LINKING MINDS THROUGH JOINT ATTENTION: A PRELIMINARY INVESTIGATION

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ABSTRACT

Joint attention is the shared focus of two or more people on the same thing. Do they know that others are attending to the same object entirely through sensory cues, such as observing the direction of others' gazes, or does joint attention also involve a kind of mental resonance? Parapsychological investigations have shown a small but significant effect of mental intention at a distance when remote participants were looking at similar objects. This study investigated a more straightforward kind of joint attention, with participants looking directly at the same object. In this investigation the participants worked in pairs. They were separated by a wall in such a way that they could not see each other, but both could see a target object such as an apple. Tests consisted of 20 trials, each lasting about 10 seconds. One of the participants (the 'looker') either looked at the object, or did not look, in a random sequence, and the other participant (the 'guesser') had to guess whether or not the other person was looking at the object. Altogether there were 310 tests with 6,200 trials. The total number of hits was 3,255 (52.5%), significantly above the chance level of 50% ($p = 0.00003$). In 155 of the tests the hit rate was above chance, and in 109 below chance. The higher number of positive than negative tests was significant at the $p = 0.003$ level. There was no significant effect of trial-by-trial feedback. As in research on the sense of being stared at, there was a response bias in favour of guessing that the other person was looking, but this bias could not explain the positive results. The data suggest that the guessers were picking up unidentified influences from the lookers.

INTRODUCTION

Joint attention is the shared focus of two or more people on the same thing. For example, it occurs when one person alerts others to an object by the direction of the gaze, or by pointing. Most young children develop joint attention with an adult by the time they are around one year old (Moore & Dunham, 2014). Chimpanzees also know what others see: they follow their gaze to external locations, then check back with the other if they do not see anything interesting. Also, they pursue contested food only if they are aware that a dominant member of their group cannot see it (Tomasello & Carpenter, 2007). Dogs can engage in joint attention with humans, for example when humans point to hidden food (Tomasello, 2010). However, studies of child development have shown that, in humans, joint attention involves not only experiencing the same thing at the same time, but knowing together that this is a shared experience:–

> This is truly intersubjective sharing, and it is critical because it creates a shared space of common psychological ground that enables everything from collaborative activities with shared goals to human-style cooperative communication
>
> [Tomasello & Carpenter, 2007]

The question I explore in this paper, as far as I know, is a new frontier for scientific investigation. In addition to following physical clues, like looking where another person is pointing, does 'intersubjective sharing' involve a kind of resonance between the minds of people who are focused on the same thing? Can people tell when another person is looking at the same thing as what they are, in the absence of visual or other 'normal' sensory cues?

I was stimulated to explore this possibility by experiences while travelling on the London Underground railway. When standing in a crowded train, before free newspapers were common, I often found myself reading other people's newspapers over their shoulders. Surprisingly often, the owners of the papers turned around, as if they had detected the intrusion of my gaze on their page. When I asked my friends if they had had similar experiences, many said they had. Maybe this phenomenon can be explained by subtle sensory cues, but is it as simple as that?

Psi researchers have investigated two possibly related phenomena. First, Braud, Shafer, McNeill and Guerra (1995) pioneered a new research protocol as part of an investigation of direct mental influences of one person on another person at a distance. In their experiments, participants tried to focus their attention on a lighted candle, while indicating by a button press each time their mind wandered from this focus. Meanwhile, during a series of 1-minute 'help' periods another person in a distant room attempted to assist the participant by focusing on an identical lighted candle with the intention that the participant would attend well and not be distracted. During the non-help periods, the helper thought about unrelated matters. Braud et al. found that there were significantly fewer distractions during the help periods. These studies were replicated in several laboratories using a very similar protocol; a meta-analysis of 11 such studies by Schmidt (2012) showed a small but statistically significant effect.

Second, Wilson (2002) and Wilson, Morris, Tiliopoulos and Pronto (2005) investigated whether distant senders could bias participants' performance in word association tests by attempting to influence their choice of words. There were no significant psi effects. However, the experiments were like tests for unconscious telepathy rather than for direct joint attention. Also, both these types of study on distant mental influences were highly artificial, and only distantly related to real-life phenomena.

I devised a simple, straightforward experiment to try to find out more about the effects of joint attention through direct looking. Two people were located where they could not see each other, but where they could see a target object such as an apple or a banknote. This was easily achieved by standing on either side of a corner or a doorway (Figure 1). In a series of trials, in a randomized sequence, one person (the 'looker') either looked at the object, or looked away and thought of something else. The beginning of each trial was signalled by a click, bleep or tap. The second person (the 'guesser') looked at the object and guessed whether or not the first person was looking at it. These guesses were either right or wrong, and by chance would have been correct about 50% of the time. Was the hit rate significantly above chance?

METHODS

Participants

The initial tests were carried out with participants recruited by opportunity sampling from among the family and friends of the author and the project's research assistant, Pam Smart (PS), as well as people attending workshops and seminars held in Britain, Canada and Sweden. The ages of participants ranged from 13 to 80. These tests were carried out between 2004 and 2006.

Materials

A standard computerized random number generator determined the sequence of looking and not-looking trials on the instruction sheets. There were 20 different instruction sheets, each with a different random sequence. Some sheets had equal numbers of looking and not-looking trials and others had unequal numbers. Jan van Bolhuis, a statistician at the Free University of Amsterdam, kindly prepared these sheets for me.

Procedure

Trials took place at the home of RS or PS, or at the seminar/workshop venues. Participants worked in pairs, and usually took turns to serve as the looker or the guesser. The looker was given a randomized instruction/score sheet, which listed a series of 20 trials with an instruction for each trial of 'look' or 'no'.

The looker wrote his or her name on the sheet, and that of the guesser, and kept the sheet folded over so that the guesser could not see it. The looker and guesser then took up their positions by a doorway or on the outside of a corner so that they could both see the target object (usually a picture, book, fruit, or banknote) but could not see each other (see Figure 1).

Just before the beginning of each trial, the looker consulted the instruction sheet, read the instruction 'look' or 'no', and then either looked at the object or looked away and thought of something else, and then signalled the beginning of the trial by the use of a mechanical clicker, electronic bleeper or by a single, firm tap on the wall. The guesser then indicated his or her guess within about 10 seconds by saying "looking" or "not looking". The looker recorded whether this guess was right or wrong on the instruction/score sheet, and proceeded to the next trial until all 20 were completed. In some tests the guessers were told after each guess whether this was correct or not; in other tests there was no feedback.

Data and Statistical Analysis

As in my research on the sense of being stared at (Sheldrake, 2005), the numbers of correct and incorrect guesses in looking and not-looking trials were tabulated separately, along with the total for each test. The total number of hits was analysed statistically using the binomial test, with the null hypothesis that the chance hit rate would be 0.5. A one-tailed test was used since the hypothesized direction of the effect was above chance.

The data were also analysed using the one-sample *t* test, comparing the score out of 20 for each test with the hypothetical mean by chance of 10 out of 20. Also, as in research on the sense of being stared at, the total in each test was evaluated by means of the sign method, with a score of 11 or more out of 20 given a '+' sign, a score of 9 or less a '–' sign, and a score of 10 an '=' sign. The advantage of the sign method is that it gives an equal weighting to each test, whereas a few individuals who guessed far above or far below chance could skew the total scores. The chance expectation was that the number of +

signs would be equal to the number of – signs, ignoring the = signs. The null hypothesis was tested using the binomial test, with one-sided probabilities. The 2 × 2 chi-squared test was used for comparisons of data from looking and not-looking trials, and from tests with and without feedback.

Cohen's effect size d was calculated according to the formula: $d = p$ (hits observed) $- 0.5/\sqrt{[0.5 \times (1\text{–}0.5)]}$.

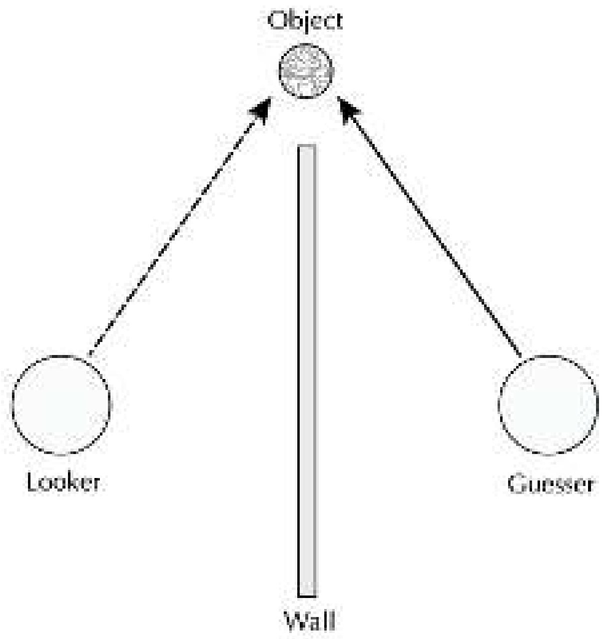

Figure 1. A diagram of the experimental set-up in joint attention tests.

RESULTS

Overall Results

Altogether there were 310 tests with 6,200 trials. The total number of hits was 3,255 (52.5%), significantly above the chance level of 50%. By the binomial test on the basis of the total number of hits, the one-sided probability value was $p = 0.00004$ (binomial z-ratio = 3.93).

It could be argued that since each subject completed 20 trials, and some subjects were tested repeatedly, the individual trials were not independent of each other and might have been influenced by the subjects' previous experience. In this case, the binomial test could be misleading. So I also analysed the results using the one-sample t test, comparing the score in each 20-trial test with the theoretical chance level of 10 out of 20. By this test, $p = 0.00003$ (one-sided; $t(309\ df) = 4.056$). The 95% confidence intervals of the 52.5% hit rate were from 51.3% to 53.9%. The effect size, Cohen's d, was 0.1.

Looking at the results another way, in 155 of the tests the hit rate was above chance, and in 109 below chance (Table 1). If the guessers had been guessing at random, approximately equal numbers of tests would have had scores above and below chance. The higher number of positive than negative tests was significant at the $p = 0.003$ level (one-sided; binomial z-ratio = 2.77).

Most tests were carried out with participants who were taking workshops or seminars with me, and most participants did the test only once as a guesser and once as a looker. In the series of tests carried out by my assistant Pam Smart (PS) and by myself (RS) in our homes with family members and friends, the same people were tested repeatedly, but there was no noticeable tendency for scores to improve with practice.

The scores from different groups of tests are shown in Table 1. Each test consisted of 20 trials. The total numbers of hits and misses for each group are shown, and also the number of 20-trial tests in which there were more hits than misses (+), more misses than hits (–) and equal numbers of hits and misses (=). In most but not all of them of them there were more hits than misses, showing a fairly consistent pattern of positive results.

Table 1

Results of joint attention tests carried out by Rupert Sheldrake (RS), Pam Smart (PS), and in RS's seminars and workshops in Stockholm, Sweden; London, UK; Schumacher College, UK (SC); and Hollyhock Learning Centre, Cortes Island, BC, Canada (HH).

Tests	**Hit**	**Miss**	**Hit %**	**+**	**–**	**=**
RS	524	496	51.4	23	19	9
PS	919	861	51.6	41	34	14
Stockholm	221	179	55.3	13	6	1
London	175	185	48.6	10	7	1
HH 07/04	272	248	52.3	15	8	3
HH 08/04	118	102	53.6	5	3	3
SC 12/04	160	160	50.0	6	9	1
SC 04/05	339	321	51.4	13	11	9
HH 08/05	280	200	58.3	15	8	1
HH 07/06	247	193	56.1	14	4	4
Totals	**3255**	**2945**	**52.5**	**155**	**109**	**46**

Differences Between Trials in which the Object was or was not Looked at

There were approximately equal numbers of trials in which the looker was looking at the object, and not looking at the object. The hit rates in looking trials were higher than in not-looking trials, 56.5% as opposed to 48.2% (Table 2). The difference in the pattern of results in these two kinds of trials was highly significant ($p < 1 \times 10^{-6}$; $\chi^2 = 41.7$).

In part, this difference may have reflected a response bias in favour of guessing 'looking'. The total number of 'looking' guesses was the sum of the number of hits in looking trials and misses in not-looking trials, namely 1775 + 1581 = 3356, or 54.1% of all guesses. But this effect alone could not explain the overall positive result, because a simple response bias would raise the hit rate in looking trials and lower it in not-looking trials to the same extent, giving an overall result at the chance level, which is not what the data show.

Table 2

The total numbers of hits and misses for trials in which the looker was looking at the object (Looking) or not looking at the object (Not Looking). These data are from the same joint attention tests as in Table 1.

	Looking		**Not Looking**		**Total**	
	Hit	Miss	Hit	Miss	Hit	Miss
Trials	1775	1364	1480	1581	3255	2945
%	56.5	43.5	48.2	51.8	52.5	47.5

Effects of Feedback

In some tests, the guessers were given trial-by-trial feedback as to whether their guess was a hit or a miss, and in others they were not. In some tests, the pairs of participants chose whether or not to give each other feedback, but in others they were instructed to give feedback or not give feedback, enabling a systematic comparison to be made. Data from these tests are shown in Table 3. The hit rates were higher without feedback than with feedback, but the difference was not statistically significant ($\chi^2 = 1.3$).

Table 3

Effects of trial-by-trial feedback (+FB) compared with no feedback (-FB) in joint attention tests, showing total number of hits and misses and also the number of 20-trial tests in which there were more hits than misses (+), more misses than hits (–) and equal numbers of hits and misses (=).

Tests	**Hit**	**Miss**	**Hit %**	**+**	**–**	**=**
+FB	606	554	52.2	31	21	6
–FB	536	444	54.6	30	17	2
p	ns			ns		

Discussion

The results of these tests suggest that people may indeed be able to detect when someone else is looking at the same thing. The effect was small, only 2.5% above the chance level (Cohen's $d = 0.1$), but nevertheless the statistically significant results suggest that the outcome cannot be attributed to chance variation.

Could these results be explained by subtle cues? Could the guessers have heard differences in the lookers' breathing, for example, when they were looking at the object or looking away? Or could the lookers have given clues to the guessers by the way they signalled the beginning of the new trials? If these or other similar possibilities for sensory leakage played a role, then the hit rates should have been higher when the guessers were given feedback, and also the guessers should have improved with practice. There was no evidence to support these possible explanations; the hit rates were in fact somewhat higher without feedback than with feedback (Table 3). Nevertheless, the possibility of subtle cues needs to be addressed in further research.

Hit rates were very significantly higher in trials when lookers were looking at the object than when they were not (Table 2). In part this phenomenon reflects a response bias, because guessers made more 'looking' than 'not-looking' guesses, but if there were no ability to detect joint attention, then the excess hits in looking trials should have been offset by an equal excess of misses in not-looking trials, which was not the case here. Thus, in addition to a response bias, there was an effect in which there were more correct guesses in looking trials than in not-looking trials. A very similar effect occurred in experiments on the sense of being stared at (Sheldrake, 2005). Both in joint-attention tests and staring-detection experiments, in the looking tests, the guessers were being asked to detect the presence of another person's gaze. In the not-looking tests they were being asked to detect the *absence* of the gaze. From a biological point of view, detecting the presence of a gaze makes good sense; but detecting absence is an artificial situation created by the experimental design with little real-life relevance. In this situation, in the absence of any stimulus, the guessers may just have been guessing.

This preliminary study suggests two ways of following up with further research. First, in an improved version of these direct looking tests, it would be important to conduct trials in which lookers and guessers were separated by a window, so that possible subtle cues could be reduced or eliminated. In addition, instead of the lookers recording the guesses, as in the present study, the possibility of errors could be reduced by the guessers recording the guesses independently. This could be done, for example, by designing an app that worked on mobile telephones. Both lookers and guessers would have phones. The lookers could signal through the phone when the trial began, and the guessers could record their guesses on the phone by pressing a button for 'looking', say 1, and a different button for 'not looking', say 0.

Second, joint attention can also be studied at a distance in automated, internet-based tests. A colleague and I have already followed up this preliminary study with an investigation of the effects of joint attention with pairs of participants in different locations, in some cases more than a thousand miles apart. They were simultaneously shown one of two photographs, with a 0.5 probability of seeing the same picture. After 20 seconds they were asked whether or not they thought their partner was looking at the same picture. After each had registered a guess, the next trial began, with a different pair of pictures. The main outcome measure was the proportion of correct guesses, compared with the 50% mean chance expectation. This test was symmetrical in that all participants were both 'senders' and 'receivers'. The hit rates in three different experiments were 52.9%, 51.4% and 51.0%, giving a combined result with $p < 1 \times 10^{-6}$ (Sheldrake & Beeharee, in press).

These results raise the possibility that joint attention effects might play a hitherto unsuspected role in the mass media. If a person can detect when one other person is looking at the same image, then is it possible to detect when thousands or millions of people are looking at the same images, as occurs when TV programmes are broadcast?

ACKNOWLEDGEMENTS

I thank Pam Smart for her technical assistance and the Watson Family Foundation, the Institute of Noetic Sciences, of Petaluma, California, and Addison Fischer, of Naples, Florida, for their financial support. I am grateful to Trinity College, Cambridge for my appointment as the Perrott-Warrick Senior Researcher during the tenure of which some of this research was conducted.

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REFERENCES

Braud, W., Shafer, D., McNeill, K. and Guerra, V. (1995) Attention focusing facilitated through remote mental interaction. *JASPR 89*, 103–115.

Moore, C. and Dunham, P. J. (2014) *Joint Attention: Its Origins and Role in Development.* New York: Psychology Press.

Schmidt, S. (2012) Can we help just by good intentions? A meta-analysis of experiments on distant intention effects. *Journal of Alternative and Complementary Medicine 18*, 529–533.

Sheldrake, R. (2005) The sense of being stared at. Part 1: Is it real or illusory? *Journal of Consciousness Studies 12*, 10–31.

Sheldrake, R. and Beharee, A. (in press) Is joint attention detectable at a distance? Three automated, internet-based tests. *Explore: The Journal of Science and Healing.*

Tomasello, M. (2010) *Origins of Human Communication*. Cambridge, MA: MIT Press.

Tomasello, M. and Carpenter, M. (2007) Shared intentionality. *Developmental Science 10,* 121–125.

Wilson, S. (2002) Psi, perception without awareness, and false recognition. *JP 66*, 271–289.

Wilson, S., Morris, R. L., Tiliopoulos, N. and Pronto, E. (2005) Psi and associational processes. *JP 68*, 129–155.