The Psychic Staring Effect

An Artifact of Pseudo Randomization

Rupert Sheldrake claims that people can tell when somebody is staring at them. Unfortunately the sequences used in Sheldrake's research are not properly randomized. When random sequences are used people can detect staring at no better than chance rates.

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See also: Rupert Sheldrake's response

Rupert Sheldrake (1994) has written a curious book, *Seven Experiments That Could Change the World: A Do-It-Yourself Guide to Revolutionary Science*. Sheldrake proposes an *Alice Through the Looking Glass* vision of things that possibly could be so but, in all probability, are not. Doing science in a controlled and thoughtful manner is a challenging and tricky operation. This is especially true of research on the paranormal, where the claims are difficult to prove because the effects are small and unreliable. Sheldrake advocates the collective participation of amateurs and nonscientists who have the "freedom to explore new areas of research." It is certainly true that the theories and methods of science change slowly and at times scientists do appear reluctant to accept new paradigms. Anybody capable of switching on a computer and downloading Sheldrake's Web pages can become a member of Sheldrake's army of revolutionary scientific experimenters.

Apart from their reluctance to change paradigms, it has been shown elsewhere (Marks and Kammann 1980; Marks 2000) what can happen when research on the paranormal is left purely to a few of the professionals. They can mess up badly. Sheldrake encourages us to set aside our prejudices about the "prestige of professional credentials" and wait for the outcomes of his "world changing" experiments. This is an awesome prospect that we can only wait for in trepidation. Will they randomize correctly? Will they use double-blind controls? Will they prevent cueing? Will they use independent judges? Will they use proper statistical procedures? The questions go on and on, but in the end, it will be a matter for future commentators to judge whether knowledge grows faster with Sheldrake's revolutionaries or with the conventional methods of normal science. In this article we examine the early findings concerning one of Sheldrake's seven phenomena: psychic staring.

The Perceptual Theory of the Staring Effect

Rupert Sheldrake (1994) has a radically new theory of perception. Contrary to commonly held and, so Sheldrake believes, possibly mistaken assumptions, we do not see images of things inside our brains. The images, in fact, may be outside us: "Vision may

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involve a two-way process, an inward movement of light and an outward projection of mental images." Imagine, for example, that as you read this page rays of light are traveling from the paper and print in front of you, into your eyes, and from there into the visual processing centers in your brain. At the same time this is happening, Sheldrake suggests that your images and perceptions of these very words are projected outwards through your eyes into the world, ending up exactly where the page and print are. There is no conflict between the real page and the imaged page because they look identical and occupy the same area of space. In the case of illusions and hallucinations, the images do not coincide with the things outside us but involve projection, an outward movement of images, nevertheless.

Sheldrake's hypothetical process of outward projection of images has some interesting implications. If our minds reach out and "touch" what we look at, then we may directly affect what we look at. For example, when we stare at somebody from behind, they may be able to actually feel that we are staring at the back of his or her neck. This feeling of being stared at apparently gives the impression of strain or pressure from skin, muscle, tendon, and joint in or around the neck region. Titchener (1898) described the feeling as "a state of unpleasant tingling, which gathers in volume and intensity until a movement which shall relieve it becomes inevitable" (895). There is in fact a sizable literature of experiments on "psychic staring," the fact that some people believe that they can determine when they are being stared at by another person who is not directly in their field of vision. Colwell, Schroeder, and Sladen (2000) reviewed this literature and carried out some empirical tests.

The psychologist Titchener reported the phenomenon over a century ago, and the idea that "unseen" staring can be detected has been supported in the subsequent research with incidence rates as high as 68-86% (Coover 1913), 74% (Williams 1983), and 92% (Braud, Shafer, and Andrews 1993a). Titchener rejected the idea that the staring effect was based on telepathy and suggested the hypothesis that the eye is attracted to movement and the starer's gaze is therefore attracted to the staree's head turning in his direction. This is certainly the case in everyday life. One of us (DM) well remembers a staring incident when his son Michael was about eight years old. Michael became disturbed one day as we were walking along a neighborhood street that people were staring specifically at him. I asked Michael how he knew that unless he had already been staring at them! Michael's feeling of being stared at disappeared shortly after that. Similarly, Titchener attributed the cause of the feeling of being stared at to the staree, not the starer, and so the attribution of causality to the starer is false, a misinterpretation (Colwell, Schroder, and Sladen 2000).

Sheldrake has conducted new experiments on the staring phenomenon and encouraged school children and other members of the public to participate in his research program. Experimental kits can be downloaded from the New Scientist Web site, including an interesting list of twenty-four "random" sequences for use in experimental trials. Sheldrake suggests that each child in a group be tested with a different sequence or use sequences determined by tosses of a coin. The results are being compiled by Sheldrake into a pooled data set.

There are two basic methods that Sheldrake's revolutionary experimenters are expected to use:

1. Pairs of schoolchildren divide into starers and starees with the starer sitting at least one meter behind the staree. Using random number sequences and a method for signalling trials

such as a "clicker," the starer signals the start of each of a sequence of twenty trials. The staree wears airline blindfolds, and responses are recorded on data sheets by the starer. After a block of twenty trials, the two children change roles.

2. Starers and starees are isolated with starers inside and starees outside of the school building.

Early results reported in the British newspaper The Sunday Telegraph (Matthews 1997) obtained from 18,000 trials with schoolchildren suggest that non-staring trials produce chance guessing by the starees, whereas staring trials produce a 60 percent accuracy rate, a statistically significant result.

New Staring Studies

One of the authors (JC) decided to put the Sheldrake findings to rigorous test under controlled laboratory conditions (Colwell, Schroder, and Sladen 2000). On the basis of Sheldrake's observations, it was decided to investigate the staring effect both with and without feedback. Two new experiments were carried out at Middlesex University.

Experiment One

Twelve volunteers, seven men and five women, who believed in the staring detection effect, were tested individually in a situation where they were stared at (or not) through a one-way mirror while sitting with their back to the mirror. Sheldrake's original sequences were downloaded from the New Scientist Web site and used to guide staring and non-staring trials. Each participant received the first 12 sequences in the same order, with 20 trials in each sequence. The beginning and end of each trial was signaled to the staree on a monitor, after which he indicated whether or not he thought he was being stared at by pressing one of two response buttons. No feedback was given on the accuracy of each trial for the first three sessions (60 trials), but on the remaining nine sequences (180 trials) the word "correct" or "false" appeared after each response. The results are summarized in table 1.

Table 1. Overall accuracy scores in Experiment One (Colwell et al. 2000).

	Non-Feedback Trials			Feedback Trials		
	Stare	**No Stare**	**Total accuracy**	**Stare**	**No Stare**	**Total accuracy**
Avg.	16.4	13.5	29.9	53.7	45.0	98.7
MCE	15.0	15.0	30.0	45.0	45.0	90.0

Avg.-Average
MCE-Mean Chance Expectation

The results showed that with no feedback, no significant results were obtained. With feedback, however, there was statistically significant above-chance accuracy, with 98.7 correct trials compared to a Mean Chance Expectation (MCE) of 90.0 ($p<.001$). On the surface, these results appear to confirm Sheldrake's original findings. However, the different results obtained with and without feedback suggested that there could be another "normal" explanation of these data.

The starees may have been learning something useful about the

sequences as a result of the feedback. If the sequences used to generate the trials were not perfectly random then they could have a predictable patterning in their structure. It is sometimes the case that experimenters use pseudo-random sequences rather than truly random ones (Brugger, Landis, and Regard 1990). This enables the experimenter to equalize the number of trials in two different experimental conditions (e.g., stare versus non-stare) and means that the starees may have been able to learn the sequence structure from the feedback. Such learning will increase with exposure, and to test for this possibility the twelve sessions were divided into four blocks of three sessions each (table 2) and accuracy scores were compared across the four blocks of sessions.

Table 2. Average accuracy for staring and nonstaring trials across the four blocks of 60 trials each (Colwell et al. 2000).

Block	Stare Avg	Stare Sig Level	No Stare Avg	No Stare Sig Level	Total (Stare + No Stare)	Total Sig Level
1	16.42	NS	13.50	NS	29.92	NS
2	17.25	.009	13.67	NS	30.92	NS
3	17.75	.001	15.33	NS	33.08	.002
4	18.67	.0001	16.00	NS	34.67	.001

Avg.-Average
Sig.-Significance
NS-Not Significant

The results in this table show clear support for the hypothesis that learning has taken place. The average level of accuracy improves from block 1 (no feedback) through blocks 2-4 (with feedback). This can be seen in the gradually increasing accuracy (see columns 2 and 6).

This suggests that Sheldrake's "random" number sequences actually contain structure, or bias, and therefore an analysis of them was undertaken. The number of repetitions in a sequence of 20 binary events should be 9.5 (Wagenaar 1970, 1972). The numbers of repetitions in Sheldrake's 12 sequences are: 6, 6, 6, 8, 8, 8, 8, 9, 9, 7, 7, 7, averaging 7.42, and this is below chance level. The average probability of a repetition is 0.39, well below what would be expected in a truly random sequence (0.50). Another way of analyzing the patterning in the sequence trials is to divide the series of stare (S) and no stare (N) trials into the eight possible trios or "three-tuples" of trials, e.g., SNS, SNN, SSN, etc. (Rapoport and Budescu 1997). In theory a random sequence should contain an equal number of the eight kinds of three-tuples giving each of the eight a probability of 1/8 =.125. The frequency of each trio was analyzed across the 12 sequences. There were huge deviations from a random distribution with many more alternating sequences (SNS and NSN) than there should have been and far fewer sequences of SSS and NNN. The deviation from randomness was highly significant ($p<.001$).

It appears likely that the subjects in the staring research are able to score above chance as a consequence of being able to learn the non-random patterns in the sequences using the feedback. This idea receives support from the literature on "implicit learning," which suggests that the learning can take place incidentally without conscious awareness (Reber 1989). There is a huge literature on "probability learning" that suggests people are

very good at learning the global and local probabilities in the patterning of events (e.g., Servan-Schreiber and Anderson 1990). The tendency of the participants to avoid multiple repetitions was well matched by Sheldrake's sequences that showed exactly the same property. The fact that starees can guess when staring is occurring at above-chance levels therefore demonstrates nothing other than an ability to notice patterns. This is a low-level ability that even a mouse can manage. However, it could be argued that improvement was not due to learning, but to an increase in sensitivity to unseen staring with repeated exposure -that is, a paranormal explanation. A critical test of the two explanations was to rerun the experiment using genuinely random sequences. Improving performance would support the paranormal explanation whereas an implicit learning explanation would predict failure to beat the mean chance expectation (MCE).

Experiment Two

Colwell, Schroder, and Sladen repeated the experiment with one main difference. Ten properly randomized sequences taken from random number tables were used instead of Sheldrake's nonrandom sequences to guide staring and nonstaring episodes. Tests of randomness were carried out and passed. Feedback was given in all sessions, the first one of the ten being purely for practice. In this case no improvement in guessing rates occurred over the three blocks of trials. The results of this experiment support the hypothesis that the improvement in accuracy during staring episodes observed in experiment one was due to pattern learning. When no feedback was provided and pattern learning was blocked (experiment one, blocks 1-3) no ability to detect staring was observed and also no learning. These data suggest that there is no evidence of a general ability to detect unseen staring when the staring and nonstaring trials are properly randomized or when no feedback is provided. The only positive results were in the context of feedback and the nonrandom sequences generated by Sheldrake.

Sheldrake has made little attempt to control for sensory cueing in his research, but some studies have solved the problem by increasing physical separation. For example, Williams (1983) linked starer and staree (in rooms sixty feet apart) by closed circuit television. Following a random number sequence, the monitor in the starer's room would come on for 12-second periods, enabling him to view the staree, and these constituted the staring periods. Presumably 12-second nonstaring periods were also provided. A positive detection effect was obtained. No feedback was given, and so implicit learning would not be possible. However, as in Sheldrake's research, randomness of sequences was not controlled for, and the possibility of a matching in bias between experimental and response sequences exists, which could lead to increased accuracy (Gatlin 1977).

Explanations in terms of sequence randomness would not account for the positive results obtained by Braud, Shafer, and Andrews (1993a, 1993b). This research used a setup similar to that of Williams (1983), except that the measure of detection was physiological-spontaneous phasic skin resistance response (SSR), which measured sympathetic autonomic nervous system arousal. However, the robustness of Braud et al.'s findings is open to question, since some replications have found the effect (Schlitz and LaBerge 1997), while others have failed (Wiseman and Smith 1994; Wiseman et al. 1995). Collaborative research by Wiseman and Schlitz (1997) using the same methodology, the same equipment, in the same location, at the same time, drawing participants from the same pool, resulted in evidence of a staring

detection effect for Schlitz (a psi believer) but not for Wiseman (a skeptic). Possible reasons for these experimenter effects are discussed, though no firm conclusions are drawn, and further research on this experimenter effect is recommended.

However, as both Colwell, Schroder, and Sladen (2000) and Baker (2000) point out, the detection of staring at a subconscious level provides no support for claims by Sheldrake and others of a conscious awareness of being stared at in the absence of normal sensory information. Baker's recent research, which included "informal staring" at individuals in everyday situations before asking them if they had been aware of being stared at, and laboratory sessions in which subjects acted both as starers and starees, provided no empirical support for a conscious ability to detect unseen staring.

Summary

Sheldrake has made the bold claim that people are able to consciously detect unseen staring at above-chance levels. Unfortunately the sequences he has used in his research are completely unsuitable. They follow the same patterning that people who guess and gamble like to follow. These guessing patterns have relatively few long runs and many alternations. The biased nature of Sheldrake's sequences has several unfortunate implications. First, it leads to implicit or explicit pattern learning when feedback is provided. When the patterns being guessed mirror naturally occurring guessing patterns, the results could go above or below chance levels even without feedback. Thus significant results might occur purely from nonrandom guessing. The New Scientist Web site is disseminating Sheldrake's nonrandom sequences to young people and other amateur scientists all over the world. This may be having an unintended negative influence on scientific education and rigor among some of society's most motivated and enthusiastic young scientists. It is also vicariously increasing the likelihood that thousands of amateur investigators all over the world could be misled into paranormal beliefs by their potentially spurious findings. This is surely not what the magazine intended. The evidence reviewed here provides no support to the claim that people can consciously detect unseen staring.

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