Lab 2: Implicit Association Test (IAT)
Student Worksheet

Overview

In today's lab we will be exploring social cognition through the lens of implicit associations. Humans are natural learners who acquire vast amounts of information (and misinformation) through experience, both consciously and unconsciously.   By definition we are more familiar with our conscious thoughts. Yet one of the major advances in modern psychology is the development of new methods to investigate the influential unconscious aspects of our minds.

The Implicit Association Test (IAT) is a widely used experimental paradigm to investigate automatic (and often unconscious) associations people have between pairs of concepts. In today's lab you will 1) participate in an Implicit Association Test, 2) analyze your own data and discuss the results, 3) work as a group to craft a hypothesis, design and implement a new Implicit Association Test, and 4) participate in this new experiment. For homework you will analyze the group data from your new experiment, and write up a summary of the results.

Why Study Implicit Associations?

Fortunately, compared to 10, 25, or 50 years in the past, many fewer people today explicitly endorse views that are racist, sexist, or generally discriminatory against groups of people. Prejudice remains hugely problematic and evident in a variety of sociological and psychological metrics, but survey data show that views have changed consistently further and further away from certain toxic forms of prejudice, such as racism. Consider the trend in the figure below, tracked by Gallup, polling whites about marriage between black people and white people (also note that for respondents 19-37 years old, approval today is around 97%, as the trend continues).

Do you approve or disapprove of marriage between blacks and whites?

■ % Approve
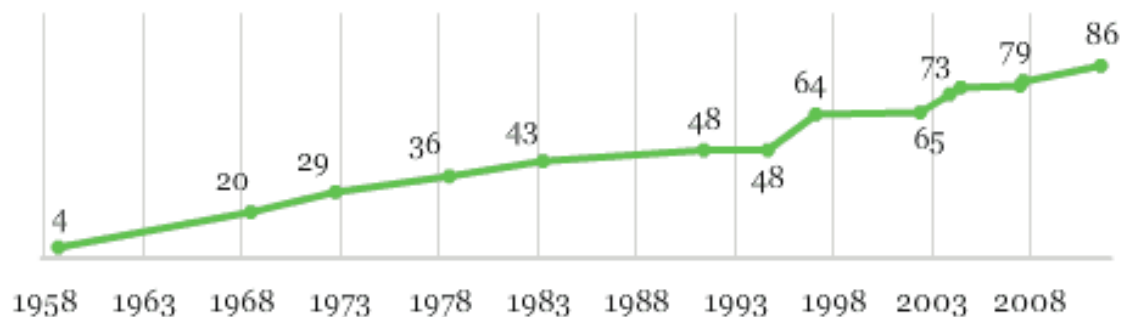
1958 wording: "...marriages between white and colored people."
1968-1978 wording: "...marriages between whites and non-whites."

GALLUP

Unfortunately, it is possible for unconscious associations to diverge from conscious beliefs and attitudes. Unconscious associations might be created by patterns in experience — average correlations observed over a lifetime between age and health, gender and employment, poverty and race, or social status and appearance, to name some hypotheticals — but we don't yet really know where these associations come from, and this is an important topic for future research. One clear demonstration of divergence between explicit views and implicit associations can be seen in the figure below, examining preferences for Young over Old. Younger people both implicitly and explicitly favor Young people. As people get older, their explicit views change, but their implicit associations persist in favoring Young (Greenwald, Nosek, & Banaji, 2002).
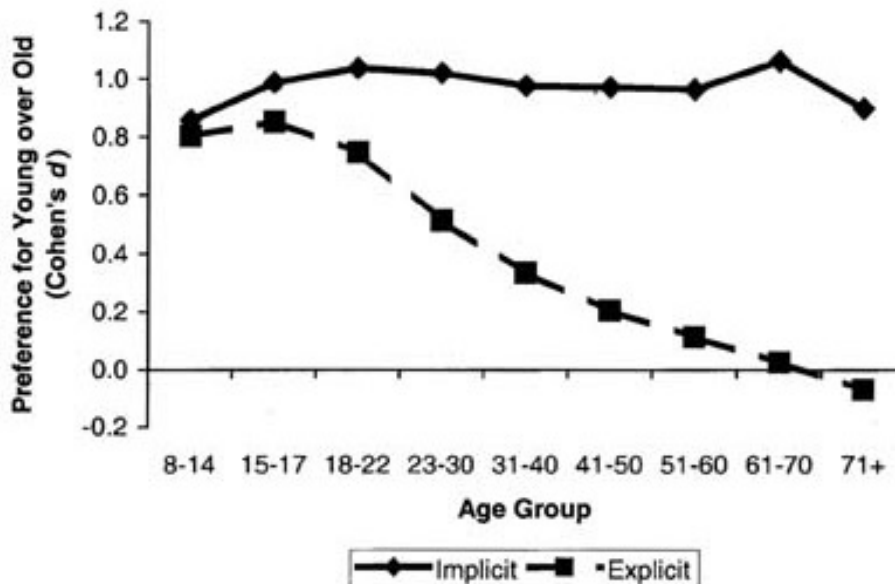
Reference: Greenwald, A., Nosek, B., & Banaji, M. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice, Vol. 6,* No.1, 101-115.

Implicit preference for young over old is among the strongest associations yet discovered with the IAT. However, implicit biases — ranging from subtle to strong — have been measured for a large number of social, demographic, and personal distinctions, including race, gender, sexuality, income, weight, and many more. It is important to emphasize that associations are not necessarily attitudes. We can and do make some important decisions consciously, aligned with explicit beliefs and values. Still, it is vital to recognize unconscious, automatic associations, especially when they conflict with our conscious values, because these automatic reactions can be influential whenever decisions are made quickly and without careful reflection. Unless we are aware of automatic associations, how can we correct our actions to account for them? Research is ongoing to investigate the sources of unconscious biases, and potential interventions that might change our implicit associations.

How Can the IAT Measure Implicit Associations?

The experimental logic of the IAT is quite clever. Assume you have two pairs of concepts; A & B, 1 & 2. For this example, let's consider A = Young, B = Old, 1 = Good, 2 = Bad. Is Young more associated with Good or Bad? Is Old more associated with Good or Bad? To test this, we use a series of categorization tasks. Each task takes two items that might be associated, and maps them to a single response: Press the Left arrow key for Young or Bad, and press the Right arrow key for Old or Good. Then we swap the groupings. Left = Young_Good; Right = Old_Bad. Items appear on the screen one at a time, and participants respond rapidly with the assigned response (Left or Right).

If you automatically associate two concepts (Young_Good), then it is easy and fast to map them onto the same response (Left). If you do not associate the two concepts (Young_Bad), then it will be difficult and slower to map them to a single response (Left). For full control, we can test all possible combinations of cross-category and response pairings. At the end we have response times and accuracy scores for performance. Were you faster when Young was grouped with Good than when it was grouped with Bad? If so, your faster responses suggest a pre-existing association between these two concepts. These pre-existing associations can be so strong that your expectations do not change the results — if you perform the task as quickly and accurately as you can, then the data will reflect your associations. (This imperviousness to conscious desires is a hallmark of the IAT, and is also a benefit for today's lab — even if you create the experiment yourself and don't want to see a particular bias, the IAT can still produce fairly robust effects).

Experience the IAT
Now you will take a version of the IAT. Carefully follow these instructions to get started.

1) Go to **lab.TeLLab.org**

2) Scroll down to the middle of the page and click **Register Today.** Register (it's easy, free, no spam, and you must have an account to download your data for the next exercise).
3) On top right, click **Experiments**.
4) Choose **Implicit Association Test**. Choose **Gender_Science_IAT** by the TeLLab Team by clicking the chain-link icon to start the experiment (fyi, the two-rectangle icon copies an editable version of the experiment to your account — we won't use this today, but it can be helpful if you want to gain further understanding of the experiment).

5) *Participate in the experiment.*

6) On top right, click **MyHome** —> **Experiments**. On the left, under "Experiments Completed," and Gender Science IAT, click **Long Format**. This will download your data as a .csv file.

7) Discuss the task with your classmates and lab instructor.
        What were the pairs of concepts being tested?
        Approximately how many stimuli were used for each concept?
        Why do you think these stimuli were chosen for the experiment?
        Can you think of ways to improve the design?
        Do you think the test will reveal a bias in your associations?

Analyze Your Own Data

1) Getting Started
- Open your .csv data file into Excel.
- Save your file with an informative name as a .xlsx file (e.g. LastName_IAT.xlsx)
- Create a new worksheet (on bottom tabs, click "+" tab), and name it AnalyzeData. Copy and paste all the data into AnalyzeData worksheet. Then lock the original data to protect it from being updated (hold option key and click worksheet tab, select "Protect Sheet"), so you can easily reproduce your analyses from the beginning, if needed.

2) Viewing Raw Data
- Spend 5-10 minutes orienting to the data file.
  - What information is in each column?
  - What is in the first row?
  - What is in each of the rows?
    - How do rows correspond to your experience in the experiment?
    - What rows are instructions, what rows are practice trials, and what rows are experiment trials?
  - Are there any columns that are useless (no info, or identical value in every row)?
  - If so, minimize these columns to lower the clutter.
  - What column contains a description of the stimuli?
  - What column contains response times? What is the unit of time being used?
  - What column, if any, codes experimental conditions?

3) Extracting Condition Information
- We want to compare average response times for the two main conditions: Female+Science_Male+Art versus Male+Science_Female+Art.
- However, condition information is embedded in Column M, and we need to extract it…
- We'll use the blank column L for this purpose. In cell L1, replace "Note" with "Condition"…
- Now we're going to use a function to extract Condition information from column M: Copy and paste the following complete function into cell L2: =IF((REPLACE(M2,31,20,""))="Women/Science-Men/Liberal Arts","FemScience_MaleArt",IF((REPLACE(M2,31,20,""))="Men/Science-Women/Liberal Arts", "MaleScience_FemArt","")) . This function will remove the labels for everything except experiment trials, and remove the stimuli from the condition names to simplify down to just Condition information for easily grouping trials by Condition.
- Next, hover over the bottom righthand corner of L2 until the cursor becomes a plus sign, +, then select that bottom right corner and drag down to the very bottom row of data. This replicates your function down the entire column, updating the input and output to correspond to the adjacent cell in M. [You can use this drag to replicate functions in many contexts]
- The Condition column now contains blanks for practice trials and instruction frames, and has renamed the condition trials in a uniform way.

4) Analyzing Your Data
  - Select all the data in this worksheet and click Sort (make sure you check to box to expand the selection, otherwise the data will get mixed and matched across rows after sorting, becoming useless). Sort based on Condition, alphabetically. This will put all the FemScience_MaleArt trials together in a group, and all the MaleScience_FemArt trials together in a group.
  - Now calculate the mean response time for each of your conditions, =average(N70:N137) and =average(N138:N205). Which condition has a faster response time? How would you interpret this? What is the standard deviation of the response times for each condition? You should also run a t-test over the response times for the two groups, =ttest(N70:N137,N138:N205, 2, 3). It will output a p-value. Is the p-value less than .05 (i.e. significant)?
  - Try running some exploratory analyses. Overall, were you faster pressing the left or right key? Significantly faster? Which condition had more errors? What figure will most effectively communicate your results? For additional exploration, try selecting all the data and using Pivot Tables in Excel.

Creating a New IAT Experiment

It is time to transition from being a participant to being a scientist. Your lab instructor will lead a collaborative brainstorming session to guide the class through designing a new IAT experiment.

If you completed the data analysis quickly, and you are waiting for the rest of class to catch up, here are some questions to think about in preparation, then discuss with your classmates:

  - What automatic associations do you think you might have for various forms of social, demographic, or personal information?
  - What would you like to know about your fellow classmates' implicit associations?
  - Are you more interested in potentially surprising results, or attempting to confirm something you already expect exists?
  - Note that your participant sample for this experiment will be limited to your lab group, and questions about individual differences (e.g. how do associations differ between liberals and conservatives, or change over age) can't be addressed with such small samples.
  - The IAT design and logic are quite open-ended and you can test associations between any two pairs of concepts you can imagine (e.g. polar bears versus grizzly bears and coca-cola versus pepsi). However the focus for today's investigation will be something of psychological importance.

Homework
Group Data Analysis & Summary of Results & Inferences

For your lab homework this week, you will be analyzing data from the experiment you collaboratively designed and participated in with your lab. You can use your experience analyzing your own data as a template. Your lab instructor will send you the data after everyone participates. To explore your data in even more ways, try selecting all the data and then using the Pivot Table function in Excel — this will rapidly let you, for example, see the average response times by condition for every participant, or figure out whether particular stimuli produce anomalous effects on response time.

Once you have completed your analysis of the group data, refer to the QALMRI document for guidance summarizing the Question, Alternatives, Methods, Results, and Inferences, in approximately 1000-2000 words. Submit this summary on Blackboard by 11:59 pm on the night before your next lab (e.g. Monday labs submit by 11:59 pm on Sunday night).