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CAN PEOPLE TELL WHEN THEY ARE BEING STARED AT LIVE ON VIDEO?

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ABSTRACT

Scopaesthesia, also known as the sense of being stared at, is widely reported and supported by controlled experiments showing detection rates significantly above chance when blindfolded subjects are observed directly by starers who are physically present. By contrast, indirect observation by remote starers through CCTV has demonstrated effects detectable physiologically by changes in electrodermal activity, but which do not reach conscious awareness. Further to explore indirect scopaesthesia, we tested whether people could tell when they were being watched on computer or phone screens. Participants worked in pairs. In each randomized trial, the starer either saw a live video of the staree, or a 'distraction' photograph. Starees then reported if they felt stared at or not. We analysed our results statistically for the overall hit rate, and for variables such as feedback, observer–subject relationship, and distance. Across 6,050 trials, the overall hit rate was 49.9%, almost exactly at the 50% chance level. The chance-level outcome was not affected by feedback, gender of starers and starees, distance between starers and starees, or multiple starers compared with single starers. Thus, scopaesthesia was undetectable consciously when people were stared at indirectly via screens.

Introduction

Most people say they have experienced being stared at from behind and turned round to find someone looking at them. Most people also say that they have looked at others from behind and found that they sometimes turn and look straight back (Cottrell et al., 1996; Sheldrake, 2003). The sense of being stared at is called *scopaesthesia* in the scientific literature. It is usually directional, in that most people say they respond by turning towards the source of the stare. The same kind of directional response is commonly said to occur in non-human animals when looked at by people, and in people when looked at by animals (Sheldrake & Smart, 2023). If this ability really exists, it could have evolved in the context of predator–prey interactions. A potential prey animal that could detect the looks of a hidden predator would have a better chance of escaping than an animal that was insensitive to being watched (Sheldrake, 2003). If so, scopaesthesia could be playing an important role in predator–prey interactions today. However, as far as we know, there have been no studies on predator–prey scopaesthesia in the wild or under laboratory conditions, so these suggestions can only be speculative.

Scopaesthesia has been tested in many experiments in which blindfolded participants were randomly stared at by a person who was physically present in a series of 'looking' and 'not-looking' trials. These experiments, replicated widely, have consistently yielded positive results above chance. Across more than 30,000 trials, the average hit rate was 55%, very significantly above the 50% chance level ($p = 1 \times 10^{-20}$; Sheldrake, 2005a). A meta-analysis of 60 experiments also revealed the phenomenon's statistical robustness ($p = 1 \times 10^{-17}$; Radin, 2005). The possibility that these effects were due to sensory leakage, for example by subtle sounds or even smells, was tested in experiments in which the starers and starees were separated by a one-way mirror (Colwell et al., 2000; Peterson, 1978) or by closed windows (Sheldrake, 2000), but despite these barriers the results were still positive and statistically significant. Additionally, in direct-staring experiments in which starer and staree were physically present conducted with online instructions and data collection, more than 19,000 trials achieved an average hit rate of 57% ($p < 1 \times 10^{-15}$; Sheldrake et al., 2008). Finally, an experiment at the NEMO science museum in Amsterdam, with more than 18,000 in-person participants working in pairs, also yielded highly significant positive results (Sheldrake, 2005a).

All the experimental tests described above involved direct staring by people who were physically present and connected to the person stared at through a direct line of sight. By contrast, in another strand of research on scopaesthesia, people were looked at indirectly though closed-circuit television (CCTV). In this case, the person staring (the 'starer') was not connected to the person stared at (the 'staree') through a direct line of sight but saw an image of the staree on a screen. In most of these CCTV experiments the starees were not asked to respond consciously by saying whether they thought they were being stared at or not; instead, their physiological responses were measured using electrodes on their fingers that detected electrodermal activity (EDA). In randomized trials, starees were either stared at or not stared at through CCTV by starers in a separate room, ruling out the possibility of normal sensory cues. A meta-analysis of such experiments indicated a small but significant mean effect size in which the EDA changed during the staring periods ($d = 0.13$, $p = 0.01$, $k = 15$ studies, $N = 379$ sessions; Schmidt et al., 2004), suggesting unconscious physiological responses to being watched. However, a subsequent CCTV study employing more rigorous EDA measurements found no significant effect (Müller et al., 2009).

These CCTV experiments on scopaesthesia grew out of a previous line of research on direct mental interactions with living systems (DMILS), which was in turn a development of research on distant healing intentions, as in sending good wishes or praying for a distant person. In the 1980s, William Braud and Marilyn Schlitz developed a DMILS protocol in which an influencer directed attention or intention towards a person in a separate room (the 'receiver'), with no possibility of sensory cueing, for periods of 30 seconds each, randomly interspersed with control periods. Various kinds of physiological measurements were made, but most commonly the receivers' EDA was recorded. A meta-analysis of 30 such tests showed a statistically significant change in EDA during the 'intention' periods compared with the control periods (Schlitz & Braud, 1997) and a subsequent meta-analysis of 50 studies showed a similar positive statistically significant effect (Delanoy, 2001). The CCTV scopaesthesia research used the same procedure as the DMILS research but instead of an influencer focusing their mental intention on the receiver, a starer focused visual attention on the image of the staree on the TV screen.

In the in-person direct-staring experiments, through light rather than CCTV, starees made conscious responses, whereas in the CCTV experiments and DMILS experiments their responses were measured physiologically, with no requirement for conscious responses. Physiological measurements may be more sensitive because there is no need for the starees consciously to detect their feelings and to express them verbally. In a DMILS experiment in which receivers were asked to respond verbally in some trials, and whose responses were measured by EDA in others, there was a significant effect using the EDA method, but no significant effect with verbal responses (Delanoy & Sah, 1994). Likewise, in a CCTV staring experiment, participants' EDA responses were marginally significant, while their verbal responses were not significantly above chance. These findings are in general agreement with earlier work showing that unconscious, autonomic responses provided a more sensitive measure of psi effects than conscious responses (Tart, 1963).

The two main types of experimental research on scopaesthesia discussed above—direct physical staring through light and watching CCTV images on a screen—have different implications for the proposed explanations of scopaesthesia.

There are two main proposals. The first involves an outward flow of influence from the eyes of the starer in the opposite direction to incoming light, coupled with the ability of the person or animal being looked at (i.e., the staree) to detect this influence (Gomez-Marin & Sheldrake, 2023; Sheldrake, 2005b). This hypothetical outflow of influence is traditionally called 'extramission', meaning 'sending out'. This process depends on a direct line of visual sight and is closely coupled to the light itself. The alternative argument put forward by Braud (2005), suggests that scopaesthesia may stem from the ability to sense another person's attention or intention, independent of any visual or line-of-sight influence. In other words, scopaesthesia may be akin to DMILS or telepathy, which do not depend on direct vision through light, and indeed do not depend on vision at all.

Braud's attention hypothesis has the advantage of potentially explaining scopaesthesia both through light and through CCTV, but it does not account for the directional nature of scopaesthesia in real-life situations. On the other hand, the visual extramission hypothesis is consistent with directional scopaesthesia, but it does not account for scopaesthesia through CCTV. One possibility is that both hypotheses are correct, but that there are two different phenomena: first, an attention-related arousal which occurs in DMILS and CCTV staring experiments, which is usually weak and unconscious, and second, an extramission-related effect which is directional and connected to direct line-of-sight vision through light.

Here, we describe a new kind of on-screen staring test through live online video streaming. Many people are now used to being looked at on screens during video calls, as in Skype, Facetime, and Zoom, and the tests we devised are closer to real-life experiences than CCTV experiments using EDA monitors. Our aim was to find out whether people could tell when someone was looking at them on a screen, even if that person was far away, in some cases distant by thousands of miles. Previous research with DMILS and CCTV staring experiments suggested that people would not be able to tell whether they were being looked at or not even if they had unconscious physiological responses. But the previous experiments were on a small scale, and in artificial laboratory conditions. Our internet-based test was designed to be more user-friendly and to be carried out on a large scale, so that even small positive responses would be detectable. The experiments took place in real-life settings, such as people's homes.

This on-screen video procedure is a new kind of test for scopaesthesia, but it is similar to CCTV tests in that the starees are not looked at directly through light but indirectly on a screen by a person who is not physically present. If this procedure gave significant positive results, it would enable the attention hypothesis of scopaesthesia to be investigated in more detail. If it failed to give positive results, it would suggest that the intention hypothesis might account only for the relatively weak, unconscious effects observed in DMILS and CCTV studies, and that the extramission hypothesis might be needed to account for the stronger effects found when people are stared at through light in line of sight by someone physically present.

We employed a protocol similar to the test procedure in direct-looking line-of-sight tests in which people gave verbal 'yes' or 'no' responses. The tests consisted of 20 randomized trials in which the starer either looked at the staree or did not look. The starees responded 'yes' or 'no' for each trial, and most did so in 10 seconds or fewer. From the point of view of the attention hypothesis, it should make little difference if attention is focused through direct vision or indirectly through an image on a screen. From the point of view of the extramission hypothesis, it should make a lot of difference, because in on-screen tests there is no extramission stimulus to the staree.

We also designed our experiment to explore possible variables that might affect hit rates, if hit rates were positive. We included immediate feedback as to whether a response was correct or not for about half the trials compared with no feedback. We did this for two reasons: first, feedback might have enabled participants to improve their scores as time went on, as in biofeedback training procedures (Frank et al., 2010); second, participants' responses might have been influenced by a precognition of whether they were right or wrong. Precognitive effects, or 'feeling the future', may occur when a person is exposed to a 'stimulus' event soon after they have made a response (see e.g., Bem et al., 2015). If starees were 'feeling the future', the feedback they received after making their responses might bias their responses towards being more correct than would otherwise have been the case. Any possible precognition would have been possible only in trials with feedback, which might therefore have shown a higher average hit rate than trials without feedback.

In addition, we compared multiple starers, up to four, compared with a single starer to find out if there was a stronger effect with more than one. We also compared different gender pairings—male starers with female starees, male starers with male starees, female starers with male starees, and female starers with female starees—to see if any patterns emerged. We examined the effects of distance between partners to find out if any effect we detected fell off with distance or not. If the attention effect in DMILS and CCTV tests is akin to telepathy, it should not fall off with distance. For instance, in experiments on telecommunications telepathy with telephone calls, emails, and text messages, telepathic communication did not fall off with increasing distance, even with participants at the antipodes, 12,500 miles apart, (Sheldrake, 2014).

This research was primarily exploratory with the aim of shedding more light on the scopaesthesia process. On the one hand, previous research on DMILS and scopaesthesia through CCTV suggested that people may not be consciously aware of when they are the object of someone's intention or attention at a distance, even though they may show unconscious physiological responses. On the other hand, these previous experiments were conducted under artificial conditions in laboratories, which might have inhibited or weakened the starees' sensitivity. Perhaps when conducted in a more user-friendly way in partnership with family members or friends in informal settings, participants' sensitivity might increase, enhancing their ability to tell when they were being watched on screen or not. If so, we may also learn something about the various factors that could affect this ability, including the effects of feedback, number of starers, gender, and distance between the starer and staree.

In total, we conducted over 6,000 trials with roughly equal numbers of randomized 'looking' and 'not-looking' trials, and a mean chance expectation of 50% correct responses. If detected, such an effect would strengthen the attention hypothesis.

Methods

Participants

<u>Recruitment of participants</u>

A total of 272 participants (139 [51%] male; 133 [49%] female) were recruited from Rupert Sheldrake's website, social media, and lectures. Ages ranged from

10 to 78 years (Mean age 28 years, SD: 13.8 years) and they were grouped into five age categories (108 aged 10–19, 75 aged 20–29, 37 aged 30–39, 25 aged 40–49, and 27 aged 50+ years). These self-selected volunteers registered through Sheldrake's website (www.sheldrake.org) giving their name, year of birth, and gender, along with email, username, and password. They then invited one or more other people to take part. They initiated their own experiments using the system, and all invitation emails were sent through the system. Starers and starees registered themselves before logging in. Starers indicated their degree of relationship to the staree, selecting 'close', 'friend', 'acquaintance', or 'stranger' upon joining an experiment. In practice, there were only three such categories, because no one selected 'stranger'. If both participants granted access to their geolocation, the system determined their latitude and longitude and calculated the distance between each starer/staree pair in miles and grouped them into one of four categories (<1, 1–99, 100–999, and 1,000+ miles). In each test there was a single staree, but there could be more than one starer. When there were multiple starers, they could either be on separate computers or more than one person could look at the same screen. The maximum number of starers that took part in a test was four. Participants could do the test repeatedly and also switch roles in subsequent tests, so that the starer became a staree and vice versa.

Recruiting text

The text below was shown to prospective participants before they signed up. In this text we used the word 'guess' to describe their response, because we expected that for most participants their response would feel like guessing; we did not expect them to have a clear conscious experience of whether they were being looked at or not. In previous research, starees in direct-looking tests through light have said they felt as if they are guessing, even though their 'guesses' were generally above the chance level. We also used the terms 'observer' and 'subject' rather than 'starer' and 'staree' because we thought these terms would be more familiar and easier to understand.

> The experiment is simple: one party stares at a video feed of the other at random intervals. As a subject, you must guess if you're being stared at. That's it! The experiment relies on new browser technology for sharing video.
>
> We hope to determine if face-on staring is easier to detect or not, and if more observers enhance the effect. We're also interested in whether physical distance between subject and observer has any effect, or if emotional closeness is involved.
>
> *Hints*
>
> 1. An experiment takes less than five minutes.
> 2. Find someone to experiment with and schedule a time. This is the biggest challenge.
> 3. The subject creates an experiment and invites others to be observers.
> 4. A link to your experiment goes out to those you invite.

5. Observers will see either the subject or a random image.
6. Subjects guess if they're being stared at, or not.
7. Share your location so we know how far apart you are.
8. There can be more than one observer in the same room, as long as everyone can see the screen.
9. Do several experiments for more significant results.
10. If your experiment is interrupted don't worry, the system will pick up where you left off. Re-open your experiment to continue.

Message to participants in the experiment waiting room

While participants waited for their partners to log into the experiment, these instructions were shown:

For the participant (staree)

1. Wait for your partners to appear and check your video below.
2. Close other open applications to improve your computer's performance.
3. Click the *Begin Experiment* button when ready.
4. For each trial we randomly determine if you will be seen.
5. You'll be asked *Are you being stared at?* and may answer *yes* or *no* at any time.
6. Half the time you'll receive feedback about your guess.
7. After 20 trials you're done: a report will detail your results.

Testing video:

Below you should see your own video; make sure your face is well lit and centred. As others join the experiment, you'll see them appear. During the experiment do not leave this page or refresh your browser. Importantly, refrain from communicating with others in your party until afterwards.

For observers (starers)

1. Wait for your partners to appear and check your video below.
2. Close other open applications to improve your computer's performance.
3. The subject begins the experiment once everyone's ready.
4. For each trial we randomly determine if you will see the subject or a random image.
5. While visible, stare intently at the subject and avoid distractions.
6. At any time, the subject may guess if they're being stared at, ending the trial.
7. After 20 trials you're done: a report will detail your results.

Testing video:

Below you should see the subject's video and that of other observers (if any) as they join the experiment. During the experiment, do not leave this page or refresh your browser. Importantly, refrain from communicating with others in your party until afterwards.

Technical implementation

We designed this online experiment using WebRTC, a technology for live video sharing, like Facetime, which works in web browsers. Volunteers registered and initiated their own experiments, inviting other people to participate in a randomized series of trials, where one of the participants served as a staree, and one or more people served as the starer or starers. The staree sat in front of his or her computer with the camera switched on, and one or more starers sat in front of their computer or computers. In each 'experiment' there was a series of 20 trials, in a randomized sequence (0.5 chance), they either saw a video image of the starer, as in a video call (see Figure 1), or a photograph of someone else, drawn at random from a pool of 30 'distractor' photos sourced online from publicly available collections of images (see Figure 2). Audio was disabled throughout. Starers were told to 'Stare intently at the subject' when the staree's image was shown. When the staree was not shown, they were shown the distractor photo instead. Along the top of the screen, 'Trial *x* of 20' marked their progress through the experiment, and next to this a 15-second countdown encouraged completion of the trial, though the starees had as long as they wished to respond. In practice, most starees (68%) responded within 10 seconds, and the majority (93%) responded within 20 seconds.

We used PHP, JavaScript, and MySQL, as well as WebRTC and the Skylink API for live peer-to-peer video, Yii2 for the web application framework, Xorshift128+ for generating random numbers, and github for version control (access to repository available upon request). WebRTC is a web technology enabling video streaming directly between individual computers through web browsers. The then new Skylink API and infrastructure from Temasys was employed to coordinate WebRTC network connections between computers, ensuring latency was minimal, on par with Skype, Facetime, and Zoom. Most major desktop browsers were supported, plus Chrome on Android devices (Firefox 46, Opera 38, Chrome 31, Chrome for Android 50; IE 10 and Safari 8 required installation of the Skylink browser plugin).

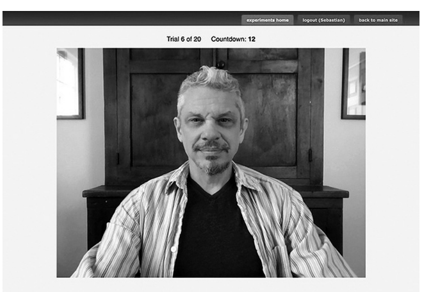

Figure 1. The staree's video as seen by starers.

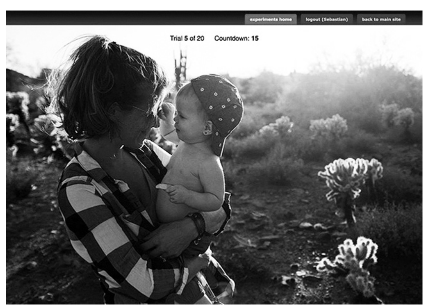

Figure 2. One of 30 photos shown when the video of the staree was not shown.

Test procedure

In each trial, starees were asked to guess whether they were being observed by clicking 'Yes' or 'No' to the question 'Are you being stared at?' In about half the trials (0.5 chance), after answering, subjects were shown 'No feedback this time' or a message telling them either 'You were STARED AT' or 'You were NOT stared at', thus giving them feedback that enabled them to know whether their response was correct or not.

After about a year of operation, due to growing lag on the Skylink network, and out of an abundance of caution, we added a two-second delay between trials. As far as we know, no delays exceeded two seconds and, in most cases, there was less than one-second delay. We also added a buffer of five seconds before subjects could answer, to ensure the API had ample time to process requests. We chose five seconds for this buffer as that was the quickest anyone had answered up to that point, and it seemed a reasonable delay to enforce.

Statistical analysis

The significance of the total number of hits was evaluated using the binomial test, with the probability of a chance outcome as 0.5. Comparisons between pairs of data, such as those with and without feedback, were evaluated using a 2 × 2 contingency table chi-squared test with the Yates procedure. Thus, for example, in the comparison of results with and without feedback, the number of correct and incorrect responses made up the columns and 'with feedback' and 'without feedback' the rows. Comparison of the effects of relationship between lookers and participants and the effects of distances between them were made by a one-way ANOVA, where independent variables were the various combinations of male and female starer and staree, namely male–male, male–female, female–female, and female–male. The dependent variable was the hit rate. Similarly, the distances between starer and staree were independent variables, and hit rate was the dependent variable. Effect sizes are given using the appropriate measure and all tests were one tailed.

Results

There were 6,050 trials, in which 3,018 (49.9%) were hits, almost exactly at the level of the mean chance expectation of 50%. An exact binomial sign test indicated that the observed proportion of hits was 0.49, which was no greater than the hypothesized value of chance 0.5, $p = 0.43$, Cohen's $g = 0.001$.

In all tests, completed and incomplete, starees scored above chance in 132, in 131 below chance, and in 59 at chance. By chance, there would have been equal numbers of people scoring above and below the chance level, and an exact binomial sign test indicated that the observed proportion of people scoring above chance was 0.502, which was very close to the hypothesized value of chance 0.5, $p = 0.50$, Cohen's $g = 0.002$ (see Table 1).

TABLE 1.

*Hit rates for complete, incomplete, and all tests**

Tests	Trials	Hits	Hits (%)	+	–	=
Complete	5,840	2,909	49.8	119	120	53
Incomplete	210	109	51.9	13	11	6
All	6,050	3,018	49.9	132	131	59

**Results are expressed as numbers and percentages of hits and also by a non-parametric method whereby tests with above-chance hit rates (11 or more out of 20) are designated as positive (+), those with 9 or fewer hits out of 20 are negative (–), and those at chance (10/20) are equal (=). By chance the number of positive and negative tests would be about equal.*

In most tests the participants completed all 20 trials, with a hit rate of 49.8%, not significantly different from the mean chance expectation of 50% (p = 0.39 by the exact binomial test, Cohen's g = –0.002). In these completed tests, 119 starees scored above chance and 120 below chance, showing no significant difference (p = 0.50 by the exact binomial sign test, Cohen's g = –0.003).

Some tests were not completed, and in the incomplete tests there were 109 hits out of 210 trials (51.9%; Table 1), but this effect was not statistically significant (p = 0.32 by the exact binomial sign test, Cohen's g = 0.019), and 13 starees scored above chance compared with 11 below chance, again not significant statistically (p = 0.42 by the exact binomial sign test, Cohen's g = 0.042).

At random, in about half the number of trials, starees were given feedback as to whether their response was correct or not (3,012 trials with feedback, 3,038 without feedback). This made no significant difference; the hit rate with feedback was 50.4% and without 49.4% (Table 2; $\chi^2(1, N = 6{,}050) = 0.89$, p = 0.35, Cramer's V = 0.009). The +/– method, comparing the number of starees with hit rates above and below chance, likewise showed there was no significant difference ($\chi^2(1, N = 239) = 0.57$, p = 0.45, Cramer's V = 0.048).

If feedback had helped starees to improve their scores as the test went on through some kind of implicit learning, the hit rate in the second ten trials of completed tests might have been higher than in the first ten trials, but there was no significant difference between them: in the first half of the test the overall hit rate was 49.6% and in the second half it was 50.0% ($\chi^2(1, N = 5{,}840) = 0.10$, p = 0.75, Cramer's V = 0.011).

Another way in which feedback could have led to an improvement through learning was by doing the test repeatedly. Most starees did the test only once, but others did it again: 49 twice, 24 three times, 9 four times, and one did it as many as many as 10 times. The hit rates in successive tests are shown in Figure 3. Even with seven successive tests there was no sign of any systematic improvement: hit rates remained around the 50% chance level. A Kruskal–Wallace test indicated that there was no significant difference in hit rate across

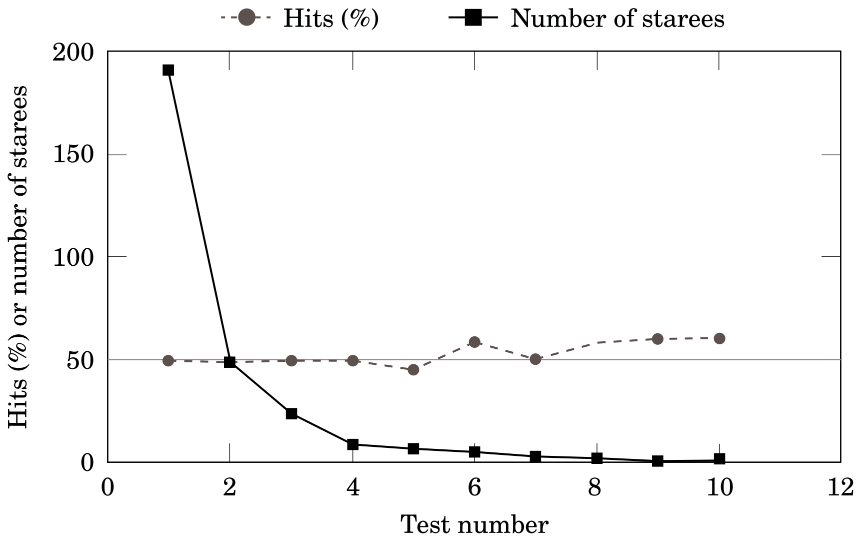

Figure 3. Hit rates and the number of starees taking part in successive tests. The horizontal line indicates the 50% chance level.

the first eight repetitions ($\chi^2(7, N = 292) = 12.58$, $p = 0.13$). The last three tests showed a slightly higher score, but in the eighth test there were only two starees, and in the ninth and tenth only one, so these above-chance scores were not statistically significant: in the ninth and tenth tests, with a hit rate of 12 out of 20 trials, by the exact binomial sign test, $p = 0.25$, Cramer's $g = 0.10$.

In about half the trials the staree's image was seen on the screen by the starer (i.e., looking), and in the other half unseen (i.e., not looking). There were significantly more hits in the 'looking' condition in the completed trials (56.8%) than in 'not-looking' condition (42.9%) (Table 2; $\chi^2(1, N = 5{,}840) = 111.2$, $p < 0.0001$, Cramer's $V = 0.137$). By the +/– method, significantly more starees scored above chance in the 'looking' condition and below chance in the 'not-looking' condition ($\chi^2(1, N = 534) = 55.55$, $p < 0.0001$, Cramer's $V = 0.322$).

There were almost exactly equal numbers of tests with female (51%) and male starees (49%). Hit rates for both sexes were very close to chance and there was no significant difference between them (Table 2; $\chi^2(1, N = 6{,}050) = 0.48$, $p = 0.49$, Cramer's $V = 0.009$). By the +/– method the results were similarly non-significant ($\chi^2(1, N = 5{,}840) = 0$, $p = 0.1.0$, Cramer's $V = 0$).

In a more detailed analysis of all combinations of male and female starers and starees (male–female, male–male, female–male, and female–female) all were very close to the chance level and a one-way ANOVA test comparing the mean hit rates for the four combinations showed no significant differences from each other ($F(3, 289) = 1.08$; $p = 0.36$; $\eta^2 = 0.03$).

Table 2.

*Comparisons of hit rates in completed trials in tests with and without feedback, when starees were seen and unseen, with female and male starees, and with one or more than one observer**

Conditions	Trials	Hits	Hits (%)	+	–	=
Feedback	2,913	1,467	50.4	131	121	40
No feedback	2,927	1,442	49.3	122	131	39
p		0.35			0.45	
Seen	2,914	1,654	56.8	175	95	22
Unseen	2,926	1,255	42.9	85	179	28
p		<0.0001			<0.0001	
Female	2,980	1,467	49.2	59	59	31
Male	2,860	1,442	50.4	60	61	22
p		0.41			1.00	
1 observer	5,380	2,673	49.7	108	113	48
>1 observer	460	236	51.3	11	7	5
p		0.55			0.45	

**Results are expressed both as numbers and percentages of hits and by the number of tests with above-chance (+), below chance (–), and at chance (=) hit rates. The significance of the comparison between the two conditions is given as the* p *value determined by the 2 × 2 chi-squared test*

In most tests there was only one starer, but in some there were several, up to a maximum of four. Hit rates with multiple starers were no different from those with one; in both cases the results were at chance levels (Table 2; $\chi^2(1, N = 5{,}840) = 0.36$; $p = 0.55$; Cramer's $V = 0.007$). Likewise, the differences were non-significant by the +/– method ($\chi^2(1, N = 239) = 0.57$, $p = 0.45$, Cramer's $V = 0.048$).

We compared the effects of the distance between the starers and the starees in four categories: <1, 1–99, 100–999, and >1,000 miles. We had distance data from only 109 tests, less than half the total, because many participants chose not to share their location. None of the hit rates were significantly different from chance nor from each other by a one-way ANOVA test comparing the four distance categories ($F(3{,}106) = 1.95$; $p = 0.13$; $\eta^2 = 0.08$).

We also compared the effects of the personal relationships between the observers and participants in three categories: close, friend, and acquaintance. Again, hit rates in all categories were near chance, and there were no significant differences between these categories by a one-way ANOVA test comparing the three relationship categories ($F(2, 290) = 1.82$; $p = 0.16$; $\eta^2 = 0.01$).

Discussion

We found no significant overall effect of being looked at on live video, nor were there any significant effects of the gender of starers and starees, effects of distance between starers and starees, personal relatedness of starers and starees, and whether feedback was given or not. Moreover, there was no significant tendency for starees to improve their hit rate when they were given immediate feedback as to whether their responses were correct or incorrect, nor did they seem able to learn with practice.

The only significant effect was in the responses to being looked at as opposed to not being looked at: hit rates were above chance in 'looking' or 'seen' trials and below chance in 'not-looking' or 'unseen' trials. However, this effect was probably the result of a response bias whereby starees tended to answer that they were being looked at more often than they were not being looked at. If participants always said they were being looked at they would be 100% correct in all 'looking' trials and 0% correct in all 'not-looking' trials, with an overall average of 50%, at the chance level. This is what happened in a less extreme form in this experiment, where the 7% excess of above-chance hits in the 'seen' trials was cancelled out by the 7% below-chance hits in the 'unseen' trials (Table 2), giving an overall chance-level result (Table 1). If the above-chance hit rate in the 'looking' trials was a genuine effect of scopaesthesia, and if there was no response bias, the hit rate in the 'not-looking' trials would have been at the chance level of 50%, and the overall hit rate would have been positive, 53.5%, but this is not what we observed.

Participants received feedback as to whether their response was correct or incorrect in about half the trials. Feedback should have resulted in an above-chance hit rate if people had a precognition of whether their response would be correct, or if participants learned implicitly how to increase their sensitivity. There was no suggestion that precognition or learning took place in these tests.

These online tests were not filmed or supervised, and as such people could have cheated. For example, pairs of participants could have completed the trials in the same room, or starers and starees could have been in contact by mobile phone indicating when they were or were not looking. Such behaviour would very probably have inflated the hit rates above chance levels across all conditions. However, this is not what we found, indicating the likelihood that participants were not cheating.

Direct-staring experiments with the starers physically present usually involved looking at blindfolded starees from behind in a randomized sequence of 'looking' and 'not-looking' trials. The striking contrast between the positive results with direct staring through light and the null results in on-screen tests imply a radical difference between looking at someone in line-of-sight and on a computer screen. It seems that many people can tell when they are being looked at directly by an unseen observer who is physically present but cannot tell when they are being looked at on a screen. In both cases the staree is the focus of the starer's attention or intention. Braud's (2005) hypothesis that scopaesthesia is primarily a result of attention or intention would predict that both kinds of test should have similar effects, but they do not. In our on-screen tests, people could not tell when they were being looked at or not. By contrast, in numerous tests with physically present starers looking through continuous light, responses were generally about 5% above the chance level (see e.g., Sheldrake, 2005a). The results therefore favour the idea that a direct connection between starer and staree through light plays a major role in scopaesthesia (Gomez-Marin & Sheldrake, 2023), over and above any unconscious, physiological effects of attention.

The word 'tell' may be important here. Both in direct-staring tests and in our on-screen tests, participants were asked to make a conscious response, saying whether they were being looked at or not. However, in real-life situations, people are not taking part in forced-choice tests, nor are they responding verbally. When people or non-human animals respond to being stared at from behind, they usually do so by turning and looking straight at the person or animal watching them (Sheldrake & Smart, 2023). This initial response may well be unconscious in most cases. People or animals simply respond by looking back, and numerous accounts from starees in real-life situations do not involve a description of a conscious feeling of being watched followed by searching to see where the look is coming from. Rather, the turning reaction comes first, and conscious awareness of being stared at follows, when the person sees another person or animal watching them.

By contrast, almost all experimental studies of scopaesthesia have not studied the natural response, namely turning towards the starer, but have either measured physiological arousal (Schmidt et al., 2004) or required verbal responses from static starees (Sheldrake, 2005a).

In real-life situations, surveys have shown that scopaesthesia seems to occur most strikingly in potentially threatening situations in public spaces (Sheldrake, 2003), and often involves people being looked at from behind or above (Sheldrake & Smart, 2023) rather than in full-face view, as in our tests. Perhaps sensitivity to stares is greater at the back than the front of the body. Both people and non-human animals can often detect potential threats visually, so a non-visual staring detection system would be less relevant in the front of the body, but potential threats from behind cannot be detected visually, and hence the non-visual stare detection system underlying scopaesthesia may have evolved primarily to detect stares from behind. Moreover, our participants were in a non-threatening, video-call-type context which may have inhibited any potential stare-detection responses. If such responses depend on detecting stimuli that are outside the field of direct focal attention, then this detection system will not be activated when the source of attention is straight ahead, through the computer camera, as in these tests.

However, despite our null result, we have not ruled out the possibility that there could be a very weak effect of being looked at on screens. The fact that some experiments with CCTV revealed measurable physiological effects in EDA (Schmidt et al., 2004) and that some people seem able to detect when they are being watched on CCTV surveillance systems (Sheldrake, 2003) suggests that there could be a small effect below the threshold of detection in our test.

One way in which this effect might be intensified might be to increase the number of lookers. If people cannot tell when one person is looking at them, or even when four people are looking at them, as in some of our trials, what if a million people were looking at them? If the stimulus is stronger, it might become easier to become aware of it consciously. Such an experiment would be feasible if it were conducted live on television. Imagine inviting viewers to participate in a test. In the TV studios there are two participants, A and B, preferably well-known media personalities who are used to being on television. They are in separate rooms with cameras running continuously. In a randomized series of trials, viewers see either A or B; thus, one of them is seen by a million people; the other by no one. After 10 seconds, A and B both say whether they were being looked at. If either or both have hit rates significantly higher than the chance expectation of 50%, this would suggest that looks from a million people have a stronger effect than looks from one or a few people, and that the response is strong enough to reach conscious awareness.

Limitations of this study

The most important limitation to this study is that it required starees to respond verbally in a series of forced 'yes' or 'no' choices. This is an unnatural situation which has the disadvantage of making people self-conscious about their responses, which usually occur unconsciously. Also, in real life these responses occur only occasionally rather than in a rapidly repeated series of randomized trials. Moreover, in the 'not-looking' trials, starees were being asked to detect the *absence* of a stare, whereas in real life scopaesthesia is all about detecting the looks of others, not the absence of looks. These limitations also apply to standard direct-looking tests through continuous light. There have so far been very few studies of scopaesthesia under real-life, 'ecological' conditions in which people are stared at by a hidden starer and respond by looking towards the starer (Cooper, 2021).

Future research may prove more fruitful by adopting a more ecological approach. For example, imagine a situation in which passers-by in a public space, like a street, are looked at from above—say from a third-floor window—or not looked at, at in a series of randomized trials. The people below are filmed on a surveillance camera located next to the looker, and the recordings are evaluated 'blind' by people who are otherwise not involved in the experiment. Do more people look up towards the camera in the 'looking' as opposed to the 'not-looking' periods? (The window would need to be covered with a dimming film so that people below could not see the starer or the camera.) The same test could also be run without a starer who is physically present, but instead with someone looking or not looking at the images on the screen of a CCTV monitor, thus providing a direct comparison of the effect of direct looking through light as opposed to looking at a screen.

A second limitation is that the video system inevitably introduces a time delay. This is usually short, and hardly noticeable, otherwise conversations through Zoom or Facetime would seem unnaturally slow. Nevertheless, there is inevitably a longer delay than in direct-looking tests through light, where the starer is connected to the staree literally at the speed of light. It is possible that a delay, however short, reduces the effect of scopaesthesia. It would be possible to investigate the effects of time delays experimentally in further research using CCTV and EDA by deliberately introducing randomized delays, say 1, 5, or 10 seconds, into the video feed.

A third limitation is that starers were looking at the starees' faces. As discussed above, in real life scopaesthesia occurs when people are looked at from behind, and the staring detection system, whatever its nature, may be better developed at the back of the body rather than in the front. Possibly people would have been more sensitive to being stared at on screen if the cameras had been directed towards the backs of their necks, which is where physically present starers usually look in standard scopaesthesia tests, instead of their faces.

Conclusion

The only significant effect we found was an above-chance hit rate in trials in which starees were being looked at and an equal and opposite below-chance hit rate in trials in which starees were not being looked at, which cancelled out. In view of all the other non-significant effects, this seems most likely to have been the result of a response bias, whereby starees responded 'looking' more often than they responded 'not-looking'. Overall, people could not tell when they were being looked at on video screens by remote starers, and there were no significant effects of gender, distance between starers and starees, immediate feedback, multiple starers compared with a single starer, and no significant improvement in hit rates with practice.

These findings are in striking contrast to research with physically present starers linked directly with the starees through light, most of whom could tell when they were being looked at. In both cases, the starees were the focus of starers' attention. According to the attention hypothesis for scopaesthesia, it should make little difference if starees are seen directly through light by physically present starers or on screens by remote starers. Our results do not support the attention hypothesis. By contrast, the extramission hypothesis predicts that scopaesthesia will not take place if starees are viewed on screens. Thus, by failing to support the attention hypothesis, our findings indirectly support the extramission hypothesis.

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DATA ACCESSIBILITY

The full data set is available online at:
www.sheldrake.org/onscreen-staring-exp-data-2024

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