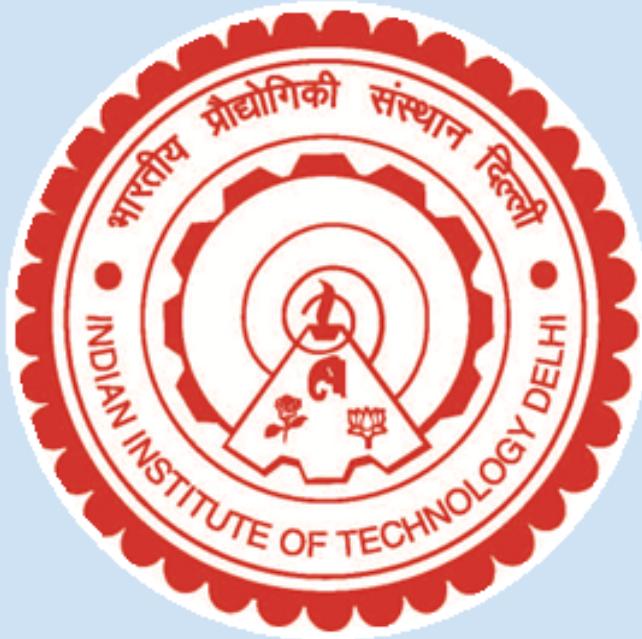


Report

Course: Selected Topics in Psychology (HUL370)

Sound Or No-Sound

A study on the effect of sound deriving images in evoking emotions



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ABSTRACT

The main motive to carry out the experiment was to study how the dimensional variables of emotions such as **Valence, Arousal, Confidence And Novelty** behave on changing the **affective visual stimuli** which has the images which derive Sound or No sound after observing the image.

This Experiment was conducted on over **30 students of IIT Delhi** in which **27 are of Male Gender** and **3 are of Female Gender**.

Since, the **distribution of Male and Female is not balanced** in the experiment; I tried not to include the data analysis for Male Vs Female dataset, as it is not a good practice.

The Experiment was performed using a subset of IAPS Images. We took **40 IAPS images** in total out of which **20 are of Sound category** and **remaining 20 are of No Sound category**. Each category of Sound and No-sound has **10 Images each for Negative and Positive Emotion**.

Through the review of literature, the effect of sound context has not been studied yet on IAPS dataset. Our experimental analysis will give **more insight to study the variable specific emotional fluctuations from the dependencies and independencies with other variables of emotion**.

INTRODUCTION

The **International Affective Picture System (IAPS)** is a database of pictures designed to provide a standardized set of pictures for studying Emotion and Attention.

In this Experiment, we took 40 images from the IAPS dataset and classified them in **four** categories:

- 1) **No Sound Negative** (10 Images)
- 2) **Sound Negative** (10 Images)
- 3) **No Sound Positive** (10 Images)
- 4) **Sound Positive** (10 Images)

The IAPS Images used in the Experiment can be seen in **Appendix at the end of Report**.

The above classification also shows the **multi-modal nature** in some images which **expresses emotion as a perception of through multiple sensory organs**.

Below are the Examples of the mentioned four categories:



No-sound Positive



No-sound Negative



Sound Negative



Sound Positive

MATERIALS AND METHODS

Participants:

A group of **30 students**, including **27 men and 3 women**, between the ages of **18 to 22**, were recruited at Indian Institute of Technology. None of the students who participated in this study reported having used or using any psychoactive drugs that could affect the results negatively.

Materials:

The dataset selected from IAPS images consisted of two broad categories, that were mainly '**Sound**' and '**No-Sound**'. Each group had an equal amount of **positive valence** and **negative valence**. This study however **did not include neutral valence images**.

Procedure:

Experimental procedure was conducted in the premises of the institute inside the Lecture Hall. The procedure was conducted in English. Firstly, each participant **signed a consent form** and **filled their demographic details**, proceeded by doing **standard tests of BIS/BAS and PANAS**. The test was conducted in a quiet hall with a distance of at least 1 metre between each participant. Participants were seated in front of laptops on which the pictures appeared. The test started with a training sample first, where the participant was made familiar with the procedure and made to rate three sample images to make him comfortable with the system. Participants were made to look at each image for **6 seconds** followed by four questions asking their response on – **Valence, Arousal, Novelty and Confidence**. Each scale ranged from **1 to 9** where **1 meant low and 9 meant high**. The images were presented in a **random order**. In each trial, an IAPS image was displayed on the whole screen. The participant was given a rest after 50% of the images had been rated.

DATA ANALYSIS

Variable to Analyze: **Valence**

Definition Of Valence

Valence, as used in psychology, especially in discussing emotions, means the intrinsic **attractiveness / "good"-ness (positive valence)** or **averseness / "bad"-ness (negative valence)** of an event, object, or situation. The term also characterizes and categorizes specific emotions. For example, emotions popularly referred to as "negative", such as **anger and fear, have negative valence**. Joy has **positive valence**. Positively valenced emotions are evoked by positively valenced events, objects, or situations. The term is also **used to describe the hedonic tone of feelings, affect, certain behaviors** (for example, **approach and avoidance**), **goal attainment or nonattainment, and conformity with or violation of norms**. Ambivalence can be viewed as conflict between positive and negative valence-carriers.

T-TEST

A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups, which may be related in certain features.

The samples of Sound Images have a **mean valence rating of 4.5** and a **Standard Deviation of 1.7**.

The samples of No-Sound Images have a **mean valence rating of 4.6** and **Standard Deviation of 1.7**.

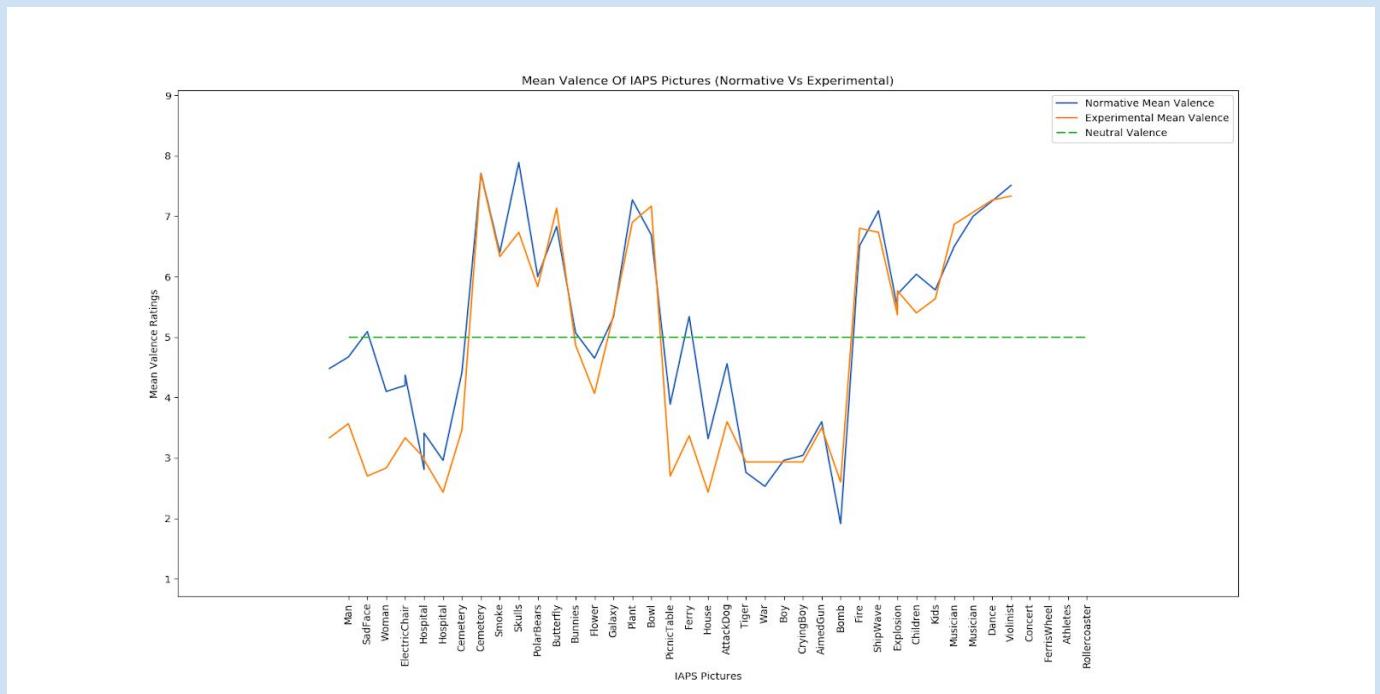
Here, T-test is performed between the **two groups of sound and No-sound IAPS images(20 images each for Sound and No-Sound)**.

T-value: 2.02, P-value: 0.97 (>0.05)

Since the p-value is greater than 0.05, no significant difference is observed in the means of Sound and No-Sound affective visual stimuli.

When applied T-test on Negative and Positive Stimuli separately, p-value of negative valence and positive valence comes out as 0.68 and 0.54 respectively, which is also greater than 0.05, which consequently explains of no significant difference.

Comparison between Normative Vs Experimental Mean Valence

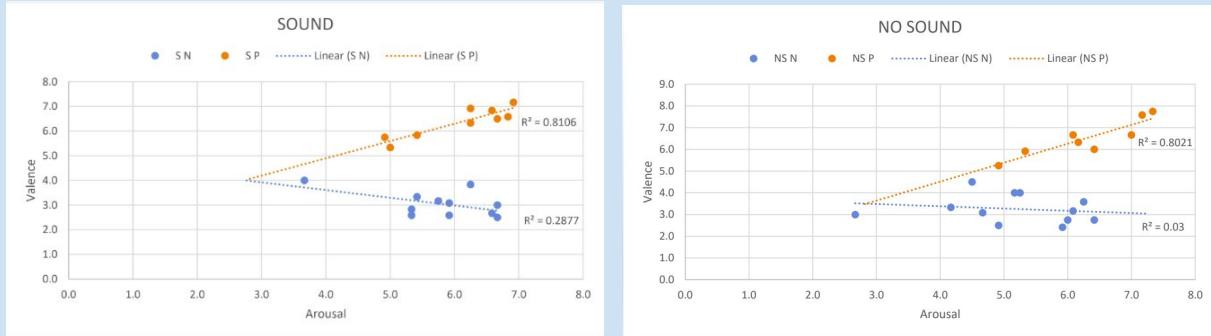


Observations

From the Graph, We can observe that:

- 1) Correlation Coefficient between Normative and Experimental Mean Valence is **0.9289** (high correlation)
- 2) The experiment we carried out on small scale gave **similar valence rating** distribution as the normative valence rating(large scale) to a visual stimuli.
- 3) Reasons for slight dissimilar ratings for pictures may be due to:
 - (a) Cultural Difference
 - (b) Male Vs Female Distribution, etc.

VALENCE AND AROUSAL



Where, **S = Sound, NS = No Sound, N = Negative and P = Positive.**

The above 2 boomerang curves show us a linear correlation between valence and arousal.

- 1) In case of sound positive and no sound positive,
The slope is positive which expresses a positive correlation between valence and arousal.
Which means valence is directly proportional to arousal.
- 2) In case of sound negative and no sound negative,
The slope is negative which expresses a negative correlation between valence and arousal.
Which means valence is inversely proportional to arousal.

- In case of positive data, the R-square value is highest for the Sound Positive (i.e $R^2 = 0.8106$) which implies high correlation between Sound Positive and Arousal.
- ❖ Correlation Coefficients -
- No-Sound Positive: **0.895**
 - Sound Positive: **0.9**

➤ In case of negative data, the R-square value is lowest for the No-Sound Negative (i.e R-square = 0.03) which implies least correlation between No-Sound Negative and Arousal.

❖ Correlation Coefficients -

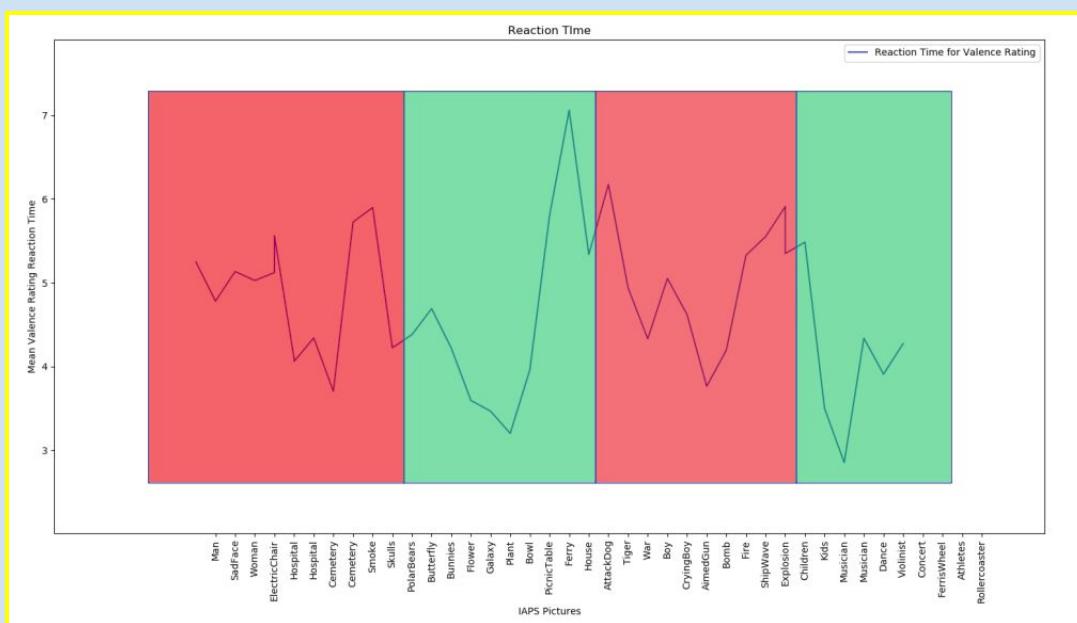
- No-Sound Negative: **-0.173**
- Sound Negative: **-0.536**

MEAN VALENCE RATINGS

- 1) No Sound Negative: **3.096**
- 2) No Sound Positive: **6.21**
- 3) Sound Negative: **2.993**
- 4) Sound Positive: **6.423**

➤ Sound Negative stimuli produces more negative valence
 ➤ Sound Positive stimuli produces more positive valence

REACTION TIMINGS FOR VALENCE RATINGS



Where, in the four strands of graph,

- 1) First (Red) Strand = No-Sound Negative
- 2) Second (Green) Strand = No-Sound Positive
- 3) Third (Red) Strand = Sound Negative
- 4) Fourth (Green) Strand = Sound Positive

The graph above does not give us a proper correlation between IAPS image and its reaction time for Valence Rating.

Therefore, I have done the analysis on the mean of the four categories of IAPS image (Sound Negative, No-Sound Negative, Sound Positive and No-Sound Positive).

MEAN REACTION TIMINGS FOR VALENCE RATINGS

- 1) No Sound Negative: **4.7071**
- 2) No Sound Positive: **4.3359**
- 3) Sound Negative: **5.1269**
- 4) Sound Positive: **4.6496**

- No Sound Positive stimuli have **least reaction time**
- Sound Negative stimuli have **highest reaction time**

DISCUSSION

In this Analytical Study, the main goal was to understand and illustrate the hypotheses regarding Valence of an IAPS Picture and it's variation in affective space on providing affective visual stimuli.

We found some nice observations in this Experiment as:

- The experiment we carried out on small scale gave similar valence rating distribution as the normative valence rating(large scale) to a visual stimuli.
- In case of sound positive and no sound positive, Valence is directly proportional to arousal which means Positive Correlation.
- In case of sound negative and no sound negative, Valence is inversely proportional to arousal which means Negative Correlation.
- High correlation between Sound Positive and Arousal.
- Least correlation between No-Sound Negative and Arousal.
- Sound Negative stimuli produces more negative valence.
- Sound Positive stimuli produces more positive valence.
- No Sound Positive stimuli have least reaction time.
- Sound Negative stimuli have highest reaction time.

REFERENCES

- 1) Bradley, M. M. & Lang, P. J. (2007). The International Affective Picture System (IAPS) in the study of emotion and attention
- 2) Riegel M, Moslehi A, Michałowski JM, Żurawski Ł, Horvat M, Wypych M, Jednoróg K and Marchewka A (2017) Nencki Affective Picture System: Cross-Cultural Study in Europe and Iran
- 3) Wikipedia

APPENDIX

IAPS IMAGE CLASSIFICATION

No-Sound Negative Valence	No-Sound Positive Valence	Sound Negative Valence	Sound Positive Valence
			
			
			
			
