Detecting Telepathy: A Meta-analysis for Extrasensory Perception Experiments in Last 20 Years

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ABSTRACT

The meta-analysis aims to detect telepathy's effect in the extrasensory perception (ESP) experiments in the last 20 years. Seven articles were chosen from psycho INFOR, and an extra two were found from a summary table for telepathy experiments in one selected paper. In these studies, the difference between the observed hit rates and the expected one represented the impact of telepathy. These papers included 16 experiments, and their data were collected to calculate their effect size. The weighted effect size was the original one multiplied by the proportion of trials. The overall effect size summed the weighted effect sizes and got 0.091. The small effect size illustrates that the effect brought by telepathy on participants' performance obtained from these experiments is very small.

Keywords: telepathy, ESP, meta-analysis.

1. INTRODUCTION

Telepathy is a kind of communication through the mind of humans without any physical interactions. As a form of ESP, there has been a long discussion about its existence. Researchers carried out experiments to test it, and the experimental methods have been advanced. Initially, they asked participants to have a card-guessing game to detect its effect. Then, it transferred to dream telepathy settings, in which participants needed to choose the correct image sent by partners in another room. After that, participants conducted the experiments in ganzfeld [1]. Nowadays, scientists draw on the experience of predicting who is going to call. They applied modern communication technology in their study to ask participants to guess the sender. They also advance the experiments by some automatic settings to minimize errors. Although methods might vary a lot, their purposes are similar: to find whether telepathy influences people's choices to make the hit rate above the chance.

In this meta-analysis, ESP experiments about telepathy in the last 20 years are gathered to see whether these tests illustrate the effect of telepathy. Besides, the meta-analysis will point out some findings from these experiments to provide a more comprehensive perspective of telepathy. Finally, some suggestions will be offered for future investigation.

2. METHOD

2.1. Study researching

This meta-analysis attempted to conclude a result focused on recent studies since the testing methods have been updated continuously. It set the publication years to be within the last 20 years for gaining enough articles. Psycho INFOR was the database. For finding the satisfying paper, the keyword "telepathy" was used for searching. Documents were further restricted by "peer viewed", and the time range was set as "in the last 20 years", which resulted in 220 pieces. Then two selections were conducted based on the criteria listed in the table below. Firstly, abstracts of these articles were manually scanned, which gave 11 results. After that, the full texts of these articles were looked through, and seven articles remained. Furthermore, from the summary table for telepathy research by Sheldrake, Smart and Avraamides [2], this meta-analysis added two more relevant articles. Finally, there were nine qualified articles.

Selection criteria
1.The article must be relevant to the topic of telepathy within the parapsychology domain.
2.The article must have at least one experiment with demonstrations about its settings.
3.The demonstrations for the experiment must include some essential information: the number of total trials for each experiment, the number of tests for hit and hypothesized hit rates.
4.The paper must have accessible full text online.

2.2. Procedure

The references list the nine paper for this meta-analysis. The number of experiments written in each article was counted, and each experiment was analysed separately. For each experiment, I collected the information listed below: a) numbers of total trials, b) numbers of hits, c) theoretical hits rate, d) experiment settings.

For managing these data, I calculated the rate of hits by $P_{hits} = n_{hits}/n_{trials}$, where n_{hits} shows how many times the participants get the correct response and n_{trials} is the number of trials for one experiment. As for the effect size for each experiment, I applied the formula $ES = (P_{hits} - P_{theoretical})/\sqrt{P_{theoretical} \times (1 - P_{theoretical})}$ (where $P_{theoretical}$ is the expected rate for participants to get the right answer), which was used in five of the articles[1-5]. For calculating a synthesized result, the effect sizes for each experiment were further weighted by multiplying the proportion of its trials, which was calculated by $P = n_{trials}/N_{trials}$, where N_{trials} is the sum of all the trials of all the experiments. The combined effect size added up these weighted effect sizes.

3. RESULTS

3.1. Descriptive statistics

This mete-analysis finally includes 9 articles. They contain 16 experiments with 21441 trials in total. As for their experiment design, there is only one experiment (6.25%) that is a two-choice design. 3 experiments (18.75%) implemented a three-choice method, and 10 (62.5%) experiments applied a four-choice design. The remaining 2 experiments (12.5%) have five choices. Besides, these only two experiments used card-guessing settings to ask participants to choose from different colours in the lab, while the rest of the experiments are online. Among them, 1 experiment applied virtual environment. 2 experiments tested email telepathy and 2 experiments studied SMS telepathy. The number of telephone telepathy experiments is the largest, which is 9. Regarding measuring the effect of telepathy, 4 experiments (25%) showed no significant difference in the two hits rates, which indicated telepathy would not influence the performance of participants; however, 12 experiments (75%) discovered a significant effect to increase participants' probability of having a correct response. Table 1 shows some general information and summarized statistics about the 9 experiments.

3.2. Effect size

The effect sizes of each experiment were calculated, and Figure 1 shows the unweighted effect size of each experiment. There are 8 experiments (50%) with a tiny effect size from 0.01 to 0.2. 7 experiments have a small effect size range from 0.2 to 0.5. Only 1 study has a medium effect size larger than 0.5. The average unweighted effect size is 0.15. While for the weighted effect size, the statistic for each experiment was further multiplied by the proportion of trials it took. Figure 2 represented the weighted effect size of each experiment, which indicates how large an experiment contributes to the overall effect size. The overall effect size, which is the sum of weighted effect size, is 0.091.

Table1. Summarized statistics about each experiment

Author(s)	Year	Trials	Success rate	Expected rate	Unweighted effect size	Proportion	Weighted effect size	Settings
Rudski(a) [6]	2002	4800	23.90%	20%	0.097	0.226	0.022	color guessing by cards
Rudski(b)	2002	4800	21.70%	20%	0.043	0.226	0.010	color guessing by cards
Sheldrake & Smart	2003	271	45.00%	25%	0.462	0.013	0.006	telephone telepathy
Lobach & Bierman(a)	2004	107	34.60%	25%	0.221	0.005	0.001	telephone telepathy
Lobach & Bierman(b)	2004	107	25.20%	25%	0.005	0.005	0.000	telephone telepathy
Sheldrake& Smart(a)	2005	552	43.00%	25%	0.406	0.026	0.011	email telepathy
Sheldrake & Smart(b)	2005	137	47.00%	25%	0.501	0.006	0.003	email telepathy
Murry et.al	2007	200	24.00%	25%	-0.023	0.009	-0.0002	virtual environment
Sheldrake et.al(a)[7]	2009	886	37.90%	33%	0.098	0.042	0.004	automated sms
Sheldrake et.al(b)	2009	43	44.20%	33%	0.231	0.002	0.000	automated sms
Schmidt et.al(a)	2009	397	26.70%	25%	0.039	0.019	0.001	telephone telepathy
Schmidt et.al(b)	2009	100	30.00%	25%	0.115	0.005	0.001	telephone telepathy
Schmidt et.al(c)	2009	60	40.00%	25%	0.346	0.003	0.001	telephone telepathy
Sheldrake & Beharee	2009	6000	26.70%	25%	0.038	0.282	0.011	telephone telepathy

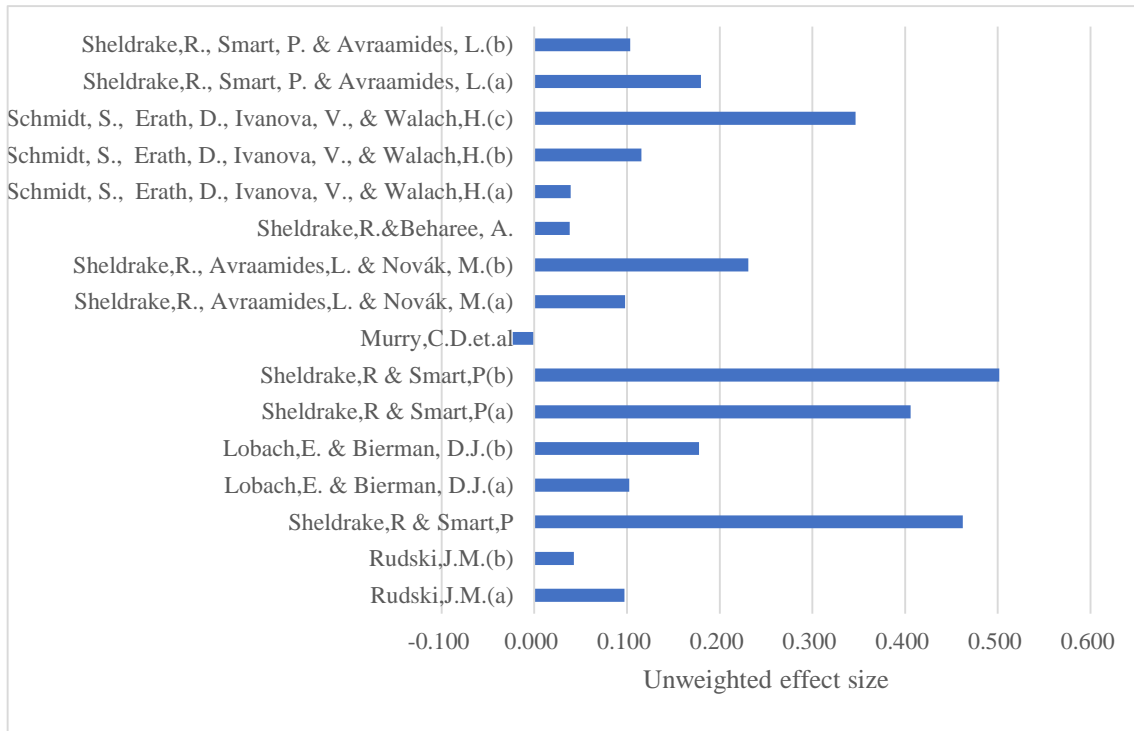| Sheldrake et.al (a) | 2015 | 2080 | 41.80% | 33% | 0.180 | 0.098 | 0.018 | telephone telepathy |
| Sheldrake et.al (b) | 2015 | 745 | 55.20% | 50% | 0.103 | 0.035 | 0.004 | telephone telepathy |

Figure1.The unweighted effect size for each experiment
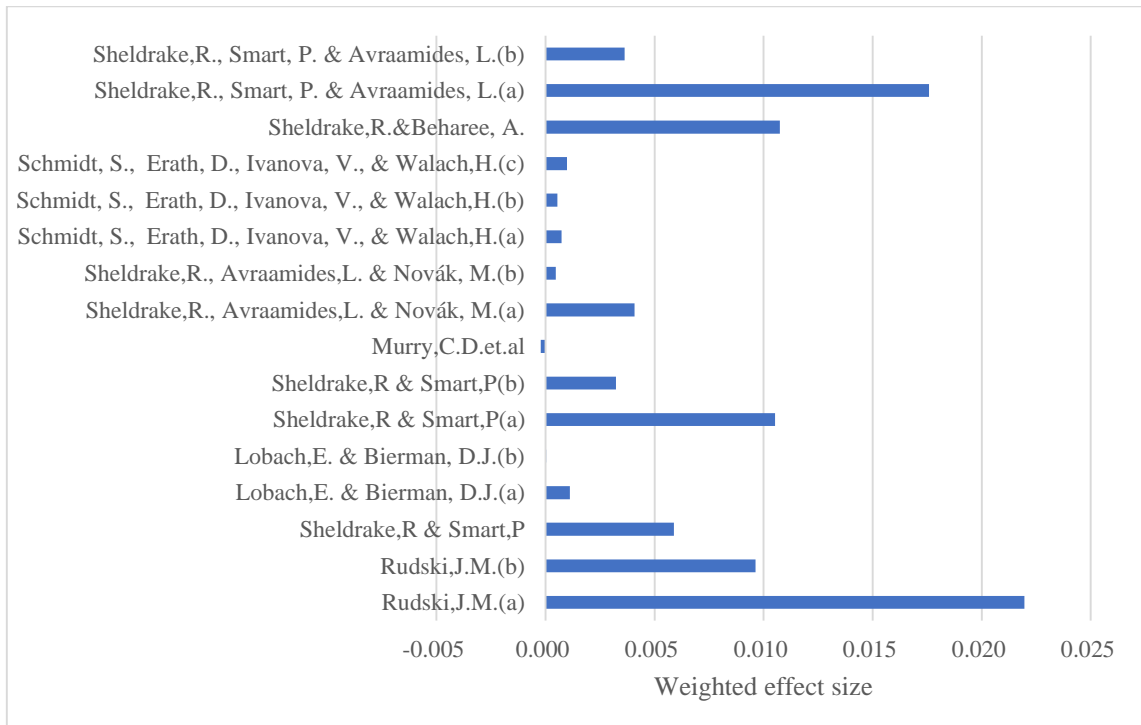

Figure2. The weighted effect size of each experiment

4. DISCUSSION

4.1. Results interpretation

The overall effect size is 0.091. It indicates the effect of telepathy on participants to increase the hit rate is not strong under experimental settings. These are some reasons for the tiny effect size. Firstly, the motivation of participants is essential for the telepathy experiment. People are required to respond consciously to apply the effect of telepathy. However, some people might be less motivated, and they randomly choose the answer without using the inner mental force. Especially in online settings, participants might be less engaged and answer physically. Therefore, the effect of telepathy might not be fully expressed.

Besides, the number of trials for an experiment is essential for calculating the overall effect size. According to the formula, the experiments with large trials significantly impact the overall effect size. However, those experiments with large trials might not have a significant effect size. The sample selection causes this problem. The telepathic ability for individuals varies, and only particular participants might have telepathy strong enough to demonstrate its effect [4]. Some study with the purpose to test a significant impact has a selection for their participants. They recruit those who have telepathy related experience in everyday lives. The results for randomly choosing sample are expected to close to chance, and researchers are difficult to conclude from them [4]. In this way, those experiments carry out trials repeatedly with participants showing strong telepathy. But repeated tests on these people show a decrease in performance. For example, some studies carry out extra experiments with high-scored participants to test whether they cheated in the initial trials. In Sheldrake et al.'s experiment [2], the success rate for them dropped from 63.6% to 44.2%. And in Schmidt et al.'s [8], it dropped from 50% to 40%. High-scored participants in Sheldrake and Beharee' [5] experiment shows a decline in hit rates from 45.2% to 35.2% in the second test, while in further tests, the hit rate was no better than a theoretical one. There is no clear explanation for this phenomenon. One possible cause is that the repeated test might cause the participants to feel more nervous and self-conscious, which will inhibit telepathy [5]. Consequently, the experiments with high effect size with selected participants do not include many trials. The experiments with repetitive trials are challenging to obtain large effect size.

Moreover, our experimental settings might be inadequate to capture its effect. Our understanding of telepathy is quilt limited. From Zener card to ganzfeld, the detecting method for telepathy has long been changed based on further study and technology advancement. Nowadays, most experiments become online, which breaks the laboratory's shackles and makes experiments closer to living settings. Furthermore, the sender in the recent studies is automatic instead of determining by researchers. In this way, the researchers could better maintain the randomness of the experiment. The study method continues to update to become more improvable.

4.2. Limitations in telepathy experiments

Initially, there is the possibility of cheating. In experiments with many trials, it is inefficient to watch every moment of each participant. Although some experiments use filmed condition either in randomly selected samples or high-scored ones, those participants still have a chance to cheat, such as have other electronic devices in monitoring blind areas [4]. Additionally, the validity of the telepathy experiment is doubtable since what the experiments measure is uncertain. Other forms of psi such as precognition and clairvoyance might also provide alternative explanations for the difference in hits rate. For example, the precognitive ability enables people to get the sense of the correct answer in advance [9], while clairvoyants could see the scene in which the sender sent their messages miles away [5]. The generality of the telepathic experiment result is also not high. Lobach and Bierman [9] tried to replicate the study conducted by Sheldrake [3] to detect the effect of telephone telepathy with local time as an additional factor. Although telepathy still shows an influence on performances preserved, the hit rate dropped. They interpreted this discrepancy as due to different selection standard for samples. The first one has a requirement and only recruit those who show strong telepathy, which leads to a more apparent disparity between expected rates. Schmidt et al. [8] also replicate this study, but they failed to result significant enough to be better than chance. It is explained by looser recruitment for participants.

4.3. Suggestions for future studies

There are three suggestions for further studies for telepathy.

1. Researchers could detect a more remarkable effect of telepathy by three methods. They should carefully select their testing samples, and the general recruitment might not provide a statistically significant result. The high-scored participants could be found by recruiting people with target characteristics like whether they have believed the existence of paranormal phenomenon or adding requirements like experiencing telepathy in life. Secondly, researchers could set their experimental time in the morning when telepathy works best. Thirdly, scientists could give some rewards to participants to increase their motivation. Besides, the use of filmed test should be careful since it might affect the hit rate. Some studies [1,5] identified a decline in the participant's performance when their performance is recorded.

2. Researchers could better apply modern technology to their experiments. Online recruiting is more efficient to gather a large number of participants with diverse backgrounds. In this way, it increases the power of the study with a large sample size. It also allows people to carry out in-depth experiments on telepathy from different domains. Furthermore, computers could substitute experimenters in some processes. For example, the computer could help to pair the senders and receivers randomly or automatically selected the sender. It contributes to reduce the errors brought by experimenters and avoid the biased brought by the human selection to maintain the randomness of the experiment. But scientists found the effect size of an automated test is small, and a slow test with relaxations could be helpful to tackle this problem [5].

3. Researchers could add a control experiment to exclude the effect of other forms of psi. For example, they could set the control experiments with virtual senders [2,4,5]. In hypothesis, there should be no difference in success rate in the control condition if telepathy influences participants' guessing. The reason is that telepathy demands the participation of two humans to communicate by mental force, which the virtual sender cannot replace. Besides, precognition and clairvoyance still work for individuals. Consequently, if the hit rate is no better than chance in this condition, it indicates that the difference in hit rate is due to telepathy.

5. CONCLUSION

This meta-analysis finds a weak effect of telepathy in recent studies. The motivation of participants, sample size, recruitment methods and experiment settings might contribute to this result. There are some limitations observed in these experiments, such as cheating, low validity and generality. Therefore, future studies could attempt to increase the effect size by overcoming these limitations, like recruiting people who are more likely to show telepathy. A controlled experiment that it is a baseline exclude noise in measurement works as well. Moreover, with the advancement of modern technology, scientists can better implement them to increase accuracy and efficiency.

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