Experimental Psi: Recent Innovations

In recent years parapsychologists have been developing new methods of testing for psi, based on digital technologies. These include double-slit optical systems, mobile apps and mass online testing.

Double-Slit PK Experiments

Since the 1980s, psychokinetic ability has been tested by means of random number generators. A more recent approach, adopted by Dean Radin at the Institute of Noetic Sciences (IONS), uses a double-slit optical apparatus to test the idea that consciousness influences the behaviour of quantum systems.

Local Experiments

Radin reported experiments where participants directed their attention away from and towards a sealed double-slit optical system at a distance of three meters. They were asked to place their minds at the location of the detector and try to identify which path the photons had taken, in the process reducing the wavelike nature of the light and increasing the particle-like nature. They were given real-time audio feedback with regard to the amount of wave-like behaviour measured in the interference pattern. One hundred and thirty-seven participants were tested in six experiments for a total of 250 test sessions. A very small effect was found, around one part in a thousand, but this is statistically very significant: ($z = -4.36$, $p = 6\times10^{-6}$).1

The most successful subjects were experienced meditators; non-meditators produced results close to chance. Psychological variables such as openness to experience, proneness to absorption and level of attention (as measured by EEG) appeared to correlate with the degree influence of the interference pattern.

Remote Testing

To eliminate the possibility of influences such as body temperature, Radin designed a follow-up online experiment, with the eventual participation of around 1,500 people in 77 countries. The effect size was a magnitude smaller than that found in the lab, but gave a hugely significant z-score of 5.72 ($p = 1.05\times10\text{-}8$).2

Single Photons

In the experiments described above, trillions of photons were measured each second. To test the influence of consciousness in a more detailed fashion, a double-slit system was developed in which a single photon registered at any one moment. Two hypotheses were tested. In the 'consciousness causes collapse hypothesis' (CCH), attention directed at the system causes the interference pattern to become less wave-like and more particle-like. In the 'consciousness influence hypothesis' (CIH), attention may either increase or decrease the wavelike nature, depending on goal-oriented factors such as feedback, subject motivations and experimental set-

up. Across a total of six experiments, some were significantly positive and others significantly negative, resulting in an overall mean shift at chance level, but highly significant variance, with a z score of = 3.95, p = 3.77 × 10-5, supporting CIH rather than CCH.[3]

Replication

Gabriel Guerrer, a physicist based at the University of Sao Paulo, Brazil, has independently replicated the double-slit experiment.[4] In the initial five experiments, he achieved a highly significant result over 160 sessions (z score 3.95, p= 10^{-5}). He then pre-registered a further 120 sessions, which unexpectedly gave significant results in the opposite direction to that anticipated when analysed according to the CCH. When the data were analyzed according to the more successful CIH, by looking at the degree of variance, this resulted in a significant z score of 2.75 (p = 0.01), further supporting the CIH model.

Guerrer is continuing this research in Rio de Janeiro as a privately funded investigator.

Future Work

Radin is adapting similar mainstream physics experiments to look for signatures of conscious influence. The main focus is on entanglement – the phenomenon of particles with a shared past communicating instantaneously over distance – looking to see if human intention can strengthen these correlations.[5] This experiment is being also being carried out in France at the Institut Métapsychique International (IMI) by physicist Peter Bancel.[6]

At IONS, Radin is developing a next generation double-slit system capable of detecting which slit the light goes through, to see whether this knowledge affects the ability of a subject's intentions to influence the photon's behaviour.[7] *** **this link leads nowhere too. Just delete?** Radin is seeking to make this research more accessible to interested investigators by creating an affordable version.[8]

Mobile Phone Apps

Mobile technology has brought new opportunities to expand psi testing among the general population. Several psi applications are currently available and others are in development.

Psi 3

In psychokinesis tests, participants are asked to try to influence the output of a random number generator to achieve minute but statistically-significant variations from the chance mean. Psi 3 is an app developed by neuroscientist Julia Mossbridge, connecting the phone to a quantum-based random number generator to enable the user to test for psi ability, ESP as well as PK.[9] *** **both Apple links in this paragraph are bad. Easy to delete the URLs but the second one looks like it's supposed to be a source. Not sure what to do.**

- In a test for psychokinesis, the user taps the image of a robot to help him grow a heart.
- Conscious precognition is tested by guessing where the image of a hidden guru will appear in the future.
- The user tests for unconscious precognition by clicking happy or sad faces to describe the mood of a photograph. This is followed by the random presentation of a happy or sad word, with a match constituting a hit.

Preliminary results from more than two thousand people reveal significant effects of age and gender across the three tests.[10] ***Another bad link** More comprehensive analyses of data from ten thousand participants revealed marginally significant below chance PK effects (p = 0.05).[11]

AmIPsychic

Am I Psychic is an app developed by Dominic Parker, a PhD candidate at Saybrook University, Oakland, California, testing for precognition or psychokinesis by means of dice, cards or spoons.[12] *** **these ones too.**

- Dice. In the precognition test, subjects guess which face of a die will be chosen in the future. In the psychokinesis version, the subject chooses a face to focus on after a run has started. The run length can be thirty, sixty or 180 seconds, with a new face selected every few seconds.
- Cards. In the precognition test, subjects guess which of six coloured cards will be chosen in the future. In the psychokinesis version, the subject chooses a colour to focus on after a run has started. Again, the run length can be thirty, sixty or 180 seconds, with a coloured card selected every few seconds.
- Spoons. In the precognition test, subjects guess which of six spoons bent at different angles will be chosen in the future. In the psychokinesis version, the subject selects a particular angle to focus on, and as the run progresses the spoon bends rapidly through the angles.

Here, the random number generator is based on a random selection of a seed number that provides the string of numbers sent to the phone. It is therefore a pseudoRNG, but thoroughly tested and passed for randomness.

The app encourages the user to send the data for scientific analysis. Several years worth of data will be analyzed as part of Parker's PhD thesis.[13]

Entangled

Entangled is a mobile app being developed by inventor and tech entrepreneur Adam Curry. It uses the random processes inherent in an iPhone's accelerometer to generate the random numbers on which its operation is based. The Entangled project is designed as a mass test of the influence of human consciousness on random systems – a huge PK experiment conceptually replicating the Global Consciousness Project, where each phone is turned into a random number generator. The project has three objectives:[14]

- Local data. The subject can use the phone directly to test for psychokinetic ability and follow progress over time. Push notifications signal when the phone RNG is behaving outside of chance, alerting the user to check for any real-world significance.
- Global data. Data from numerous users can be viewed on a map, enabling identification of activity hotspots that are indicated by correlations between the output of various RNGs. These hotspots can then be correlated with wider societal or community events.
- Lab data. The supply of data to enable testing of pre-planned hypotheses such as the effects of earthquakes, terrorism strikes or elections on various sub-populations and across various geographical locales (under development).15

Internet Testing

The Internet is increasingly being used to facilitate mass psi testing that is both economical and tightly controlled.

Gotpsi?

The Gotpsi online suite of tests hosted at IONS has been in operation since 2000. The brainchild of Dean Radin, it tests for psi performance in three major classes of experiments: forced-choice tests, spatial tests, and remote viewing. With over 250 million trials from 350,000 people, this represents the largest body of psi data ever collected, to be used to look for subtle patterns suggestive of psi.16

Forced-choice Tests. Two forced-choice tests were conducted: a card test in which a target card was chosen from five possible options and a simple three-choice picture guessing task. Over 100 million trials from an estimated 200,000 individuals around the world were collected. The direct hit rate combined across both experiments came close to the expected 20% chance level, but a planned secondary analysis based on previous research resulted in an extremely significant deviation of $z = 10.6$, $p < 10^{-25}$. In this analysis, a pattern in the hitting and missing that had been camouflaged by standard significance tests emerged strongly. Control tests found no evidence for optional stopping, response biases, target sequence dependencies, learning of subtle cues, or other potential artifacts.17

Spatial. The user is asked to guess where on a blank screen a dot will be placed. After the choice has been made, the web server randomly picks a location and calculates a probability value for the subjects guess. After eighteen years there have been nearly 600,000 sessions, totalling 48.5 million trials. Radin reports a very large positive influence of belief in psi on the outcomes to a hugely significant degree, with a z-score in excess of 5 ($p = 10^{-6}$).18

Remote Viewing. The user imagines what image will be presented later and completes a simple binary questionnaire for the presence or absence of features such as people, open spaces and water features. The image is presented and a probability value calculated for the trial. After eighteen years a total of 1.2 million

trials have been collected, again revealing a hugely significant relationship with belief in psi ($p = 10^{-8}$).19

Markus Maier

Online testing affords the opportunity to ask new kinds of questions because of the large amount of data that can be collected and readily analysed. Accordingly, some parapsychologists host websites that are totally dedicated to harvesting data, and also use online testing to augment their lab-based research. A leading example is the work of Markus Maier's team at the Department of Psychology at Ludwig-Maximilians-University in Munich, Germany. The team has carried out many experiments, testing for precognition (especially replicating Daryl Bem's work) and more recently psychokinesis.

In a large-scale experiment recently reported in *Frontiers in Psychology*, Maier and Moritz Deschamps reported on data taken from 12,500 participants who were recruited online by a data-collection company.20 Subjects were exposed to auditory and visual stimuli designed to elicit either a positive emotion (photos showing aspects of social belonging and affiliation, landscape shots, and pictures of cute animals and pleasant-sounding, harmonious chords), or negative emotions (pictures depicting imminent danger or pitiful and nauseating images and anxiety-inducing, discordant sounds). These images and sounds were controlled by a true random number generator (based on quantum processes). It was hypothesized that underlying motivations to seek pleasant stimulation rather than unpleasant stimulation would bias the random output accordingly. The overall results were close to chance. However, the researchers noted an undulating pattern in the temporal evolution of the PK effect, which had been predicted beforehand on the basis of previous research and theory. When this harmonic oscillatory effect was modelled mathematically, it was found to be statistically significant. Such findings are important because they support new theories about psi production.21

Julia Mossbridge

Julia Mossbridge, based at the IONS (among other appointments), is a leading researcher in the phenomenon of presentiment, where the body responds seconds in advance of unpredictable future events – a major line of parapsychological research. A concern is that during an experiment, expectancy effects might account for some positive results. To counter this, Mossbridge developed a single-trial testing paradigm in which only the *first* trial is used, for which there can be no expectancy issues.

Mossbridge has investigated presentiment in the brain's EEG patterns, skin conductance and heart rate using this approach. In a typical study, subjects selected by Amazon's Mechanical Turk – an online platform where people are paid to take part in research – sit in front of their console while a smartphone app measures heart rate responding to a camera light flash. They are instructed to guess which of four cards will win , and wait to see if they are correct. Mossbridge has found pre-stimulus heart rate differences based on future outcome. Gender is a clear moderating factor with men showing stronger pre-stimulus heart-rate effects.22

Michael Duggan

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Endnotes

Footnotes

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