

# Probability Misjudgement and Belief in the Paranormal A Newspaper Survey

**Susan Blackmore**

*British Journal of Psychology*, **88**, 683-689, 1997

## **Abstract**

A questionnaire in the Daily Telegraph in Britain on March 16 1994 listed ten statements (e.g. I have a cat, I have a scar on my left knee) and respondents were asked whether each was true for them. They then estimated the number likely to be true for others and the distribution of probabilities for given numbers of statements being true. "Probability misjudgement" theories of the origin of belief in the paranormal predict that people should underestimate the number of statements true for others, and that believers (sheep) should underestimate more than non-believers (goats).

6238 replies were received. 59% were sheep and 52% were male. There was a large sex difference, 70% of females were sheep but only 48% of males. On average 2.4 statements were true for each person. Sheep claimed that more statements were true for them than non-believers did. This suggests a possible means by which sheep come to believe in psychic powers.

The mean estimate of number true for others was 3.6. Sheep gave higher estimates but the difference between the number true for self and the estimate for others was the same for sheep and non-believers. Sheep were no worse than non-believers at estimating the distribution of the number of true statements. The probability misjudgement theories are not confirmed.

## **Introduction**

Belief in the paranormal is widespread (Clarke, 1991; Gallup and Newport, 1991). The most common reason given is personal experience (Blackmore, 1984; Palmer, 1979) and strength of paranormal belief is positively correlated with number of subjective paranormal experiences (Glicksohn, 1990). This correlation might be explained in at least three different ways. (1) Some people have genuine paranormal experiences (2) People who believe in the paranormal for other reasons are more likely to interpret normal events as paranormal (3) People who misjudge the probability of coincidences are more likely to misinterpret normal events as paranormal and this encourages their belief.

The third possibility has been proposed by Blackmore and Troscianko (1985) and by Brugger, Landis and Regard (1990). "Probability misjudgement" theories predict that believers should show worse probability judgements and greater underestimates of chance coincidences than non-believers.

Attempts to test these theories have used computer controlled probability judgement tasks (Blackmore and Troscianko, 1985), repetition avoidance in generating random numbers ((Blackmore, Galaud and Walker, 1994; Brugger et al, 1990, Brugger et al, 1994), ESP tasks (Broughton, 1991) and variations on the "birthday paradox" (Matthews and Blackmore, 1995). However, the results have been mixed and do not provide strong support for the "probability misjudgement" theories.

One of the problems is that all these experiments use laboratory tasks which may bear little relationship to real life situations. The study reported here investigated the appreciation of coincidences in a way more relevant to people's personal experiences.

A common type of coincidence occurs in the course of psychic and Tarot readings, and astrology. The reader tells the client various facts about him or herself and the client judges that far more were true than could have been guessed by chance.

The "probability misjudgement" theory suggests that clients underestimate the chance that something that is true for them is also true for others (and hence can easily be guessed by the psychic) and underestimate the chance of several guesses simultaneously being true. If this is the reason for their belief, believers should underestimate more than non-believers.

The study reported here had four aims: first, to find out the prevalence of belief in the paranormal and any sex differences in belief, for a very large, though not random, sample; second, to find out how frequently a number of simple statements are true for that sample; third, to obtain people's estimates of how many statements are likely to be true for other people; and fourth, to compare believers and non-believers in their judgments. The hypotheses were that people would generally underestimate the number of statements that were true for others, and that believers would underestimate more than non-believers.

## **Method**

**Procedure.** The study was chosen to be carried out as part of British Science and Technology Week in March 1994 by publication in the Daily Telegraph newspaper. There are two editions of this paper, North and South, and a slightly different questionnaire was printed in each on March 16 1994.

**The Questionnaire.** The questionnaire consisted of a list of ten statements of the kind that might be produced by psychics, such as "There is someone called Jack in my family", or that might be important in psychic experiences, such as "Last night I dreamed of someone I haven't seen for many years" (see appendix). Respondents had to say whether each statement was true or false for them.

Next they were asked "Suppose you stopped the first person you met in the street and asked him or her about the same ten statements. How many times would you expect him or her to say True?". Then they were asked to imagine the same person in the street and estimate how likely it was that a given number of statements would be true for that person, using a five-point scale from extremely likely to extremely unlikely. To cover as much of the range as possible without making the task too onerous, those in the North were asked to estimate for none, three and seven statements and those in the South for one, five and nine statements. The resulting distribution could then be compared with a theoretical distribution.

Finally respondents were asked their age and sex and whether or not they believed in extrasensory perception (e.g. telepathy or clairvoyance).

## Results

A total of 6238 usable replies was received. Overall 51.7% of the sample was male, and 59% of respondents were believers in the existence of ESP. There were more people in the older age groups, as follows: under 25, 4%; 25-34, 6.5%; 35-44, 12%; 45-54, 22%; 55-64, 24%; 65 and over, 31%.

The percentage of people for whom each statement was true was as follows for statements 1 to 10:- 21.3, 33.5, 9.7, 24.1, 16.4, 26.9, 26.4, 28.3, 28.7, 27.1, respectively. To give examples, almost 30% claimed that their back was giving them trouble, that they are one of three children, that they own a tape or CD of Handel's Water Music, or that they have a cat. 34% said they had a scar on the left knee. The mean number of statements claimed to be true was 2.42 and the mean estimated number true for other people was 3.57, which is significantly higher ( $t=60.47$ , 6237 df,  $p<.0001$ ). In other words people have overestimated the number that would be true for others.

Respondents were divided into believers and non-believers on the basis of their answer to the ESP question. The number of true statements was higher for believers (2.56) than non-believers (2.23). These differences are shown in Figure 1. They are significant for questions 2 ( $\chi^2 = 74.0$ ), 3 ( $\chi^2 = 22.7$ ), 4 ( $\chi^2 = 8.7$ ), 6 ( $\chi^2 = 33.5$ ) and 9 ( $\chi^2 = 33.1$ ) (all 1df).

The estimates of the number true for others were also higher for believers (3.73) than non-believers (3.35) but the amount of over-estimation did not differ between believers and non-believers. In other words, there are significant differences between believers and non-believers in the number of statements claimed to be true for self and in the number estimated to be true for others but not in the difference between them.

Probability estimates for the South and North versions of the questionnaire were combined to give the results shown in Table 1. Results were compared for believers and non-believers but they do not differ substantially.

<b>Believers</b>	3.9	1.6	2.6	3.6	4.4	4.8
<b>Non-believers</b>	4.0	1.5	2.6	3.3	4.2	4.7
	None	One	Three	Five	Seven	Nine
	<b>Number of statements true</b>					

**Table 1. Estimated likelihood of a given number of statements being true for a random person.**

There was a large sex difference in belief. Among females 70% were believers but among males only 48% were ( $\chi^2 = 296$ , 1 df,  $p<.000001$ ). The percentage of believers does not change much with age, although it is lowest in the youngest group ( $\chi^2 = 15.3$ , 5 df,  $p<.01$ ). The percentage of

believers in males and females also does not change much with age. This is shown in Figure 2. A series of chi squared analyses (from youngest to oldest with 1df) shows that the sex differences are highly significant in all age groups except the youngest ( $\chi^2=2.3$ , ns;  $\chi^2=33.2$ ,  $p<.0001$ ;  $\chi^2=33.5$ ,  $p<.0001$ ;  $\chi^2=52.2$ ,  $p<.0001$ ;  $\chi^2=75.8$ ,  $p<.0001$ ;  $\chi^2=98.3$ ,  $p<.0001$ ).

## Discussion

The probability misjudgement theories are not supported by these data. They predicted that people would underestimate the number of statements that were true for others, and that believers would underestimate more than non-believers. This was not found. Indeed people's probability estimates were generally good and did not differ between believers and non-believers. This null finding in so large a sample suggests that misjudgements of probability are not likely to be an important factor in the determination of paranormal belief.

The figures for the number of individual statements true are surprisingly high. You might easily be impressed if a medium or psychic correctly told you the name of a specific piece of music you owned. However, nearly 30% owned the music chosen here. 27% of respondents had been to France in the past year (another common psychics' gambit) and 21% had a Jack in their family. Clients are often impressed by accurate names given, even when these are fairly common names. This figure suggests that a correct name might quite easily be obtained with relatively little probing.

Also of interest is that 10% had dreamed the previous night of someone they had not seen for many years. Statisticians have sometimes tried to work out the odds of a coincidence between a dream and a real event and have had to make many assumptions or "guesstimates" to do so (Blackmore, 1990). This figure provides a fair estimate for one side of the equation.

The major, and unexpected, finding was that believers reported far more of the statements true than non-believers. Conceivably this could be due to actual differences in lifestyle or family between believers and non-believers. For example believers may be more likely to have cats or even to injure themselves. Several of the questions were made deliberately vague to make them more closely comparable to the kinds of statements made by psychics. A possible explanation for the large difference is that believers used more inclusive categories when answering the questions. However, the vaguest questions were not obviously the ones with the largest difference. For example, the largest difference between believers and non-believers was in the statement "I have a scar on my left knee". Although there is clearly some leeway possible in what counts as a scar, this does not appear to be as flexible as a statement like "There is someone called Jack in my family" for which there was no difference. Clearly further research would be needed to establish the origin of these large differences between believers and non-believers.

The study is unique in providing such a large sample for looking at belief in ESP and sex differences in belief. Previous studies have varied widely in any sex differences found. Generally females show more belief than males but there has been much argument over whether this difference is genuine or still exists. Irwin (1985) has reviewed studies of sex differences and argued that sex should not be considered a primary correlate of belief in the paranormal. However, in this large sample we have found the usual sex difference with females being far more likely to be believers. It might be suggested that the sex difference is predominantly in older people and is disappearing as time goes

by. Figure 5 suggests that this is not true, except for the possible exception of the youngest group. Possibly sex differences are finally diminishing in the under 25s. Since Irwin used students aged about 20 this may explain why he found no sex differences. In future it would be interesting to look further at these changes with age.

Belief in the paranormal itself may also be diminishing but not to any great extent. For example twenty years ago Evans surveyed readers of *New Scientist* and found that 67% thought that ESP was likely or certain to exist, compared with the 59% found here.

As far as these figures are concerned it must be born in mind that the sample was not random. It consisted of a self-selected sample of *Telegraph* readers. The *Daily Telegraph* is a serious newspaper with a conservative outlook and its readers tend to be intelligent and aged around 40 years or over. These figures cannot be generalised to the whole population but they nevertheless give a useful indication.

More important, and less prone to this potential bias, are the differences between believers and non-believers. Most interesting is that the number of statements claimed to be true is much higher for believers than non-believers. Conceivably this could be due to actual differences in lifestyle or family between believers and non-believers. Alternatively it could be that believers interpret the questions more broadly and are more likely, for example, to include distant relatives as family. The ANOVAs show that there is a main effect of belief so this difference cannot be attributed to sex differences. This would mean that, in visiting a psychic or interpreting a Tarot or astrology reading, believers would be more likely to find statements that they judged to be true of themselves. In this way their belief in these psychic practices would be increased. Not surprisingly there is the same sheep-goat difference for the number of statements true for others. It is important to note that these are the only significant differences between believers and non-believers.

Comparing how many statements were actually true for each person and how many statements respondents thought would be true for others, it was expected that the former would be higher than the latter but this was not so. In fact people thought that more of the statements would be true for other people than were true for themselves. Possibly this could involve a "false consensus effect", that is, people tend to assume that others are more similar to themselves than they in fact are (Marks & Miller, 1987). Another possibility is that they guessed the purpose of the survey and therefore tried to push the results in their preferred direction. This, however, would suggest that believers would give a higher number for others than themselves and non-believers lower. This was not found.

The probability misjudgement hypothesis suggests that believers should generally be worse at estimating probabilities than non-believers. We might therefore expect a greater difference for believers than non-believers between the number of statements true for self and the estimate for others. However, this was not found and the difference scores are remarkably similar for believers and non-believers. This is evidence against the idea that misjudgements of probability underlie paranormal belief.

The estimates people gave of the likelihood of any given number of statements being true for the person they met in the street were generally quite accurate given the true mean number correct is

2.4. The distributions of actual number correct and estimated likelihood cannot directly be compared, but the shapes of the distributions are generally similar.

What then can we conclude about the "probability misjudgement" theories?

This is by far the largest study ever conducted on this topic. Although the sample is not random it contains a wide distribution of ages and roughly equal sex distribution. The task was piloted on students until a version was found that was easy and quick to complete. There is no evidence that people failed to understand the questions and the very good estimates of probability they gave suggest that the task was able to tap probability judgements rather accurately. Given all this I suggest that the lack of the expected sheep-goat effect is very telling. It appears that the biggest difference between believers and non-believers is not in their probability estimates but in their tendency to claim that statements are true of themselves and of others.

## Conclusion

The results of this large scale survey do not provide evidence to support the probability misjudgement hypothesis. They do, however, suggest that believers are more likely than non-believers to claim that a statement is true of themselves. As found in previous research, belief in the paranormal is widespread and far higher among females than males.

## REFERENCES

- Blackmore, S.J. (1984). A postal survey of OBEs and other experiences. *Journal of the Society for Psychical Research*, **52**, 225-244.
- Blackmore, S.J. (1990) The Lure of the Paranormal *New Scientist* 22 Sept 1990 62-65.
- Blackmore, S.J., Galaud, K. & Walker, C. (1994). Psychic experiences as illusions of causality. In Cook, E. and Delanoy, D. (eds). *Research in Parapsychology 1991*. Metuchen, N.J., Scarecrow, 89-93
- Blackmore, S. and Troscianko, T. (1985). Belief in the paranormal: Probability judgements, illusory control, and the 'chance baseline shift'. *British Journal of Psychology*, **81**, 455-468.
- Broughton, R.S. (1994) Repetition avoidance in ESP tests: Do sheep and goats really differ? In Cook, E. and Delanoy, D. (Eds), *Research In Parapsychology 1991*. Metuchen, New Jersey: Scarecrow, 147-150
- Brugger, P., Landis, T. & Regard, M. (1990). A 'sheep-goat effect' in repetition avoidance: Extra-sensory perception as an effect of subjective probability? *British Journal of Psychology*, **76**, 459-468.
- Brugger, P., Regard, M., Landis, T., Krebs, D. and Niederberger, J. (1994) Coincidences: Who can say how "meaningful" they are? In E.W. Cook & D. Delanoy (Eds.), *Research In*

*Parapsychology 1991*. Metuchen, New Jersey: Scarecrow, 94-98.

Clarke, D. (1991) Belief in the paranormal: A New Zealand survey. *Journal of the Society for Psychical Research*, **57**, 412-425

Evans, C. (1973) Parapsychology - what the questionnaire revealed. *New Scientist*, 25 January. 209-210.

Gallup, G.H., & Newport, F. (1991). Belief in paranormal phenomena among adult Americans. *Skeptical Inquirer*, **15**, 137-146.

Glicksohn, J. (1990). Belief in the paranormal and subjective paranormal experience. *Personality and Individual Differences*, **11**, 675-683.

Irwin, H.J. (1985) A study of the measurement and the correlates of paranormal belief. *Journal of the American Society for Psychical Research* **79** 301-326

Lawrence, T.R. (1990-1) Subjective random generations and the reversed sheep-goat effect: A failure to replicate. *European Journal of Parapsychology*, **8**, 131-144

Marks, G and Miller, N. (1987) Ten years of research on the false-consensus effect: An empirical and theoretical review. *Psychological Bulletin*, **102**, 72-90

Matthews, R. and Blackmore, S. 1995 Why are coincidences so impressive? *Perceptual and Motor Skills*, **80**, 1121-1122

Palmer, J. (1979). A community mail survey of psychic experiences. *Journal of the American Society for Psychical Research*, **73**, 221-251.

Acknowledgements: I wish to thank Paul Northcott for his help with the analysis.

## **APPENDIX**

The ten statements.

1. There is someone called Jack in my family
2. I have a scar on my left knee
3. Last night I dreamed of someone I haven't seen for many years
4. I travel regularly in a white car
5. I once broke my arm
6. My back is giving me pain at the moment

7. I am one of three children
8. I own a CD or tape of Handel's Water Music
9. I have a cat
10. I have been to France in the past year

Page created 13 October 2003