variables (required)

**Describe each variable that you will measure. This will include outcome measures, as well as any predictors or covariates that you will measure. You do not need to include any variables that you plan on collecting if they are not going to be included in the confirmatory analyses of this study.**

Age, sex, race, and psychological/neurological history will be measured with a standard demographic survey. We will calculate valence bias as a percent negative rating for each stimulus type and valence as well as reaction times for each condition. The valence bias and reaction time means and standard deviations will be calculated.

Indices (optional)

**If any measurements are going to be combined into an index (or even a mean), what measures will you use and how will they be combined? Include either a formula or a precise description of your method. If you are using a more complicated statistical method to combine measures (e.g. a factor analysis), you can note that here but describe the exact method in the analysis plan section.**

We may combine positive/negative stimulus valence ratings into a measure of accuracy for clearly valenced stimuli. We may average across faces, scenes, and words to calculate a “grand mean” valence bias. Previous work has averaged across ratings of both faces and scenes to serve as a more robust measure of valence bias.

Statistical models (required)

**What statistical model will you use to test each hypothesis? Please include the type of model (e.g. ANOVA, multiple regression, SEM, etc) and the specification of the model (this includes each variable that will be included as predictors, outcomes, or covariates). Please specify any interactions, subgroup analyses, pairwise or complex contrasts, or follow-up tests from omnibus tests. If you plan on using any positive controls, negative controls, or manipulation checks you may mention that here. Remember that any test not included here must be noted as an exploratory test in your final article.**

As a manipulation check, we will run a repeated measures ANOVA with stimulus (faces, scenes, words) and valence (positive, negative, ambiguous) on percent negative ratings. We expect that negatively valenced stimuli will be more negative than both ambiguous and positive stimuli, and that positive stimuli will be less negative than ambiguous stimuli.

Paired sample t-tests will be used to compare standard deviation values of percent negative ratings across word valence conditions (hypothesis 1)

Semi-partial or partial correlation will be used for the primary hypotheses (2-4) – This will allow us to compare percent negative ratings for each stimulus category while controlling for age and gender.

Transformations (optional)

**If you plan on transforming, centering, recoding the data, or will require a coding scheme for categorical variables, please describe that process.**

Inference criteria (optional)

**What criteria will you use to make inferences? Please describe the information you’ll use (e.g. specify the p-values, Bayes factors, specific model fit indices), as well as cut-off criterion, where appropriate. Will you be using one or two tailed tests for each of your analyses? If you are comparing multiple conditions or testing multiple hypotheses, will you account for this?**

We will use Bonferroni corrected p-values (i.e., .05 / number of tests to compare) to adjust for multiple comparisons.

Data exclusion (optional)

**How will you determine which data points or samples if any to exclude from your analyses? How will outliers be handled? Will you use any awareness check?**

RT outliers will be removed (i.e., 2.5 SDs from the mean or under 250ms)—as in the pilot study.

We’ll remove participants that fail to rate clearly valenced stimuli (faces, scenes) accurately (i.e., above 60% accuracy)

Missing data (optional)

**How will you deal with incomplete or missing data?**

Pairwise deletion will be used for correlational analyses.

Exploratory analysis (optional)

**If you plan to explore your data set to look for unexpected differences or relationships, you may describe those tests here. An exploratory test is any test where a prediction is not made up front, or there are multiple possible tests that you are going to use. A statistically significant finding in an exploratory test is a great way to form a new confirmatory hypothesis, which could be registered at a later time.**

There is the possibility that there may be item effects in these stimulus sets. Therefore, we intend to run exploratory analyses using mixed-effects models to better understand the qualities of individual stimuli and how this relates to valence bias. Within a given stimulus set (faces, scenes, or words) a single level mixed effects model may be used; however, we may also use multilevel modeling to assess across stimulus types (repeated measures) within individual participants.

Other (optional)

**If there is any additional information that you feel needs to be included in your preregistration, please enter it here. Literature cited, disclosures of any related work such as replications or work that uses the same data, or other context that will be helpful for future readers would be appropriate here.**

Neta, Kelley, & Whalen

Neta, Norris, & Whalen

Neta & Tong, 2016