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All deletions are marked by ~~strike-thru~~ text, and all insertions are marked by **yellow highlight**.

**Revision: Reproductive Hormonal Status as a Predictor of Precognition: Pregnancy Experiment;
A Confirmatory Experiment**
Research Protocol Registry Document

Protocol Title: Reproductive Hormonal Status as a Predictor of Precognition: Pregnancy Experiment; A confirmatory experiment

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Abstract

Previous evidence and three exploratory experiments suggest a correlation between reproductive hormones in women and performance on precognition tasks. An additional online exploratory experiment revealed that pregnant women perform significantly better on a conscious precognition task than non-pregnant women in the same age group; however due to the difficulty of locating pregnant women online, they were necessarily paid more than the non-pregnant women. In the proposed confirmatory experiment, we will attempt a confirmatory replication of this effect among ~~locally recruited~~ unpaid participants **recruited online via the Institute of Noetic Sciences website and newsletter**, to remove the potential confounding factor of participant payment. **Revision note: This change was made because only 1 local person participated in the study, despite our recruitment efforts, within the first three months of recruitment. Note that data from this participant has not been analyzed and will be deleted.**

Objective: The objective of the study is to confirm previous results indicating that pregnant women perform better on a conscious precognition task as compared to non-pregnant women in the same age group (18-35).

Background

Recent empirical evidence strongly suggests that people can have access to information about future events that are generally considered to be unpredictable. While many anecdotal experiences suggest that this is the case, controlled laboratory evidence is required to verify this phenomenon, called *precognition*. In the laboratory, precognition seems to occur only in certain circumstances, such as when individuals are in a relaxed state, they are responding quickly, and/or future events are salient.

The reverse-time nature of precognition violates everyday intuitions about the order of events in time, and it is therefore regarded as controversial by most scientists. Nonetheless, according to the results of two recent meta-analyses examining different types of precognitive effects (D.

Bem, Tressoldi, Rabeyron, & Duggan, 2015; J. Mossbridge, Tressoldi, & Utts, 2012), precognition is statistically reliable. While the cumulative evidence for precognition is quite strong relative to most other psychological and psychophysiological phenomena, there is still no agreed-upon explanation for it.

When the mechanism underlying an effect is unknown, any consistent parameter dependencies in the effect can help shed light on the mechanism. For instance, recently it has become clear that some forms of precognition are more likely to be revealed when participants respond quickly rather than deliberating over a choice (D. Bem et al., 2015), implying that at least these forms of precognition may not depend on conscious analysis.

We recently discovered what we believe to be another parameter dependency in precognition, specifically a gender difference, in which men and women show opposing patterns. There is also partial evidence that this gender difference declines with age in women. Over their lifespans, women's reproductive hormones change more drastically than men's, so the observation of the reduction of a gender difference with age in women could suggest that reproductive hormones may be tied to the mechanisms underlying precognition. To our knowledge no one has empirically assessed the relationship between reproductive hormonal status in women and precognition.

We have now conducted several analyses of data related to gender, hormones and precognition. Most recently, an online experiment using a conscious precognition task delivered on a smartphone revealed a significant performance difference: pregnant women (months 4 and later) performed better than nonpregnant women, with an effect size (Cohen's *d*) of 1.39. This experiment is an attempt to confirm this difference, using unpaid participants to avoid payment as a potential confound.

Design: Online data collection, blind (participants blind to the purpose of the study), across-participant design. Comparison groups are:

Women:

- known pregnant (> 3 months) and between ages 18-35
- known not pregnant and between ages 18-35

Men: No men are included in this confirmatory study

Participants: Goal: 25 pregnant and 25 non-pregnant women (about 15 women in each group needed to have 80% power to test our hypotheses with an alpha of 0.01). However, the online platform creates a situation in which sometimes more participants than expected complete the experiment. We will take all participants who complete the experiment without discarding any data within the first three months of gathering data (timed from the approval of this revised document), but no data analysis will be completed until after it is clear that the minimum number of participants in each group has been met or 3 months of data collection have passed, whichever comes first. Women who are under 18 or older than 35 will be excluded from the analysis (though they can participate in the study and their data will be used for exploratory analyses). All participants must perform the study on an iPhone, so anyone without access to an iPhone is

excluded. Analyses that include “all participants” refer to all recruited participants within the demographic constraints.

Recruitment: Participants will be told that the experiment is meant to study intuition. All participants will be recruited via **the Institute of Noetic Sciences website and newsletter.** fliers posted in locations women frequent in downtown Sebastopol and Santa Rosa (yoga studios, gyms, health centers, health food stores). Participants will be asked to contact the experimenter for more information, once contacted the experimenter will provide participants with a link to a survey to gather their demographic information and a link to the experimental task download.

Tasks and Procedures:

After completing a consent form and a survey about their age, gender and pregnancy status, participants will be asked to download the Psi3 app from the app store. In that app they will be asked to complete another consent form to gather data from the app, and also will be asked to complete the Big5 questionnaire (see below) as well as answer two questions about their belief in and experience with psi abilities.

Big5 Questionnaire

The brief Big-5 Inventory (Rammstedt & John, 2007) will be administered online to all participants prior to the experimental task, using the following 10 questions:

English version.

Instruction: How well do the following statements describe your personality?

I see myself as someone who ...	Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly
... is reserved	(1)	(2)	(3)	(4)	(5)
... is generally trusting	(1)	(2)	(3)	(4)	(5)
... tends to be lazy	(1)	(2)	(3)	(4)	(5)
... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
... has few artistic interests	(1)	(2)	(3)	(4)	(5)
... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
... does a thorough job	(1)	(2)	(3)	(4)	(5)
... gets nervous easily	(1)	(2)	(3)	(4)	(5)
... has an active imagination	(1)	(2)	(3)	(4)	(5)

Conscious precognition task

Participants will be asked to perform the “Hidden Gurus” game on the app 5 times for a total of 50 trials (5 sets of 10 trials). In this game, participants try to predict the future location of an avatar or “guru” that appears on the screen after the user presses on the screen of the smartphone to make their prediction. On each trial, the location at which the guru is presented is calculated only after the participant makes their prediction. This location is calculated using a random number generator using a truly random source (the KISS07 Java algorithm XOR’d with the rapidly changing output of the phone’s accelerometer). 5 games take about 5-10 minutes to perform. Though the participant is shown a score correlated with their performance on each set of 10 trials, the score used in the analysis is calculated in a more rigorous way (see below).

Data cleaning

Participants who do not complete the entire experiment will be excluded from the data set (though their data will be recorded for potential later analysis). Original (first-time) data from participants who complete the experiment more than once will be kept and any additional data will be excluded from the data set (though again, we might examine these data in an exploratory analysis). Participants who report they are pregnant but do not report that they are female and participants who report they are pregnant with gestation ages 3 months or less will be excluded from analysis. The number of participants obtained will be calculated after these exclusions, and more participants will be added to each group as needed, until the final number of participants after making these exclusions reaches the planned amount in each group or greater, or 3 months of data collection have passed, whichever comes first. No data analysis will be performed until after all groups have met their quotas (or the 3 months have ended). Leaving the experiment open for a longer period of time will likely not produce an increase in the number of participants, as recruitment tends to fade after the initial burst.

Dependent variable

We are concerned with one dependent variable derived from performance on the Hidden Gurus task. In both a pilot study and in the online study comparing the performance of pregnant vs. nonpregnant women, the fourth of five Hidden Gurus games appears to be the game on which participants reveal consistent precognitive ability to the extent that they have any. Our dependent variable is the score calculated from all 10 trials in the 4th game. Note that even for participants who do not complete the 5th game, we will include their data in the analysis as according to an intent-to-treat protocol. The way we calculate the score is by dividing the smartphone screen into four quadrants and determining, on each trial, whether the target “guru” and the press on the smartphone screen were both in the same quadrant (a “hit”) or not (a “miss”). Hits are given 1 point and misses are given 0 points, and the average score across all 10 trials is calculated. Chance is 0.25.

Prediction for this confirmatory experiment:

The dependent variable will be significantly higher amongst pregnant as compared to nonpregnant women (pregnancy as defined by our parameters).

Data Analysis

No participant recruitment or data analysis will be performed until this protocol is approved and registered.

Statistical standards

If all participants who perform any trials in game 4 perform all game 4 trials (in other words, there are no partial completions of the 10 trials in game 4), an independent samples two-tailed t-test will be used to determine whether the means of the dependent variable differ between the two groups. If there are any participants who do not complete all 10 game 4 trials, we will instead examine the same hypothesis using a pooled binomial test comparing the performance of each group to chance, as well as a chi-square analysis comparing the two groups to each other. Alpha will be set at 0.05 for interpretation of significance.

References

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