**THE EFFECT OF EXPERIMENTAL SET-UP ON THE CONJUNCTION FALLACY: How intention can influence our decision-making**

**SURA 2020**

**Research Question and Background Discussion**

This study aims to examine the effect that perceived intention has on decisions made by participants in the specific context of a psychological paradigm: the conjunction fallacy. Specifically, we aim to ask answer the question, “What effect will weak and strong sampling have on the outcome of the conjunction fallacy paradigm with the Linda Problem?”

To discuss the conjunction fallacy, we refer an experiment called the Linda Problem in the 1983 Tajfel seminal paper. The following problem was given to participants:

*Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.*

Which is more probable?

1. Linda is a bank teller.
2. Linda is a bank teller and is active in the feminist movement.

The probability of the first statement being true is less than the probability of the first and second statements being true. Imagine that the probability of Linda being a bank teller is 5%, or 0.05, and the probability that Linda is a feminist is 5%. The majority of participants (85%) choose Option 2: “Linda is a bank teller and active in the feminist movement.” They chose the *conjunction* – the probability of two statements put together – and wrongly did so, thus making it a *fallacy*.

In our study, we plan to use strong and weak sampling to convey intention to the participant. Strong sampling corresponds to the learner having knowledge of intention or guidance from a teacher, and weak sampling corresponds to the opposite – when a learner does not have knowledge of intention and is left to make their own conclusions. For example, suppose that a hiker on a trail comes across a fork in the path and sees a stack of three rocks of decreasing size placed upon each other along the side of the leftmost path. If hiker understands that three rocks placed upon each other is an intentionally constructed indicator from one hiker to another, they can conclude something further about the path that is relevant to hiking, perhaps a sign of danger or safety. This is an example of strong sampling – the knowledge of intention guides the learner. If the hiker has no such knowledge, there are more possibilities for the conclusions that they will draw about the path. This is an example of the weak sampling case.

**Experimental Design and Methods (*and justification*)**

First, we proceed by conducting a meta-analysis of studies of the Linda Problem paradigm by searching, scanning, and reading through papers found on Google Scholar and JSTOR to gain a deeper understanding of the conjunction fallacy effect when performed with multiple variations and with a variety of populations. Next, we plan to investigate methods of strong and weak sampling that might be effective in testing the conjunction fallacy using an online study. We have begun to consider methods of framing intention of the experimenters. At this moment, we have arrived upon two points of possible exploration:

1. Assigning authorship of the problem statements to a human experimenter for one condition and assigning authorship of the statements to a neural network, and
2. Conveying experimental instructions with a robotic voice as opposed to a human, recorded voice.

Assigning authorship to a human experimenter associates human intention with the problem text while assigning authorship to a neural network distances the problem text from the idea that a human experimenter intends for one certain choice to be picked over the other. Similarly, a robotic auditory presentation of the problem text can possibly distance the problem text from human intention.

After investigating further into other possible avenues of strong and weak sampling, we aim to adjust our current experimental design to reflect our findings. Finally, we plan to use the Linda Problem text, along with slight variations on the character descriptions and choices, in an online study with the above methods of sampling.

**Significance of Research**

At any given point in time, the decisions we make are influenced by a great variety of factors. In particular, humans are sensitive to the motivations and intentions of others.

We find that certain portions of the description text in the Linda Problem are notable:   
“Linda is…single, outspoken…majored in philosophy…was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.” These portions are suggestive of the second statement of the incorrect option, “[Linda] is active in the feminist movement”. It is possible that participants’ understanding that this problem was written by human psychologists that are testing a hypothesis in the context of an experiment has an effect on which option they ultimately select in the Linda Problem.

Though simple, the conjunction fallacy is a clear representation of decision-making that is influenced by the set-up of the problem presentation to participants. This study aims to gain insight into the cause of the conjunction fallacy, i.e. if it is simply due to limited knowledge of statistical rules, or if it is influenced by the perceived intention of the experimenters.

Experiments in the field of psychology aim to understand how we process stimuli and make decisions, but experiments themselves are also suspect to the perceptive nature of participants. The language, delivery, and set-up of an experiment itself will undoubtedly have an effect on the outcome. A better understanding of the influence of human intention on experimental set-up will allow scientists to obtain more accurate results and lead to an improved understanding of human decision-making.

To whoever is reading my proposal: I know you probably expected four short paragraphs! Thanks for your patience for sticking through to the end; I appreciate it and look forward to your feedback!