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Science, research into the paranormal, and
irrational belief: what is the link?

Submitted in partial fulfilment for the Master in Science Communication

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I declare that this thesis is my own work, unless otherwise stated

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ABSTRACT

This study is aimed at checking the following assumption, supported by several French scholars: in France, the investigation of the paranormal is completely ignored and regarded as a pseudoscience, and this is responsible for the overwhelming proliferation of irrational beliefs. This rejection is not justified; this discipline used to be thoroughly investigated by the major academic figures of the end of the XIXth century, and, contrary to what is now assumed, the debate has never been closed.

My first concern has been to check whether the study of the paranormal (and more precisely parapsychology) actually meets the criteria of a pseudoscience or not. This has been done by first establishing a list of criteria which I believe should characterize science vs. pseudoscience; second by analysing the communication within the paranormal researchers' community in respect to those criteria. This analysis has been conducted on a selected samples of the main fringe journals (content analysis), but also through interviews of editors. I was also able to make an assessment of the oral communication process by attending to the annual meeting of the community. I found several significant differences in their communication process compared to mainstream science; differences which are discussed. However, the conclusion of this first part is that the study of paranormal meets the scientific criteria I selected. According to those criteria, the rejection of parapsychology from the mainstream scientific community is indeed not justified.

My second concern was to assess the media coverage of the scientific study of the paranormal in France vs. UK. This has been done by a dissemination analysis (amount of articles published) and diffusion analysis (analyse of the content of these articles) conducted for the newspapers and two main scientific magazines (one per country). The second conclusion of this study is that the French scholars are right: the scientific study of the paranormal is completely disregarded by the French media. It is on the contrary well reported by the British media.

This allowed me to check the primary assumption, whether the proliferation of irrational beliefs is indeed negatively correlated to the acknowledgement and report of the scientific paranormal research. By studying the surveys made on paranormal beliefs in France and UK, I found out it is not. Irrational belief is as widespread in the UK as it in France, although the British population is more informed about the scientific aspects and interpretations of paranormal phenomena. My final conclusion is that, even though some French scholars are right to consider that the dismissal of paranormal research as pseudoscience is not justified, they are wrong to believe that this dismissal is responsible for the proliferation of irrational belief. Belief, by nature, doesn't appear to look for any external justification. It is related to faith rather than scientific evidence.

TABLE OF CONTENT

INTRODUCTION.....	1
Chapter 1 : ANALYSIS OF THE SCIENTIFIC COMMUNICATION.....	3
1. Definition of pseudoscience.....	3
Possible criteria for pseudoscience	3
Selected criteria for pseudoscience	5
2. Methodological approach and premises.....	8
General overview	8
The Parapsychological association	8
The journals	8
Procedure.....	10
3. Written communication.....	11
Scientific approach : Induction and deduction	11
Type of the articles	12
Attitude to scientific evidence	13
Methodology	15
Questioning and confrontation	16
Questioning	16
Confrontation with other researchers' work.....	16
Communication strategy	20
Summary of the results.....	23
Discussion	24
4. Peer reviewed process.....	27
General features	27
Editorial processing	27
Criteria for selection.....	28
Content	28
Readability and clarity	29
Scientific merit	29
Impartiality.....	29
5. Oral Communication	31
Chapter 2: MEDIA COVERAGE	34
1. UK Newspapers	34
Dissemination	34
Types of articles.....	36
Attitudes	37
Scientific institutions and researchers	39
2. New Scientist.....	40
Dissemination	40
Types of articles.....	41
Attitudes	41
Scientific institutions.....	42
3. French Newspapers.....	44
Dissemination	44
Type of articles	44
Attitudes	45
Scientific institutions.....	45
4. French scientific magazines.....	45
Summary of the results.....	47
5. Discussion.....	48
Chapter 3: PARANORMAL BELIEF.....	48
CONCLUSION	52

FIGURES

Figure 1 : proportion of articles dealing with empirical data – fringe vs mainstream journals	12
Figure 2 : proportion of articles dealing with theoretical ideas – fringe vs mainstream journals	12
Figure 3 : proportion of lab experiments.....	13
Figure 4 : percentage of articles bringing positive or	14
Figure 5 : percentage of articles suggesting scientific / irrational	14
Figure 6 : statistical and mathematical tools used in demonstrations	15
Figure 7 : number of auto-citations vs. other authors' citations	17
Figure 8 : proportion of auto-citations	17
Figure 9 : Mean number of references per articles	18
Figure 10 : proportion of single author's book citation	18
Figure 11 : proportion of single author's book citation British J. Psychol. specificity	18
Figure 12 : breakdown of journal references cited in fringe journals	19
Figure 13 : breakdown of non-psychological journal references cited in <i>British Journal of Psychology</i>	20
Figure 14 : categorisation of the expressions used	21
Figure 15 : Type of reports communicated during the PA convention.....	32
Figure 16: UK articles containing the word « parapsychology » - past two years	34
Figure 17 : breakdown of UK newspaper articles between different newspapers.....	35
Figure 18 : breakdown of UK newspaper articles between different countries	35
Figure 19 : breakdown of the UK articles	36
Figure 20: UK newspapers attitude towards psi - 46 articles	37
Figure 21: UK newspapers attitude towards psi - case studies article	38
Figure 22: UK newspapers attitude towards psi - experimental articles.....	38
Figure 23 : breakdown of the scientific institutions and bodies cited.....	39
Figure 24 : breakdown of the names cited in UK newspapers	39
Figure 25: New Scientist articles containing the word « parapsychology »	40
Figure 26: breakdown of the 6 New Scientist articles	41
Figure 27: New Scientist attitude towards psi	42
Figure 28: : breakdown of the scientific institutions and bodies cited.....	42
Figure 29: breakdown of the names cited in New Scientist	43
Figure 30: French articles containing the word « parapsychologie » - past twelve years..	44
Figure 31: breakdown of the French articles	44
Figure 32: French newspapers attitude towards psi - 17 articles.....	45

TABLES

Table 1: set of criteria selected to differentiate science from pseudoscience.....	7
Table 2 : Yves Lignon's evaluation of the main fringe journals	9
Table 3 : summary of the analysis of the written communication.....	23
Table 4 : general features of the journals	27
Table 5 : Comparative analysis of the coverage of psi research in UK newspapers, New Scientists and French Newspapers	47
Table 6 : surveys on irrational beliefs	50

INTRODUCTION

The idea of this study came from a polemic article written by a French historian and philosophy teacher, Bertrand Méheust in *Alliage* (1996). Here are his statements (which mainly relates to the situation in France):

- Paranormal phenomena used to be investigated and debated by the most prominent scientists (astronomer Camille Flammarion, physicists William Crook and Olivier Lodge, Nobel Prizes Charles Richet, Pierre and Marie Curie...) at the end of the XIXth century. The debates were intense and of high standard. Their work was commonly published in mainstream journals. The field used to be called “métapsychique”.
- Nowadays the questions they raise are completely dismissed by the scientific community. They pretend that the debate is closed and regard it as old-fashioned and ridiculous. It has become a kind of “taboo”, “one of the most powerful bans of modern times”.
- According to Bertrand Méheust, the debate was never resolved. This attitude resulted in the proliferation of cheap literature and programs, the level of which is nothing like what it used to be one century ago. This state of things had actually been forecast by theoreticians that studied magnetic somnambulism: “they indeed thought that if magnetic somnambulism wasn’t integrated in the rational thinking of the elite...there was a risk that superstition, angels and spirits would come back, which would end in a totally uncontrolled situation” (my translation). It is exactly what happened.

To cut a long story short, Méheust’s idea is that investigation of the paranormal is completely ignored and rejected (at least in France), and this is responsible for the overwhelming proliferation of irrational beliefs.

This aim of this study is to check out this assumption by analysing the situation at an international level. In order to do that, I will have to address three points:

- 1) Is there any international research on the paranormal that could be regarded as scientific? In other words, are the French scholars right to dismiss such investigation as soul-destroying pseudoscience?
- 2) How is this scientific research (if any) dealt with by the media? I will compare the situation in France and in the UK.
- 3) Is irrational belief indeed negatively correlated with the extent to which this scientific research is communicated?

These three points are the three chapters of this dissertation.

The first point, that is deciding between science and pseudoscience (chapter 1) constitutes the core (two thirds). I will address this question by analysing communication within the community investigating paranormal phenomena. I will mainly focus on parapsychology, which appears to be the modern term for what Bertrand Méheust refers to as “*Métapsychique*”. The second question will be addressed by a dissemination and diffusion analysis of the press articles dealing with parapsychology; the third by an estimation of irrational beliefs referring to existing surveys. I will confront these last two points, for France and UK, to see whether or not there is a negative correlation between irrational beliefs and press coverage of parapsychological research.

Chapter 1 : ANALYSIS OF THE SCIENTIFIC COMMUNICATION

Our question here is: is the study of paranormal phenomena a science or a pseudoscience? To define the community that investigate the paranormal, the first thing is to define its subject. According to the Oxford dictionary, the definition of paranormal is an adjective meaning:

“Denoting events or phenomena such as telekinesis or clairvoyance that are beyond the scope of normal scientific understanding.” Parapsychology is obviously part of it, as it is defined by “the study of mental phenomena which are excluded from or inexplicable by orthodox scientific psychology (such as hypnosis, telepathy, etc.)” So it appears that paranormal phenomena refer to what the current scientific knowledge cannot explain. This does not tell us much. Obviously, this is the case for many things that science investigates and has not discovered yet. Gravity is a phenomenon that has been investigated for decades. Science can describe it with laws, but it still cannot explain it. Physicists still look for the famous “gravitons” which would allow them to control gravity. This does not seem to be very different from hypnosis. This well observed psychic phenomenon has been investigated for decades, and researchers still haven’t any idea how it works. Then why should parapsychology be called a pseudoscience whereas nobody would ever think of denying that the investigation of gravity is a science?

To answer this question, the first thing is to define what are the criteria that define a pseudoscience.

1. Definition of pseudoscience

Possible criteria for pseudoscience

What is a pseudoscience? The word comes from the Greek *pseudes* which means “false”, the contrary of “genuine”. So it seems that pseudo-science is defined only by comparison with science. It is something which imitates science, but which isn’t. It is thus a negative definition, which appeals to another one: what is science?

To remind the French of a famous ad (on the absence of alcohol in canadry), it looks like science, it smells like science, it tastes like science, but it isn’t science. So how can you know it isn’t (genuine) science? You certainly need a very subtle and refined definition of science and its criteria in order to avoid being fooled. This is where the things get more complicated. So many efforts have been made to set up a nice and smooth “necessary and sufficient” set of criteria for science (Chalmers, 1999), and with so little result... rather daunting. How come? One would argue

there aren't such things as "epistemological invariants" for science, as each discipline (or even each lab) would have his own rules and methods (Zingrone, 2002).

Yet even if there isn't any clear definite criterion for science, we have to find a way to distinguish from pseudoscience. With Canadady actually, the answer to the question: how you know it isn't (alcohol)? is simple. You don't get drunk.

This is actually a first possible way to identify science: look at its results. It works or it doesn't work. There are three useful weapons that science commonly use in his war against ignorance: falsifiability, reproducibility and predictability. Thanks to falsifiability science can reject what doesn't work; thanks to reproducibility and predictability, it can welcome and accept what works. These three features are essential for science to get its results, and to progress.

Yet there is another way to look at science: look at its method. The two main bases of the scientific methodology, i.e. induction and deduction have been extensively described in Chalmer's book (1999). The cohabitation of these two poles in the process of science reflects an essential component of scientific methodology: the relentless confrontation of theories and facts. On one hand science can't escape facts; on the other hand the goal of science is to go beyond facts, in order to find the underlying mechanisms, or at least to get a pretty close image of it. What merely defines the scientific attitude is a mere question: How does it work? So you look, and guess; *and the answer is never taken for granted*, so you look again and guess again, and look again...how, how, how???? Relentless questions, no define answer. Questioning facts and theories is the fundamental attitude of the (true) scientist. And the scientist has not only to address his own observations and experiments, he must address other scientists' in his field as well.

Now let's have a look at the specific scientific criteria that have been proposed to distinguish science from pseudoscience, and we will classify them according to the categorisation we have just made. Is it a "result" criterion and in this case does it refers to falsifiability or predictability? Or is it a "methodological" criterion, and does it refer to the empirical approach or to the theoretical one?

I found in the literature three different tables made by sociologists and philosophers that propose possible distinctive criteria. I indexed them according to my classification as follows:

- Methodological criteria: categories E, T and Q

The E category will assess if the practitioners use the empirical approach and how they deal with facts, the T category if they use the theoretical approach, and the Q category whether and how they confront to other works.

- Result criteria: category R

The R category will assess the success and progress of the science.

- There is an independent criterion, that I called **C**, which assess the way the practitioners communicate their work. This doesn't belong to the main definition criteria that I cited previously, and it is interesting to notice that Strahler and Bunge disagree on that criterion.

Example:

Typical attitudes and activities

	Scientist	Pseudoscientist
E	Seeks empirical confirmations and disconfirmations	Neglects empirical matters
T	Proposes and tries out new hypotheses	Optional
Q	Seeks critical comments from others	Falls back consistently on authority
R	Progresses over time: develops new theories that explain new facts	Stagnant in doctrine and applications
C	Writes papers that can't be understood by everyone	No

The full tables are given in Annexe1.

Selected criteria for pseudoscience

By studying the scientific communication within the researchers, I will try to assess how these different criteria are dealt with. However, they are too numerous and diversified and I had to make a selection according to their relevance. I chose to address the definition of science by the method. There are two main reasons for that:

1 - Predictability, falsifiability and reproducibility are not essential criteria for science. This stance has been extensively defended by Ian Stevenson, a researcher in paranormal science, in an article published in JSE (1999). Falsifiability is often subjective, as scientists disagree whether one observation would constitute an adequate refutation of a theory. Moreover, falsifiability is not a relevant tool to assess the importance or the usefulness of a scientific theory. Reproducibility is very difficult to attain in some well accepted mainstream fields. It is the case especially with particle physics. To give an example, the omega minus particle has been claimed being discovered after only too successful essays taken out 200 000 trials (Discovery of the omega minus particule, Brookhaven national laboratory).

2 – The fact that the observations studied don't fit a mainstream theory (and don't meet the R criteria “Uses highly consilient (i.e. explains many facts) and simple theories” (Table 2, Annexe 1) can be an indicator of the emergence of a new paradigm to science (as described by

Kuhn, 1970). This is the whole problem of how anomalies are handled. They can trigger a major scientific discovery (a “revolution”), or on the contrary constitute a basis for pseudoscience to emerge; and it is often impossible to predict the future of anomaly at a given time (Note 1, Annexe 1).

Exemples are numerous in the history of science, where aberrant results inconsistent with mainstream theories ended up as major discoveries. Maybe the most famous one is the anomaly in the classical theory of light, widely debated, which finally revealed the quantum aspect of light (Note 2, Annexe 1).

These arguments are obviously extensively used by researchers of the paranormal to defend themselves against attacks from mainstream scientists criticizing their lack of well confirmed theories and practical results. Along with Stevenson, other parapsychologists have proposed a redefinition of scientific criteria according to those remarks (Jahn & Dunne, 1997). They define a "neo-subjective" science, which mainly retains the "logical rigor, empirical/theoretical dialogue". This type of defence is so predictable that sceptics laugh at it. However, I don't see any good reason to laugh (they actually don't really give any). I would rather agree with Lakatos view, summarized by Steven E. Phelan as followed:

“The existence of anomalies makes falsification untenable as a doctrine. In place of falsifiability as a demarcation criterion, Lakatos has proposed distinguishing between ‘progressive’ and ‘degenerative’ research programs (RPs). A progressive research program makes a few dramatic, unexpected, stunning predictions. An RP that ceases to make novel predictions is degenerating. Scientists tend to move to progressive programs and away from degenerating programs although Lakatos does not condemn those trying to turn a degenerating program into a progressive one.”

Thus, predictability and reproducibility usually bring results, results brings consensus and assure acceptance by mainstream science. However, this process is the final objective of science. A science in the making may not have gone through these different stages yet. It doesn't mean that it won't; therefore it doesn't mean that it is not science. That's why the criterion of assessing what is science by its results doesn't seem to be a completely reliable criterion.

To conclude, the methodological approach, that is the confrontation of facts and theory, both from one's own work and from its peers', will be my chosen one. This *continual questioning* is opposed to *knowledge being taken for granted*, which is the true invariant of pseudo-science. Indeed, the philosopher and physicist Mario Bunge (1984) once suggested that, rather than dividing disciplines into "sciences" versus "non-sciences," we ought instead to characterize them as either "research fields" or "belief fields." I would completely agree with that distinction. For pseudoscience to

develop, it has to be based upon a *belief*, whether it comes from an authority, a sacred text or a tradition, that isn't questioned. And this is actually the definition that chose by the Oxford dictionary: "Pseudoscience: a *collection of beliefs or practices* mistakenly regarded as being based on scientific method."

Finally the combination of the three different approaches (tables 1, 2 and 3, Annexe 1) when limiting to the methodological definition and practical feasibility of my study brings me to the final set of criteria I will analyse in this study (Table 1).

Table 1: set of criteria selected to differentiate science from pseudoscience

Typical attitudes and activities		
	Scientist	Pseudoscientist
E	Gather or uses data, particularly quantitative ones	Suppresses or distorts unfavourable data
E	Uses correlation thinking (e.g. A regularly follows B in controlled experiments)	Uses resemblance thinking (e.g. Mars is red, red is the color of blood, therefore Mars rules war and anger)
E	Seeks empirical confirmations and disconfirmations	Neglects empirical matters
T	Proposes and tries out new hypotheses	Overreliance on testimonials and anecdotal evidence
T	Relies on logic	Formal background modest, little mathematics or logic
Q	Admits own ignorance, hence need for more research	No
Q	Finds own field difficult and full of holes	No overlap with another field of research
Q	Seeks critical comments from others	Falls back consistently on authority
Q	Practitioners care about evaluating theories in relation to alternative theories	Practitioners oblivious to alternative theories. (pseudoscientists make little attempt to solve problems with the theory or evaluate the theory in relation to other alternatives).
C	Writes papers that can't be understood by everyone	Obscurantist language??

To address these types of criteria, *the nature and process of the communication within the researchers' community is a central feature*. I will mainly analyse the content of the written communication of researchers in the paranormal (articles published in dedicated journals). I will

then try to assess the peer review process and get a general idea of their oral communication process.

2. Methodological approach and premises

Here are the steps I followed to investigate the communication within the community of parapsychologists.

General overview

The Parapsychological association

I first had to get a primary idea of how the field is organised. My first concern was to check for the existence or a defined parapsychology researchers' community. This was the easy part. The internet provided me of a list of universities and other institutions conducting research in parapsychology (see annexe 2 for a non-exhaustive list). I learned that the researchers related to this community belong to a specific association: the Parapsychological Association (PA). This is an international body founded in 1957 by J. B. Rhine and regrouping qualified scientists having an interest in parapsychology. Its aim is to integrate the field into the concern of the scientific community. I had the chance to meet its president who now lives in France: Mario Varvoglis. He explained to me that the association has 300 members, which are selected according to the relevant contribution they have made to the field, or eventually because their scientific skills interest parapsychology. Among those members, he estimates that around 50 individuals are actually conducting laboratory research in that field. Apart from the scientists, the PA also includes historians, sociologists and philosophers. The PA has been finally introduced into the AAAS (American Association for the Advancement of Science, that publishes Science journal) in 1969. Thus there is a small¹, but well defined community of researchers in parapsychology, which is now apparently accepted by the mainstream scientific community.

¹: to compare, the Society for Neurosciences has tens of thousands of members.

The journals

I also addressed myself to a well-known researcher in France, Yves Lignon, in order to learn about the written support of their communication. Yves Lignon is a teacher in statistics who is also involved in research in parapsychology. He began the publication of a French journal, the "Revue Française de Parapsychologie". He gave me the names, characteristics and ranks of the main peer-reviewed journals.

Table 2 gives an English-translated summary of his comments (original text available in Annexe 3):

Table 2 : Yves Lignon’s evaluation of the main fringe journals

Journal of the Society for Psychical Research (JSPR)	The academic journal (in the old fashion acceptance of the term). Remains of interest to the present day, even though the original published works are not always on the cutting edge.
Journal of Parapsychology (JP)	Interesting but uneven : because of a lack of consistent material, some issues are almost entirely dedicated to abstracts.
Journal of Scientific Exploration (JSE)	Publishes, without any doubt, the most advanced research in the field (Jahn, Dunne and other well known researchers regularly submit their papers in JSE first).
Journal of the American Society for Psychical Research (JASPR) and European Journal of Parapsychology (EJP)	Definitively ranked within the inferior category.
Revue Française de Parapsychologie (RFP)	Published since 1988. The level is significantly lower than the level of Anglo-Saxon journals. This is not the result of a lack of talents and good will, but rather to a lack of material resources.

According to Yves Lignon, there isn’t really a number one journal and one has to read JSPR, JP and JSE (and often JASPR) regularly to be aware of the major researchers’ work.

Note: a list of the bodies that publish the different journals can also be found Annexe 2.

I then checked the main scientific databases to see whether these journals were reported. Science Direct doesn’t give access to any of them. I was able to find two of them, the Journal of the American Society for Psychical Research (JASPR) and the journal of Parapsychology (JP) in the Science Citation Index. JP is recorded from 1990 up to now, but JASPR records stop in 1999 (1990-1999). However, the Science Citation Index only gives access to the abstracts. Actually, the only journal that I found fully available on line is JP. And interestingly it isn’t into a scientific database, but a newspapers one: Lexis Nexis. As to JSE, which is supposed to publish the most advanced research, I couldn’t find it anywhere. I asked Mario Varvoglis about the database issue, and he indeed confirmed that a database still needs to be created for this kind of journals.

These observations conducted me to re-evaluate the supposed integration of parapsychology within the mainstream scientific community. Moreover, I didn’t find any mention of parapsychology on the AAAS website. The purpose of my study, trying to find out if it is a pseudoscience or not, thus remains fully justified.

Procedure

Starting from this piece of information, here is how I proceeded to study the communication within the parapsychologists' community, in order to evaluate how the scientists use and criticize each others work regarding the different criteria mentioned in the introduction.

1) Analysis of the written communication

I will use:

- a content analysis to study the empirical (E) and theoretical (T) approach,
- a citation analysis and interviews of peer reviews to study the confrontation with peers (Q),
and
- a word analysis to study the communication strategy (C)

Most of the statistical analysis have been made using a chi2 test (except one that used an ANOVA). The significance has been noted has followed:

**: $p < 0.05$*

***.: $p < 0.01$*

****.: $p < 0.001$*

2) Analysis of the peer-reviewed process: interviews of editors (confrontation with peers (Q))

3) Analysis of the oral communication within meetings (Q)

I chose to analyse the written communication process (1) and (2) by studying journals taken from three different countries:

- US: JSE (two issues that I ordered and paid for on the web)

JP (two issues, one sent as a free sample, another available on the Lexis Nexis database)

-UK: JSPR (two issues that I have been sent after becoming a member of the Society for Psychological research)

-France: RFP (only one issue –that Yves Lignon sent me- was available)

These four journals will be compared to three others within mainstream scientific fields:

- Psychology: the British journal of Psychology (available at DCU library)
- Biology: Experimental Physiology (that I borrowed from a biologist)
- Physics: Journal of Physics B: Atomic, Molecular and Optical Physics (*J. Phys. B: At. Mol. Opt. Phys*) (available at DCU library)

The size of mainstream journals being generally larger, only one issue of each was necessary to get an equivalent number of articles (42 articles for each category, mainstream or fringe science). For the purpose of this study, I will only present the main significant results (for those interested by a most comprehensive analysis, detailing the different journals, please don't hesitate to contact me).

I could approach the oral communication process (3) by attending the annual meeting of the Parapsychological Association, which by chance was going on in August (4th-8th) and for the first time in 55 years in France (Paris).

By addressing 1), 2) and 3) successively, I will try to evaluate whether there is a genuine confrontation between their ideas, which I believe is the motor of real science.

3. Written communication

The first thing I will analyse is how the parapsychologists address facts and theories.

Scientific approach : Induction and deduction

The way that the scientific approach - that is the observation of facts and the proposition of new theory (respectively E and T criteria) - should be in science is given in the part of table 1 (see Introduction) copied here:

Typical attitudes and activities

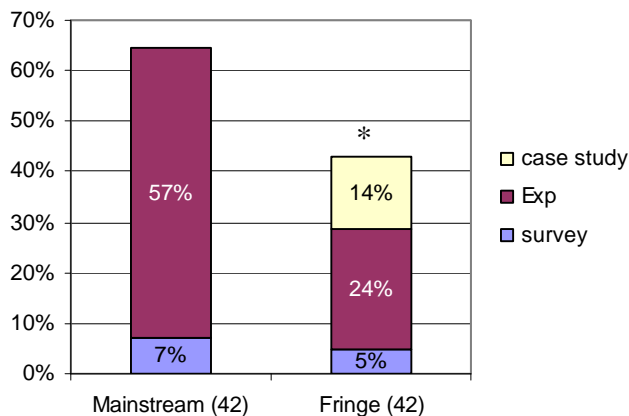
	Scientist	Pseudoscientist
E	Gather or uses data, particularly quantitative ones	Suppresses or distorts unfavourable data
E	Uses correlation thinking (e.g. A regularly follows B in controlled experiments)	Uses resemblance thinking (e.g. Mars is red, red is the color of blood, therefore Mars rules war and anger)
E	Seeks empirical confirmations and disconfirmations	Neglects empirical matters
T	Proposes and tries out new hypotheses	Overreliance on testimonials and anecdotal evidence
T	Relies on logic	Formal background modest, little mathematics or logic

To address these points, I used three different approaches: a categorisation of the articles, an evaluation of their attitude towards scientific evidence and an analysis of the methods used to establish these evidences.

Type of the articles

Do the articles “Seek empirical confirmations and disconfirmations”, and do they “Propose and try out new hypotheses”? To answer these questions, I categorized the 42 articles taken from the four fringe journals (RFP, JSPR, JP, JSE) into two main types: those dealing with empirical data (Figure 1) and those dealing with theoretical ideas (Figure 2). The breakdown between these two categories has been compared with mainstream science.

Figure 1 : proportion of articles dealing with empirical data – fringe vs mainstream journals

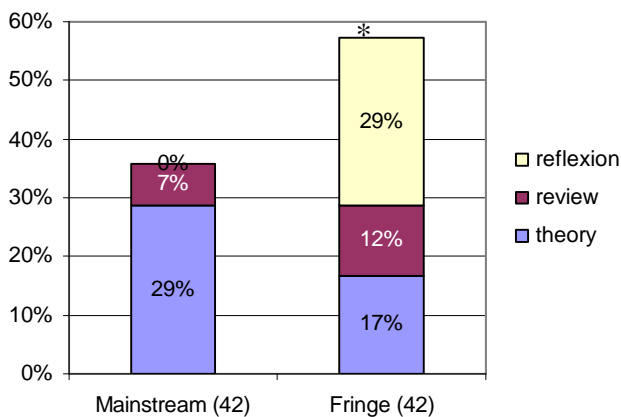


The empirical data regroup all the articles that bring about new observations. They are further divided into experiments, case studies and surveys (i.e. Investigations about beliefs).

The articles which remain have been categorised as theoretical. These include articles dealing with calculations and new theories, reviews and epistemological

reflections.

Figure 2 : proportion of articles dealing with theoretical ideas – fringe vs mainstream journals



These results show that :

- the pseudoscience criteria “neglect empirical matter” doesn’t apply for fringe journals articles: indeed 43% of the articles deal with empirical data. Among these, 24 % are laboratory experiments. So the pseudoscience

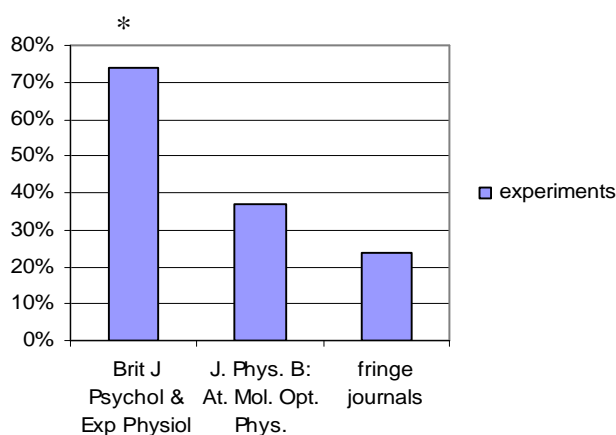
criteria “Over-reliance on testimonials and anecdotal evidence” isn’t completely fulfilled either.

- Moreover, the science criterion “proposes and tries out new hypothesis” appears to be met, as 17% of the articles are aimed at suggesting new theories to explain their results.

Thus, on the contrary to pseudoscience, these fringe journals are concerned to confront theories and experimental data.

On the other hand, these results also show quantitative differences compared with mainstream journals. Mainstream journals contain a significantly higher proportion of laboratory experiments (57%). And even though no case study has been observed, the overall amount of articles dealing with empirical data is significantly higher than in fringe journals ($p < 0.05$). However, the low proportion of experiment reports isn't typical to fringe science. It has also been found as far as *J. Phys. B: At. Mol. Opt. Phys* is concerned. Indeed, the proportion of experiments found in the physics journal, i.e. 37%, is rather similar to the proportion found in the fringe journals, i.e. 24% (no significant difference) and significantly smaller than the one found in the remaining mainstream journals, i.e. 74% ($p < 0.05$) (Figure 3).

Figure 3 : proportion of lab experiments



Attitude to scientific evidence

- Do paranormal research “Suppresses or distorts unfavourable data”? My approach to answer this has been to record all the publications that attempt to bring new scientific evidence, whether with a positive (showing +) or a negative outcome (showing -) (Figure 4).

- I also wanted to check if Bunge’s criterion for pseudoscience “No specific background of well-confirmed theory” was fully valid. I then recorded all the articles that attempt to provide an explanation for their observations, whether according to a known scientific framework –namely rational explanations–, or to unproven speculations –namely irrational explanations e.g. the existence of spiritual entities (Figure 5).

Figure 4 : percentage of articles bringing positive or negative evidence – fringe vs. mainstream journals

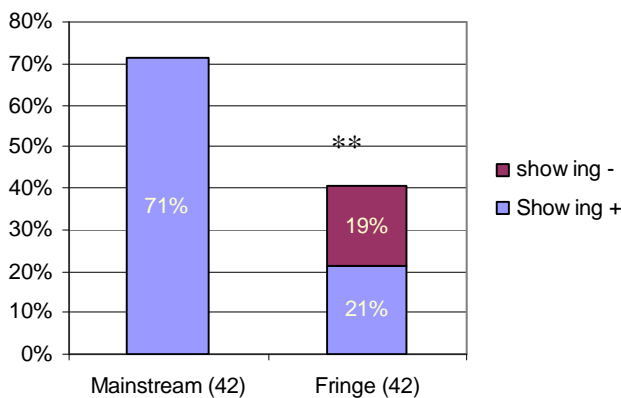
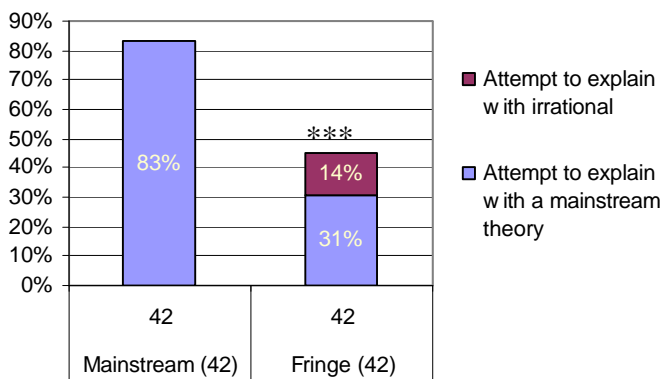


Figure 5 : percentage of articles suggesting scientific / irrational explanations – fringe vs. mainstream journals



- Figure 4 shows that fringe journals definitely don't "suppress or distort unfavourable data". Indeed, 19 % of the articles have been found to report experiments or data that goes against paranormal evidence (showing -). It is interesting to notice that, by contrast, this pseudoscience criterion is met as far as mainstream journals are concerned: no articles have been found reporting negative data. The result of Figure 4 also confirms that the criterion "Seeks empirical confirmations and disconfirmations" is fully met.

- Figure 5 shows that in 31 % of the cases, the researchers suggest rational explanations according to mainstream theories to account for their empirical results. This contradicts Bunge's criterion that pseudoscientists "do not have any specific background of well-confirmed theory". Apparently, at least in some cases, they do.

However, the comparison with mainstream journals here again shows some quantitative differences that will be discussed further:

- The publications that are aimed to bring about new scientific evidence is significantly higher in mainstream journals (71% against 40%, $p < 0.01$). If we only consider the percentage of publications that bring new positive evidence, the difference is even more significant ($p < 0.001$).
- Similarly, the mainstream journals also account for a significantly larger proportion of publications that suggest explanations according to known scientific theories ($p < 0.001$).

My third approach in dealing with their empirical data has been to address the method that is been used to assert scientific evidence. Do fringe journals use “correlation thinking” or “resemblance thinking”? Do they “rely on logic”? or do they show “Formal background modest, little mathematics or logic”?

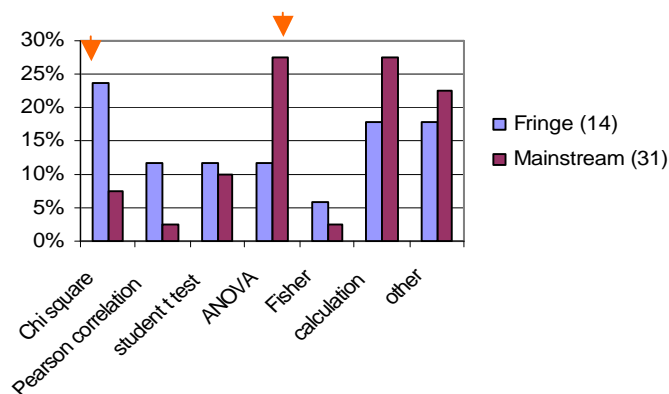
Methodology

All the articles (whether from fringe or mainstream journals) that aim to provide any experimental evidence have been found to use statistical tools. Four tests (ANOVA, Chi square, Pearson correlation and student t tests) are classical tests that were used in both types of journals (Figure 6). From this analyse, it doesn't appear that fringe journals are more inclined than mainstream to “use resemblance thinking” rather than “correlation thinking”; and their formal background and their reliance on logic appears to be similar to those of mainstream articles.

However, the frequencies of the tests used seemed to differ in relation to the type of journal.

The fringe journals put the emphasis on the Chi square test (24% of the 14 articles studied), whereas the mainstream journals show a more frequent use of the ANOVA test (27% of the 31 articles studied). The amount of cases is too small to check whether this trend is significant or not. However it could reflect a tendency for the fringe journals to use qualitative data (more suitable for chi square test) rather than quantitative measures as the ANOVA test would reveal. This tends to contradict the first “real science” criterion: “Gather or uses data, particularly *quantitative* ones”.

Figure 6 : statistical and mathematical tools used in demonstrations



The second point we will analyse is how paranormal researchers use each other's work, question and confront their views.

Questioning and confrontation

The part of table 1 that address the questioning attitude of paranormal researchers and their confrontation with others sciences is copied here:

Typical attitudes and activities

	Scientist	Pseudoscientist
Q	Admits own ignorance, hence need for more research	No
Q	Finds own field difficult and full of holes	No overlap with another field of research
Q	Seeks critical comments from others	Falls back consistently on authority
Q	Practitioners care about evaluating theories in relation to alternative theories	Practitioners oblivious to alternative theories. (pseudoscientists make little attempt to solve problems with the theory or evaluate the theory in relation to other alternatives).

Questioning

The big occurrence of “reflection articles” (29%) that are completely absent in mainstream journal (Figure 2), reveals a main concern to the criteria “Finds own field difficult and full of holes” and “Admits own ignorance, hence need for more research”. Paranormal researchers constantly ask question regarding the relevance of their research and their acceptance by mainstream science. Indeed, most of the articles belonging to this category are epistemological articles. Their authors are especially aware and sensitive of all the criticisms that come from mainstream scientists. The criterion: “Seeks critical comments from others” is thus fully valid as well. I didn't find the equivalent in the mainstream articles I studied.

Confrontation with other researchers' work

I assessed the confrontation with other works by an analysing the references that are cited in the articles (citation analysis). Indeed, a citation analysis provides a quantitative monitoring of the extent to which the researchers rely on each others' work. I studied three different points:

1 - The average amount of citations of other authors' work per article, and the proportion of auto-citations compared to the total amount of citations.

2 - The proportion of book citations compared to citations of works published in scientific journals. I will focus on what I called “single author’s books”, that is books that are not a compilation by an editor of different scientific articles. I assume that those books are not as “scientifically valid” as a work published in a journal; it is not peer-reviewed, and deals more with the individual opinion of one or two authors.

3 – Finally I will study the nature of the journals cited. Are they mainstream journals? Which scientific disciplines are represented?

1- Auto-citations

Figure 7 : number of auto-citations vs. other authors’ citations

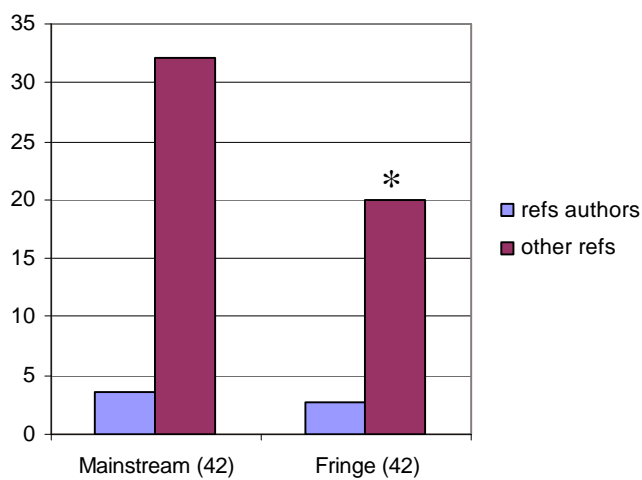
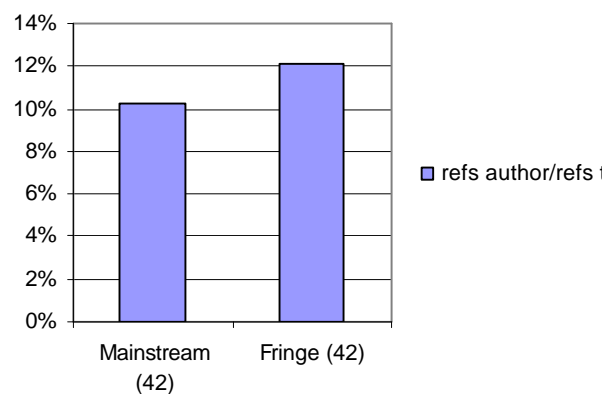


Figure 7 shows that practitioners care about evaluating their theories and findings in relation to works from different researchers, as they cite an average of 20 citations from authors different from themselves (other refs) per article.

Figure 8 : proportion of auto-citations



However, here again, there are some qualitative differences. Figure 7 also shows that the mean number of references which are not auto-citations (other refs) given in an article is significantly inferior (20) in the journals dealing with paranormal, comparing to mainstream journals (32) (variance analysis, $p < 0.02$).

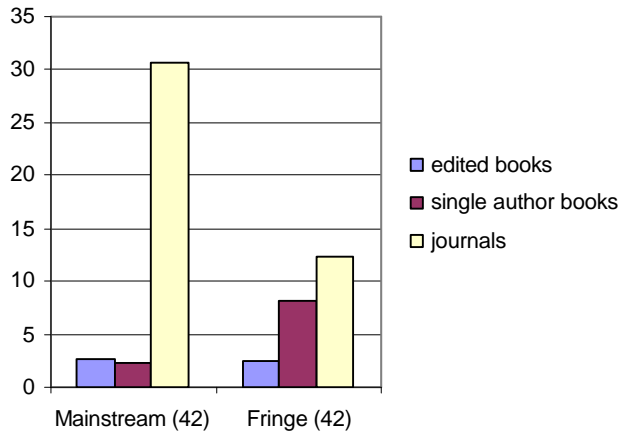
Moreover, as shown in Figure 8, the proportion of auto-citations (citations by the author of his own work) is significantly higher in fringe journals ($p < 0.02$).

2- Book citations

The breakdown of the references between books and journals is given in Figure 9. Even though references to single author’s books are found in both types of journals, works published in journals are more cited. This tends to show that fringe journals (as mainstream) rather rest on work that has

already been peer- reviewed, therefore criticized, by other researchers. This also meets the science criterion “Seeks critical comments from others”.

Figure 9 : Mean number of references per articles



However, fringe journals over-use references to books that are not compilations of articles (what I called single authors books) (36%). This feature is very much different from mainstream journals, where only 6% of the references are from this kind of books ($p < 0.001$, Figure 10). It thus seems that, as far as fringe journals are concerned, the reference

to other researchers is more often that of general opinions than that of peer-reviewed works. Yet significant differences can be found within mainstream journals as well: interestingly, the *British J. of Psychology* stands in the middle as far as book citations are concerned ($p < 0.001$), (Figure 11).

Figure 10 : proportion of single author’s book citation

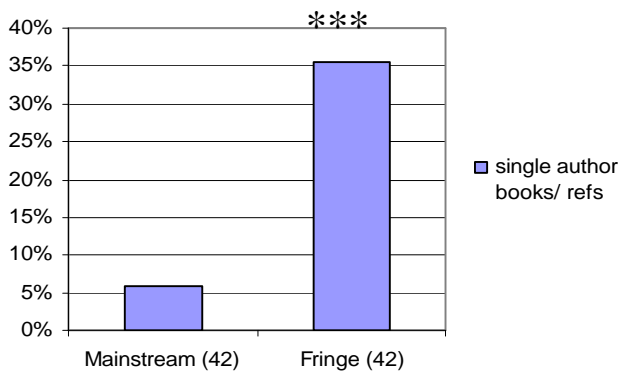
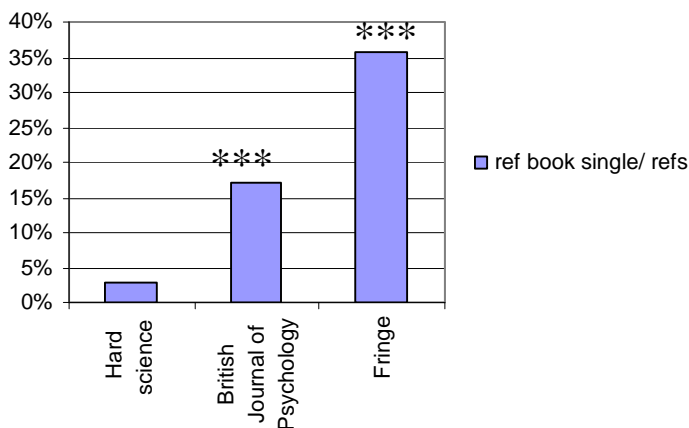


Figure 11 : proportion of single author’s book citation British J. Psychol. specificity



3 – journal citations

The monitoring of the journals cited give an indicator on the kind of work fringe research relies on. This aims to assess whether the criterion “No overlap with another field of research” applies to fringe journals or not.

Fringe journals

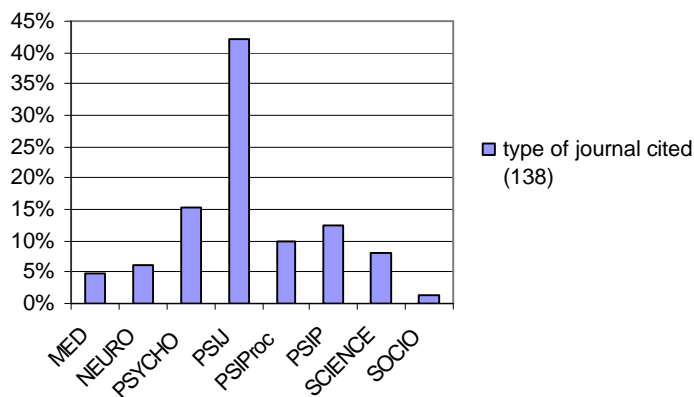
I studied 138 references taken from the European journals (the one issue of RFP and the two issues of JSPPR). The list of the journals cited is given in annexe 4. A first characteristic is the diversity of the fields addressed.

For the convenience of this study, I had them classified into eight categories:

MED	Medical journals
NEURO	Journals dealing with neurosciences
PSYCHO	Psychological journals
PSIJ	Psi (ie. Fringe) journals
PSIProc	Psi proceedings
PSIP	Psi popular journals
SCIENCE	Journals dealing with science in general (eg. Nature)
SOCIO	Sociological journals

The breakdown is given in Figure 12.

Figure 12 : breakdown of journal references cited in fringe journals



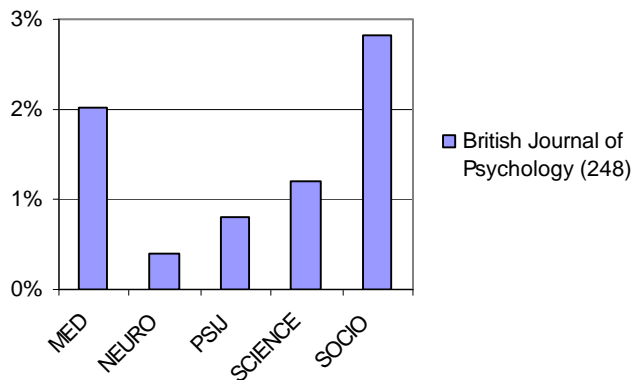
Thus, it appears that the percentage of references taken from journals specifically dealing with paranormal (PSIJ, PSIProc and PSIP) is 64%, which leaves 36% for mainstream journals.

Psychological journals are well represented (15%), but also harder science journals (general science or neurosciences journals in particular).

Mainstream journals

In the *British Journal of Psychology* and the *J. Phys. B: At. Mol. Opt. Phys.*, I have found that most of the references cited are taken from the same field (91,94% and 98,62% respectively). The remaining 1.38% in *J. Phys. B: At. Mol. Opt. Phys.* is taken from general science journals (with 5 references from Science and 2 from Nature). Figure 13 gives the breakdown for the remaining non psychological ones in *British Journal of Psychology*.

Figure 13 : breakdown of non-psychological journal references cited in the *British Journal of Psychology*



It was more difficult to address Experimental Physiology, as the width of the field is much broader (it goes from cell membrane biology to the physiology of the brain or every kind of organs, and even to medical studies).

However I found that most of the 450 article references studied were located

in biological, and to a lesser extent medical, journals. A few were from general science journals (of which three from Nature), and one from a psychological journal. No other category was represented.

Thus fringe journals appear to address a much broader range of fields in terms of references (medical field, neuroscience, psychology, sociology, general science) than mainstream journals whose focus remains restricted to their own specialty. In that respect, the pseudoscience criterion “No overlap with another field of research” seems paradoxically to apply less to paranormal research than mainstream science. Here again, the *British Journal of Psychology* seems to be closest to fringe journals: a part of its citations (though much smaller) refers to other fields of research.

On the other hand, non peer-reviewed references (that are references from popular journals, PSIP) represent 12% of the total amount of references whereas they are very rare in mainstream journals. This reflects the same trend as the greater proportion found for book references (see the discussion part for comments on this point).

Communication strategy

We have seen in the introduction that epistemologists disagree as to the nature of the vocabulary that characterised pseudoscientists. Bunge (1984) considers that they use “obscurantist language”, and Stralher (1999) thinks they “write papers that can be understood by everyone” (which is not the case in “real” science).

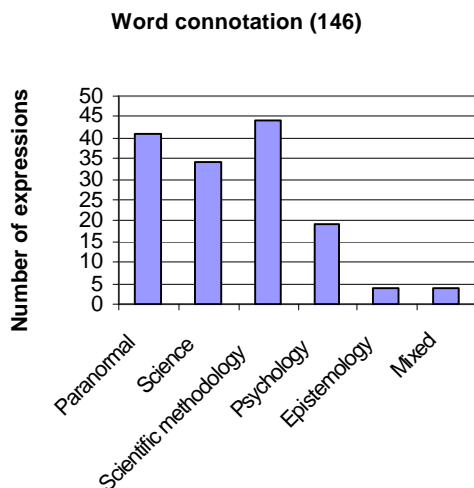
Typical attitudes and activities

	Scientist	Pseudoscientist
C	Writes papers that can't be understood by everyone	Obscurantist language??

I don't think this is much of an issue, however, as I found both types of papers (which I could find in mainstream science as well). Some of the papers have to be very technical depending on the field they deal with - this is the case in particular for several of the theoretical papers of JSE last issue that deal with physical calculations- and some are very clear. This appears to be the general idea of JSE editor to select articles that can be understood by someone with a general scientific background, unless there is a technical reason for it (Bauer, 2002).

“Because the Journal is intended to be *read* by its subscribers, who on the whole do not expect to find in it material that is so arcane, or so confusingly presented, that only a few individuals (at most...) could make head or tail of it”

Figure 14 : categorisation of the expressions used in the titles of fringe journals articles



I believe this should be a general common sense attitude for any editor...

I don't believe however that the nature of the vocabulary used isn't an issue. On the contrary, it is a major issue in the classification of a science as a pseudoscience.

In order to evaluate the type of terminology favoured, I categorised the words used in the titles of the articles of the fringe journals (Figure 14). The words have been divided into four main categories:

those which belong to a paranormal register; 2) those which belong to a scientific and technical register; 3) the terms that reveal a scientific approach (scientific methodology); 4) the terms that traduce a controversy (epistemological terminology). Some expressions have been identified as “mixed”, i.e. associating a paranormal terminology with a scientific one (see the list of words in annexe 5).

This analysis shows that the expressions having paranormal connotations (paranormal or mixed category) represent less than on third (31%) of the 146 expressions studied. The terms that are

familiar to the usual mainstream scientific register are thus favoured, especially those which reflect the use of a scientific methodology (30%). The practitioners are obviously aware of the terminology issue, to different degrees depending on the journal. The European journals have been found to be richer in paranormal vocabulary than the American journals. JSE in particular tends to avoid terminology that would straightforwardly reveal a paranormal influence (at least in the titles). An example is given in the article untitled “Electronic Device-Mediated pH Changes in Water”. The correct title would be “Intention-imprinted electronic Device-Mediated pH Changes in Water”, or even “pH change in water mediated by psychokinesis on electronic device” as the electronic device alone doesn’t appear to have any effect on the pH without the influence of a psychic. JSPR seems to have a more traditional approach and doesn’t care too much about using traditional highly-charged words, even though they are aware of the risks of misinterpretation. One example of this is given in the January 2002 issue (McCue):

“There are problems with definitions and categorization, since “haunting” is a traditional term rather than a precise label for a clearly defined set of phenomena known to involve common mechanisms and single type of agency.”(p.1). Interestingly, Pierssens (2002) argues that romantic literature has had a determining influence in the banishing of paranormal studies into the pseudoscience category. I would tend to agree with that. Many times in reading some of the articles, I couldn’t help but smiling. Here is one example taken from McCue’s article on haunting:

“Another approach [for studying haunting] would be for researchers to try to “haunt” selected locations after their bodily death if they found themselves surviving” (p. 19).

I found this image of the persistent parapsychologist going back to haunt a targeted house for his peers to get a compliant guinea pig rather funny.

The essence of Science is rejecting any kind of superstitious and traditional beliefs when not proven. Science actually developed against opinion and superstition. As a result, all the words belonging to this traditional set of vocabulary (ghosts, ectoplasms, spirits, haunting houses...) generate strong feelings of rejection among scientists. This doesn’t mean that studying the phenomena is not scientific. Yet some other words may have to be found and used to overcome very strong prejudice and be taken seriously...

Summary of the results

Table 3 : summary of the analysis of the written communication - quantitative differences between mainstream and fringe journals

SCIENTIFIC APPROACH : induction vs deduction		STAT
Type of articles		
case studies, epistemology typical of fringe journals		
less lab experiments		0.01
<i>amount of lab experiments similar to J. Phys. B: At. Mol. Opt. Phys.</i>		
less empirical data/more reflection & theory		0.05
Attitude to scientific evidence		
negative results shown		
% attempt to bring new evidence smaller		0.01
% positive results shown smaller		0.001
% attempt to explain smaller		0.001
Methodology		
same statistical tests		
use more chi2 (qualitative data)		
CONFRONTATION WITH OTHER STUDIES		
% auto-citations bigger		0.02
number other references smaller		0.02
% non edited book bigger		0.001
<i>Brit J Psycho intermediate as to % non edited book</i>		
Fields of journals cited more diversified		
COMMUNICATION STRATEGY		
paranormal vocabulary		
attempt to favour more scientific terms (JSP)		

Discussion

To conclude with the written communication analysis, it appears that all the criteria that I selected to characterize science against pseudo-science (left column of table 1) have been met. Empirical evidence and theoretical explanations are sought and confronted with those of other researchers. The main feature that in my opinion reveals true science, which is never take things for granted and always question the validity of its findings or even the validity of one's research is definitively addressed (as revealed in particular by the big occurrence of discussion-article). Interestingly, there are some so-called "scientific" criteria as the report of negative results, the openness to critics, the reflections upon the progression of the research, and the interdisciplinary approach and overlap with other fields of research, that appear to characterize less mainstream fields than fringe ones. Thus there is no qualitative difference between fringe and mainstream approaches regarding those criteria, which allow us to conclude that both are science. However, there is a significant quantitative difference in the extent to which all of these criteria are met in fringe science by comparison to mainstream science (see Table 3 for a summary of the results).

Are these results indicators of the smallness of the community of researchers?

A main possible reason to account to this quantitative difference is the small quantity of resources dedicated to paranormal research (small in terms of number of scientists and in term of funding available). The Parapsychological Association includes 300 members and only a small proportion of them are doing full time laboratory research (around 50 according to his president Mario Varvoglis, personal communication). This has to be compared to the wide range of phenomena that are being dealt with (from psi, to UFO, to homeopathy...). As a result any scientist working in a particular area doesn't have a lot of studies to refer to, except his own work. This account for the smaller number of "other author" citations, and the greater proportion of auto-citations, non peer reviewed popular journals or work, and general books references (in fact few books stand as reference in the area and are cited in many different articles). This reliance on a few authors could even be interpreted as following the criteria "Falls back consistently on authority", if these authors were not researchers themselves undergoing the same questioning attitude. However, if we had taken the approach of science by result, all these features could also reflect a field that doesn't progress rapidly.

Are these results an indicator of the progression rate of parapsychology?

I decided not to take the "result" criterion as a relevant criterion to decide if this is science or not (see introduction for the reasons). It could be nevertheless interesting to see if this study could give any indication of the "progressiveness" of parapsychology (after all, if no progress doesn't necessary reveal pseudoscience, clear progress would obviously reveal real science).

- The tendency to handle qualitative data rather than quantitative one (as shown by the prevalence of chi2 tests) is likely to slow down the development of paranormal research. It is obviously harder to build and check hypothesis on a material that can't be quantified.

“When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science*, whatever the matter may be.” (Lord Kelvin, 1889)

- The large number of epistemological articles (29%) mainly accounts for the smaller proportion of experimental works and also partly explains the greater amount of book references, as this kind of essays deals more with ideas and opinion than specific scientific work. The very controversial status of this kind of science obviously stands as a determinant inspiration to reflect on epistemological questions. However it is also likely that the small amount of successful experimental studies and empirical data incite the editors to turn to other kind of publications. Added to a general smaller amount of references, this could foster the hypothesis that parapsychology is not very progressive.

Such assumption seems though to be very subjective. Sceptics usually agree that there has been absolutely no progress after one century of research (Alcock, 1991). Yet, I found many articles within my sample where the parapsychologists themselves assume that progress in their field cannot be questioned.

Here are two examples:

“As a working scientist in this discipline, it is obvious to me that we have made an enormous amount of scientific progress since the founding of the Society for Psychical Research in 1882, particularly given the persistent lack of funding, institutional support, and personnel... I agree with Henry Sidgwick, and with Dean Radin who quoted Sidgwick a few years back in his Presidential Address: The time when we needed to debate whether or not the phenomena we study exist is long past. There is an anomaly here. The shape of the natural world that is embodied by that anomaly is becoming clearer and clearer with every methodological refinement, every theoretical advance. The day is coming when the social, psychological, and political surround will not be able to distort the process of observation or the resulting interpretation.” (Zingrone, 2002, p. 18)

“In terms of the substance of our field, I have seen a number of exciting discoveries in these 50 years. Among them are the remote viewing procedure, which seems to give some of the best psi yields in the field, as well as the ganzfeld procedure. Both of these approaches also show that we have learned a lot about handling free-response data in an objective fashion, insofar as evaluating whether psi is present ... Further, I have been impressed by the geomagnetic and sidereal-time correlates of ESP findings, by various studies using physiological responses to detect psi, and by psychic healing research, as well as many other findings. In spite of the progress in learning more about psi, however, our field is not accepted.” (Tart, 2002).

Yet this enthusiastic attitude over the results mainly concern parapsychologists. On one hand, it may be difficult to admit that a field on which you have been working many years doesn't work. On the other hand, the parapsychologists are the best informed; and many sceptics don't care about going into their work in detail. They just notice that there is no practical application (which is different from no new knowledge).

Thus, whether parapsychology doesn't progress much because there isn't enough resource or whether it hasn't many resources because it doesn't have many results is impossible to tell. This is a further reason why the "result" approach doesn't seem to be appropriate to assess whether it is science or not. Moreover fringe science appears to share some of its characteristic with other fields of science when taken separately. Psychology, as pointed out by the citation analysis of the *British journal of Psychology* references, seems to rely more on general books than specific work published in journal compared to the average hard science mainstream ($p < 0.001$). As pointed out by Remy Chauvin (1999, p. 319), the progresses of psychology are not that obvious: "Everybody knows that in a number of cases, a drug in a syringe gives a much more rapid result than a lot of psychological therapy". And atomic physics, as pointed out by the analysis of the *J. Phys. B: At. Mol. Opt. Phys.* belongs to the same category as fringe science as far as the amount of laboratory experiments are concerned; and is significant inferior to the mainstream average. This reflects the difficulty in conducting experiments in that field, and therefore to attain reliable results based on predictability and reproducibility. In this respect, the result of this analysis validates our choice to a more "qualitative" approach of the invariants of science based on general attitude and methodology.

The analysis of the written communication wouldn't be complete without an attempt to evaluate the peer-review process. This will indeed provide us with an essential clue regarding the criteria "Seeks critical comments from others".

4. Peer reviewed process

Analysing the peer reviewed process is obviously essential to assess how the researchers criticize each other's works. It will also determine the scientific reliability of the journals, which I couldn't do by a content analysis of the articles.

General features

Table 4 : general features of the journals

Journal	Number issues/year	Editor	Editorial Board
RFP	irregular	Yves Lignon	3
JSPR	4	Zofia Weaver	12
JP	4	John Palmer	
JSE	4	Henry Bauer	18 (6 foreign countries)
J British. Psychol.	4		14 (3 foreign country)
Exp. Physiol.	6		22 (all foreign countries)
J. Phys. B: At. Mol.	24		18 (10 foreign countries)
Opt. Phys			

Except for the French journal which is quite marginal, the size of the Editorial board is comparatively the same for fringe journals and mainstream ones (between 12 and 22). They all contain scientists from different countries with PhD degrees in different fields. The fields covered are larger as far as the fringe journals (especially JSE) are concerned, as they cover a larger scope of disciplines (from psychology to physics to physiology).

Editorial processing

I got some information on the editorial processing by interviewing two editors by email: John Palmer from JP and Henry Bauer from JSE. I also had a chance to directly question Yves Lignon, the editor of RFP.

The text of the interviews is available in Annexe 6.

From these interviews, general common features can be outlined:

At least two referees are asked for one paper. They are researchers outside the Editorial Board, (taken from a roster of 100 or so as far as JSE is concerned), often belonging to the PA (JP) but not necessarily (some referees for JSE are mainstream scientists who haven't done research on unorthodox matter). As most parapsychology papers intersect with a mainstream discipline, the selected referees must have some background in that discipline. The editor has the final decision and the Editorial Board act has an advisory body.

RFP seems to be an exception, as the decision is taken by the three members of the editorial board and an outside contribution is only asked in case of disagreement (Yves Lignon, personal communication).

Further clues about the selection process have been given to me by an article published in JSE by its editor in which he explains how he proceeds (Bauer, 2002).

“Over the two years that I have edited the Journal of Scientific Exploration, the ratio of rejections to acceptances has been roughly 2 to 1. Among the rejections, about 60% were by the editor and the remainder upon advice of referees.

...I regard the interplay between author, referees and editor to be a conversation, with the editor as the inevitable final arbiter of which side has made the more convincing case.”

When looking at my selected mainstream journals website, I had some clues about their own editorial process.

It appears to be very similar. All three use two independent expert referees. These referees are “carefully selected from the international research community” (J. Phys. B: At. Mol. Opt. Phys), and the final decision also belongs to the editor: “the editor may process a paper at his or her discretion” (J. Brit. Psychol.).

Criteria for selection

Henry Bauer’s article makes very clear and detailed statements about the criteria he uses to select the articles. The criteria used by mainstream journals have been found on their websites. I will present here the criteria used by JSE along with two mainstream journals (The *British journal of Psychology* and the *J. Phys. B: At. Mol. Opt. Phys*) as a comparison.

Content

A first criterion of selection is the kind of material the article deals with.

The content that interest JSE is defined by exclusion : “interesting topics that *was not being attended* to by the scientific community: “cryptid” animals, “psychic” phenomena, UFOs...”, whereas the content of other mainstreams journals is rather defined by inclusion (list of appropriate fields). Henry Bauer aims “to promote consideration of heterodox views about matters already broached within the established scientific disciplines.”. He thus wants to address a general point made by Bernard Barber in his classic discussion (1961) related to the resistance by scientists to scientific discovery: “As men in society, scientists are sometimes the agents, sometimes the objects, of resistance to their own discoveries” (cited in Bauer, 2002).

However, JSE editor Henry Bauer explains that “a totally open mind would let the brain fall out”. Therefore he has also criteria for inclusions, and in that respect defines his role as “providing a forum for *scholarly* anomalistics – what might be called *mainstream* cryptozoology, ufology, and parapsychology.”

Readability and clarity

The clarity criterion seems to be important for both types of journals, mainstream or unorthodox. JSE editor insists on the necessity “to ensure that the piece would be understandable by a high proportion of the Journal’s readers”. The *British journal of Psychology* mentions readability and interest to general readership” as important criteria. And the *J. Phys. B: At. Mol. Opt. Phys* recommend that those three questions are answered positively: “are ideas expressed clearly and concisely? Are the concepts understandable? Is the discussion written in a way that is easy to read and understand?”.

Scientific merit

Both types of journals insist on the novelty of the scientific finding as well as on the up to date accuracy of the referencing. “...different, contrasting, novel approaches” (*British journal of Psychology*), “Does the work contain significant additional material to that already published? has the author made reference to the most recent and most appropriate work? Is the present work set in the context of the previous work?” (*J. Phys. B: At. Mol. Opt. Phys*), “the evidence and logic and literature interaction seem sound” (JSE).

The journals also insist on the quality of the methodology: “is the work scientifically rigorous, accurate and correct?” (*J. Phys. B: At. Mol. Opt. Phys*). JSE editor dedicates an important part of his article to address this question, as it is certainly a more sensitive one regarding the topics he addresses. Each new theory or empirical procedure must be thoroughly explained and discussed in relation to other mainstream views. It must introduce an improvement to a pre-existing paradigm to be published. He invites to send critiques of the content of the articles for publication in the journal. He also publishes any dissenting view of a referee (I actually observed this in the 13.2 issue).

Impartiality

Both types of journals insist on their impartiality regarding the author or his institutional affiliation. “The referees will not be made aware of the identity of the author” (*British journal of Psychology*). “Unbiased consideration is given to all manuscripts offered for publication regardless of race, gender, religious belief, ethnic origin, citizenship or political philosophy of the authors” (*J. Phys. B: At. Mol. Opt. Phys*), “I don’t prejudge manuscripts according to who the author is” (JSE). JSE editor goes even further: “accomplishments in science or other personal credentials of those who

make anomalous claims are not a good guide to the possible validity of those claims. People new to a discipline sometimes make great advances; on the other hand, people long versed and highly accomplished in a field sometimes go sorely wrong, as with N-rays.”

However, impartiality is difficult to control. Unless the final decision of the editor is made without knowing the identity of the author (which is unlikely to be the case), there is no way to ensure it, whatever the type of disciplines considered.

To conclude with this part, it appears that the editorial process, the criteria for selection and the limits are very similar, at least as far JSE and the two selected mainstream journals are concerned. Interestingly, and because of the specific character of the field addressed (mainly anomalies), JSE editor seems to be even more concerned about the scientific quality and rigour of the papers and less about the authority and personal credentials of its author. Thus, as shown by this analysis of the peer reviewed process, the criteria of pseudoscience, that is “Falls back consistently on authority” and “don’t seek critical comments from others” doesn’t seem to apply for parapsychology.

These are obviously only words, but this is consistent with what I found in analysing the content of the articles: there is no major qualitative difference with mainstream science in the written communication process. However, the question of the oral communication during scientific meetings remains to be addressed. This kind of informal exchange and direct interaction between researchers stands indeed for a key component in the making of science. This is a more open and straightforward kind of communication, where the scientists express their critics more frankly and constructively than in their publications (which are submitted to the constraints of peer reviews and grants). I had the chance to assist to one of these meetings.

5. Oral Communication

The meeting of the Parapsychological Association took place this year in Paris. The first day was in French and opened to the general public. The four following days were in English and consisted in the researchers presenting their work to each other (as they do every year). Ninety five people were attending, whereas the PA includes 300 members (many American scientists actually didn't come because of the poor exchange rate).

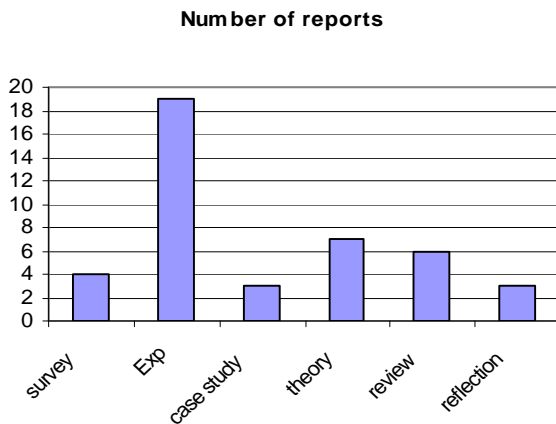
Thus the first comment I will make is about the size of the event. I have a background in Neurosciences, and the difference is striking. The neurosciences meetings gather around 20 000 scientists, physicians and PhD students each year. As to the public day, it is interesting to compare the 60 or so people attending it to the huge success of the "salon de la voyance" ("psychic fair") which gathers more than one thousand people each year...

Apart from that, the general features of the communication were exactly the same. Scientists were presenting their most recent work, which was commented and criticized by their fellows. The criticisms were often constructive and new ideas for further experiments or change in procedure were given.

I don't have the space here to develop a detailed analysis of the event. However I will point out several points that could interest the subject of this study. These are about some specificity I have noticed and that I will try to explain.

- The scope of this meeting was very large, especially with respect to the small number of participants. The reports dealt with social, historical, theoretical methodological or experimental studies. In other words, all the categories identified in the written communication were also represented, with an emphasis on experiments (Figure 15). The scientific studies themselves could deal with such different fields as computer sciences, neurosciences, physiology or quantum physics. As a result, the participants were psychologists, philosophers, historians, neuroscientists or physicists. Such a variety of skills is quite unusual as far as scientific meetings are concerned, which are usually focused on one particular field of research. Yet this interdisciplinary approach created an atmosphere of intellectual interaction that I found very stimulating.

Figure 15 : Type of reports communicated during the PA convention



- On the other hand, one could argue that this lack of focus is a drawback when it comes to find out the right interlocutor to discuss any specific finding. Each person in his own speciality will find it difficult to argue about someone else's speciality in a constructive way. Indeed, the general feeling of the scientists involved is that the confrontations and criticisms are fewer than in any other mainstream scientific meeting.
- More generally, the overall atmosphere was an atmosphere of cohesion and helpfulness rather than an atmosphere of competition (which usually appears as a normal feature of the communication between scientists). This can indeed be explained by the wide scope of the studies involved, but also by the specific status of parapsychology. The scientists seem to share this common feeling that they have to join and fight together in order to be accepted by the mainstream community.
- As a result, one could make a parallel with sects where the "believers" have to stick together in order to resist and, if possible, convince the "unbelievers". This friendly atmosphere that I mentioned is indeed very similar to the general atmosphere that characterizes any sect. There is this feeling of belonging to a threatened community that has to fight to convince the rest of the world (who is mistaken) that they are resisting the truth.
- However, there is, in my opinion, a major difference: the parapsychologists do not pretend to hold any truth. Indeed, there certainly are as many personal beliefs and theories as parapsychologists. A small minority is even not yet convinced about the reality of psi phenomena, and nobody will call them "heretics". This is where I believe there is a genuine scientific approach. Coming back to what I said in the introduction, by contrast to what characterize pseudo-sciences, there is no dogma, no a priori prejudice of how the reality should be. Each view was openly and freely put into question in the search for truth.

To conclude, this brief overview of the oral communication process confirms the previous findings on the written communication and peer review process analysis. Scientists genuinely confront their findings with each other, they are concerned about previous work made in their discipline and other disciplines and try to critically build upon it. In that respect, there is no qualitative difference with real science. As Collins entitled one of his articles (1979): “The construction of the paranormal: Nothing unscientific is happening here”.

We will now assume in the following that parapsychologists and other researchers in paranormal are doing science, and see how this science is dealt with in the UK and French media.

Chapter 2: MEDIA COVERAGE

In this chapter, I will study how the research in parapsychology is covered by the press media in UK and in France. My study will focus on newspaper coverage, but also on specialised scientific magazines (New scientist for UK and Pour La Science for France).

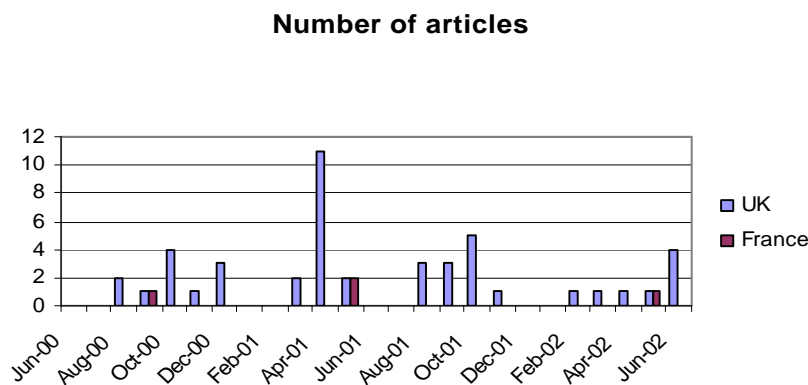
1. UK Newspapers

My first concern was to address the amount of newspaper coverage dealing with parapsychology in the British press (dissemination analysis).

Dissemination

Figure 16 shows the number of UK Newspapers articles (taken from the databasis Lexix Nexis) that contains the word “parapsychology” for the last two years. I have found 46 articles. The comparison is made with the French coverage on the same period (word “parapsychologie” used as a key word). I only found four articles.

Figure 16: UK articles containing the word « parapsychology » - past two years



Thus, a first result is that this is a subject regularly dealt with in the UK.

The peak of April 2001 in the UK coverage is related to the *Edinburgh Science Festival*, where a lot of manifestations of supposedly paranormal phenomenon had taken place.

Figure 17 : breakdown of UK newspaper articles between different newspapers

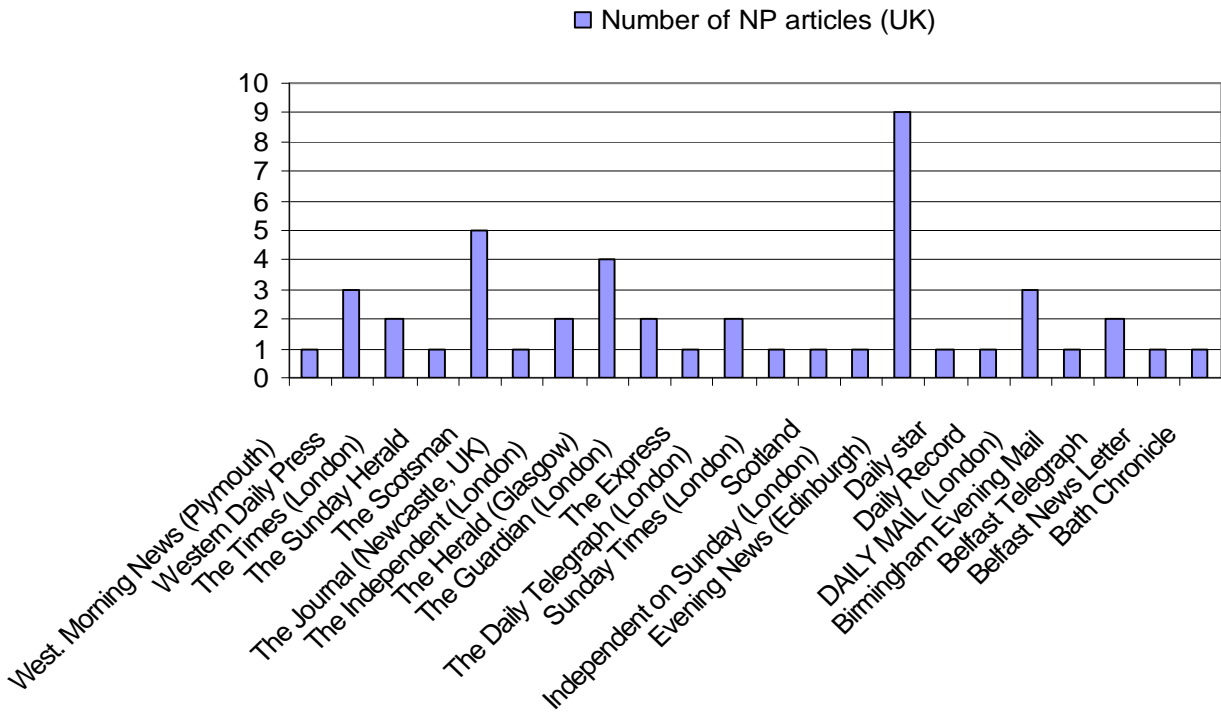
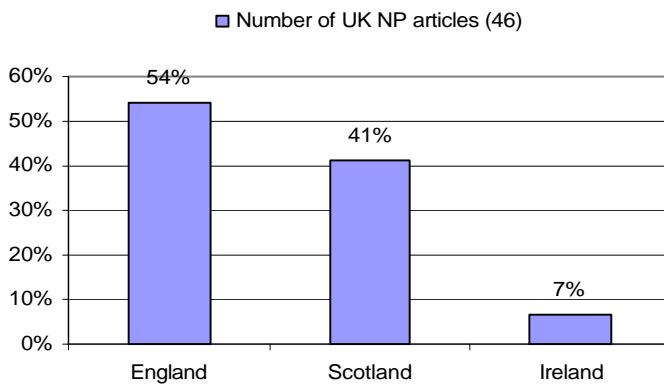


Figure 17 shows the breakdown according to the newspaper titles. *The three most represented are the Scottish newspapers.* Evening News (Edinburgh), the Scotsman and the Herald (Glasgow) account for 39% of the total number of articles on parapsychology.

Figure 18 confirms the importance of Scottish coverage relatively to the Scottish population. (the Scottish represent less than 10% of the UK population and ensure 41% of the coverage).

Figure 18 : breakdown of UK newspaper articles between different countries



Thus parapsychology is not absent from the mass media. The question is now: do the articles account for the scientific research studied in the last chapter? And if they do, the next question will be: what stance to they take regarding paranormal phenomena?

An analysis of the content of the articles (diffusion analysis) has been conducted in order to characterize their scientific approach.

Types of articles

When analysing their content, the 46 articles have been divided into 8 categories as follows:

case studies : Articles dealing with a specific paranormal phenomenon

Exp : Articles dealing with pre-designed experiments

Medium : Articles dealing with a particular medium

Writer : Articles dealing with a writer interested in parapsychology

Withcraft : Articles dealing with witchcraft

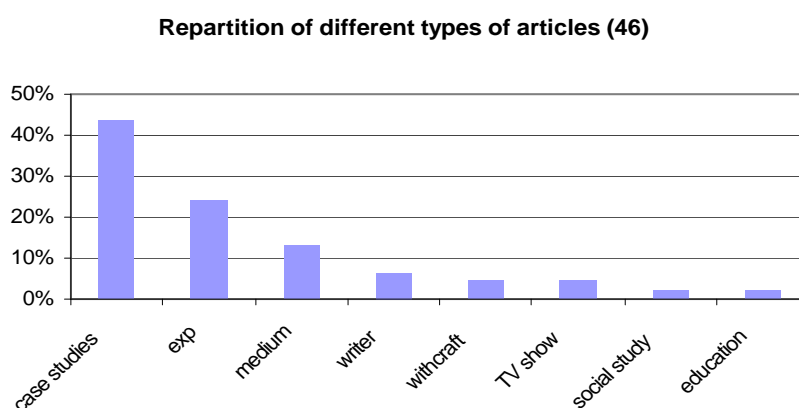
TV show : Articles dealing with TV show on paranormal

social study : Articles dealing with reports on paranormal beliefs

Education : Articles dealing with education in parapsychology

The breakdown between these 8 categories is given in Figure 19.

Figure 19 : breakdown of the UK articles



“Case studies” and “exp” are the articles that have the most scientific approach.

- The “case studies” try to figure out whether any rational explanation can account for a reported paranormal phenomenon. For example, one third of the articles present a rational explanation for

the Indian rope trick. Thirty nine percent of the paranormal phenomena studies occurred during the Edinburgh Science Festival.

- The “exp” report experiments that are conducted by parapsychologist researchers. Most of the experiments (73 %) reported are large scale experiments looking for volunteers among the public.

Thus a first result of the diffusion analysis is that 67% of the articles analysed have a scientific approach.

Attitudes

The articles were further categorised according to the attitude regarding paranormal phenomena:

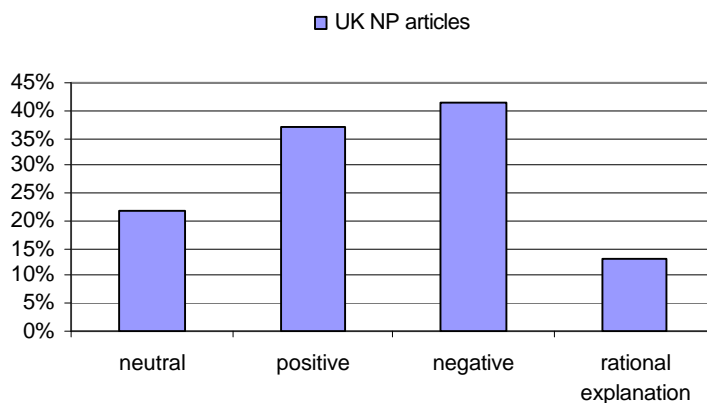
- *Positive*: articles having a relatively positive attitude toward the possible existence of genuine parapsychology.

- *Negative*: articles having a relatively negative attitude toward the possible existence of genuine parapsychology.

- *Neutral*: articles presenting a mixed position.

I have also estimated whether the article presented a rational explanation of the phenomenon or not. This kind of classification is obviously partly subjective, but I thought it would nevertheless give some general idea on the average stance that is being adopted. Figure 20 shows the general breakdown between the three possible attitudes (sum equal 100%) along with the percentage of articles presenting a rational explanation.

Figure 20: UK newspapers attitude towards psi - 46 articles



So it appears that there is a higher proportion of negative articles (41%) than positive ones (37%), with 13% of the articles giving a rational explanation of the phenomenon involved. Overall, a majority of the articles studied (63%) are not promoting the belief in the paranormal (either neutral or negative).

The question is: does this negative attitude mainly concern the articles presenting a scientific approach (case studies and experiments)? Figure 21 and Figure 22 show the distribution of the attitudes within each type of article.

Figure 21: UK newspapers attitude towards psi - case studies

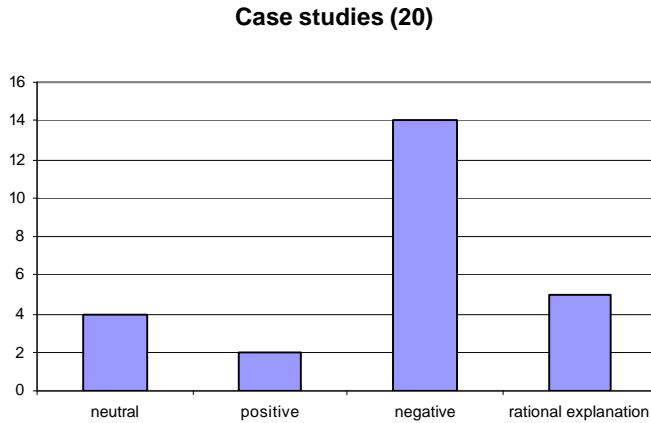
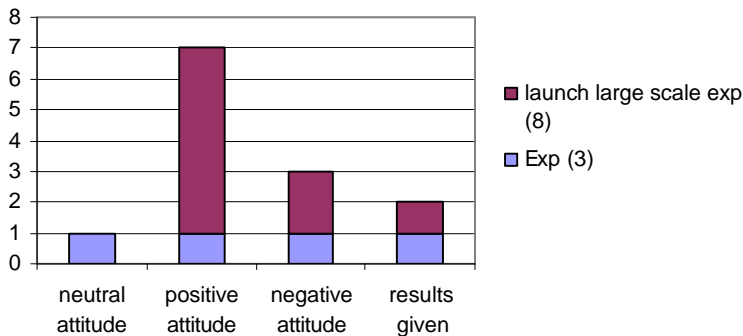


Figure 22: UK newspapers attitude towards psi - experiments



The experimental studies are generally presented with a positive attitude (64%). This mainly concern the large scale experiments (they try to recruit...). I found no article suggesting any rational explanation in this category. However, the results of the experiments have been given in two cases out of eleven (18%), and they were negative.

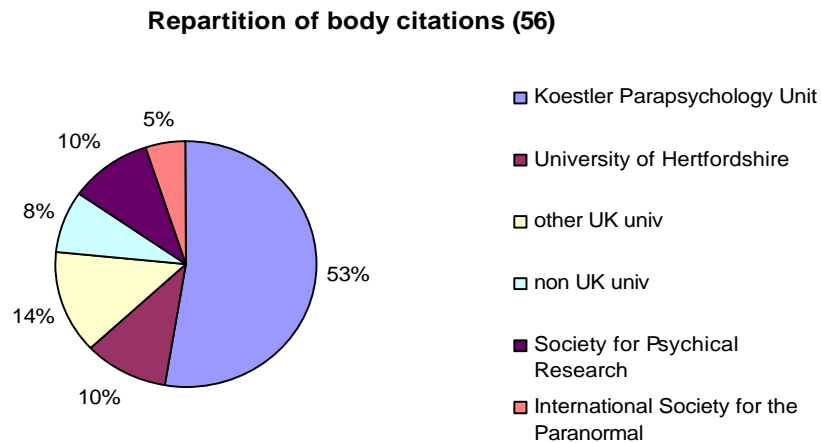
The case studies on the contrary have an average negative attitude towards the “paranormal” issue (70% of the 20 articles studied), and often try to give rational explanation (25%).

I finally studied which scientific institutions or bodies were cited in regard to parapsychological research, and how often.

Scientific institutions and researchers

I found 56 citations (out of the 46 articles studied). The breakdown of the citations is given in Figure 23.

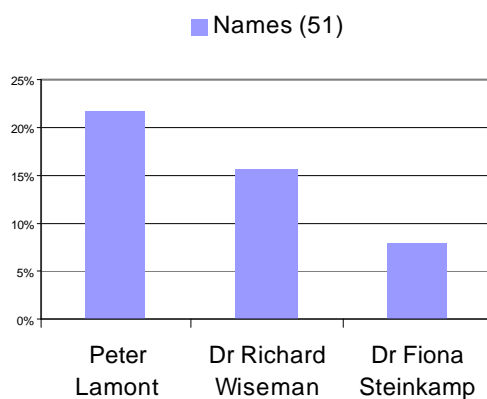
Figure 23 : breakdown of the scientific institutions and bodies cited



The *Koestler Parapsychology Unit of Edinburgh University* accounts for 53% of the citations, and *University of Hertfordshire* for 10%. Finally, 77 % of the universities quoted are British, and 8% are from other countries. The remaining 15 % is given by societies dealing specifically with paranormal phenomena, including the oldest one (*Society for Psychical Research*).

I found 51 citations of names of people (mainly researchers) dealing with parapsychology (research or teaching). Out of those 51 citations, there are only 24 distinctive names. Three names account for 45% of the total of names cited (Figure 24). These are researchers' names, two from Edinburgh university: Peter Lamont, a practising magician and Dr Fiona Steinkamp. The third one is Dr. Richard Wiseman, from the *University of Hertfordshire*.

Figure 24 : breakdown of the names cited in UK newspapers



The overall proportion of articles making at least one citation of either a researcher or a research unit is 72 %.

To summarize the UK coverage on parapsychology, we have found that:

There is an extensive coverage, especially in Scotland. Two third of the articles have a scientific approach and 63% are not promoting the belief in paranormal. Most articles (72%) make references to either a researcher or a scientific institution dealing with parapsychology. These institutions are mostly British ones (77%). They are focused on a restricted range of scientists and institutions (63% of the articles cite the same two bodies, and 45% the three same researchers), whereas there are seven institutions in UK with ongoing research projects.

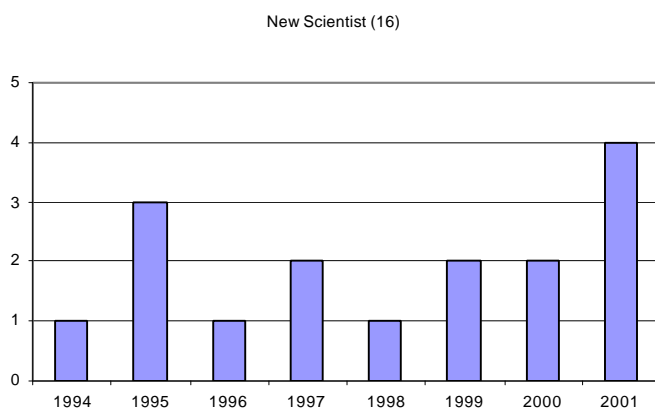
A more detailed summary of the results is given in Table 5.

I will now address the same question regarding a more specialised press: New scientist magazine.

2. New Scientist

Dissemination

Figure 25: New Scientist articles containing the word « parapsychology »



New Scientist published one to four articles dealing with parapsychology per year during the past eight years. *This dissemination is much higher than in French scientific magazines.* A search on "parapsychologie" as a keyword on Pour La Science issues from 1995 to 2000 brought back three articles.

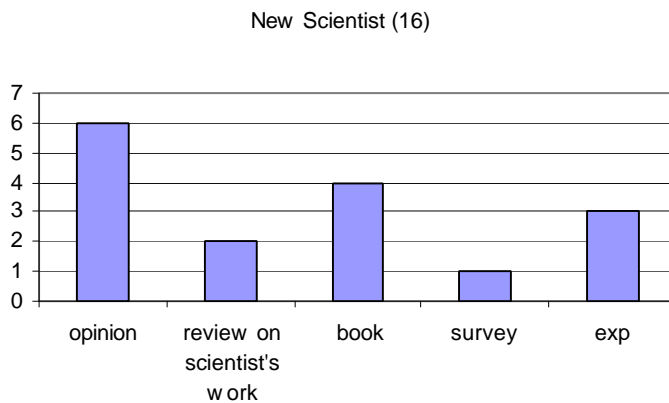
Let's now look at the content of the articles (diffusion analysis), especially as far as scientific research is concerned.

Types of articles

The 16 articles have been categorised in five different types as shown in Figure 26.

Opinion	Reaction to other published articles
Review on scientist's work	Review of the work of a particular parapsychologist
Book	Presentation of new books
Survey	Survey on paranormal methodology
Exp	Report on experimental work

Figure 26: breakdown of the 6 New Scientist articles



Thus, almost one third of the articles (32%) consist in reviews or reports on experimental work (review on scientist's work and exp).

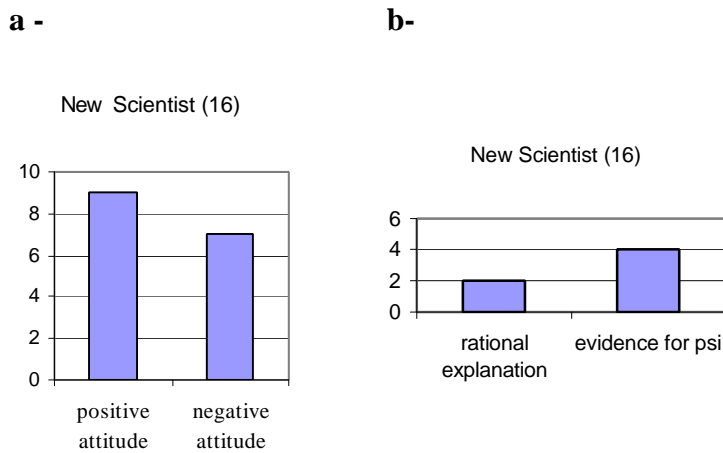
Attitudes

The same approach used for newspapers articles is now used to categorise the New Scientist articles according to its attitude towards the existence of genuine paranormal phenomena.

Overall, New Scientist's attitude towards parapsychology is relatively balanced, with a slight majority of articles relatively positive (Figure 27a).

Similarly, some articles are found providing a rational explanation for paranormal effects whereas others (and slightly more) are providing evidence for genuine paranormal phenomena (Figure 27b).

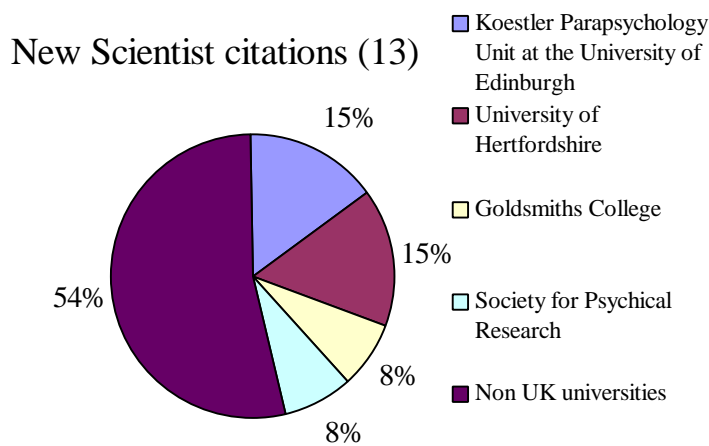
Figure 27: New Scientist attitude towards psi



I also studied the references of bodies and researchers dealing with parapsychology.

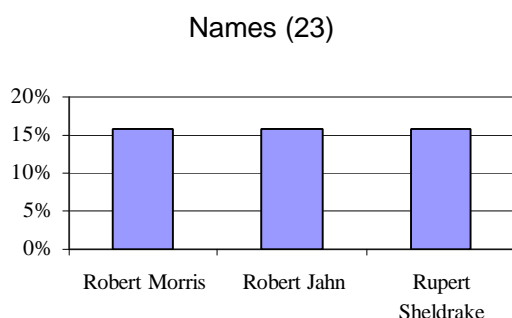
Scientific institutions

Figure 28: : breakdown of the scientific institutions and bodies cited



Like newspapers articles, New Scientist articles contain many citations of scientific institutions (Figure 28). The same few UK universities are cited (the two most cited being Koestler Parapsychology Unit at the University of Edinburgh and University of Hertfordshire). However, they account for only 30% of the total amount of citations (against 77% in newspapers articles); *unlike what we found in newspapers, non UK universities (mainly US), are more represented than UK bodies (54%).*

Figure 29: breakdown of the names cited in New Scientist



As in UK newspapers, three names account for around 40% of the names cited (Figure 29); two of them are again British (Robert Morris, university of Edinburgh and Rupert Sheldrake, biologist, Cambridge University), yet this time one is American (Robert Jahn, Princeton university).

Interestingly, the three main names cited are different from those cited in the newspapers studied; this tend to show that what is considered “major figures” in the field depend on the point of view, popular or scientific. Moreover, *there is proportionally a wider range of scientists cited, including many from non-UK universities* (18 distinctive names out 23 names cited).

The overall proportion of articles making at least one citation of either a researcher or a research unit is 88 %.

Thus, New Scientist give a more representative idea of the research going on at an international level.

To summarize the results of the study of New-scientist coverage, we have found that:

There is a relatively important coverage of the scientific aspects of parapsychology. Almost one third of the articles consists in reviewing or reporting experimental work. Overall, New Scientist attitude towards parapsychology is relatively balanced, with a slight majority of articles relatively positive. They usually cite the names of institutions and researchers (88%), which (on the contrary of the newspapers) are not only British ones but also represent the research that goes on outside UK. However, their references are still focused on certain prevailing names (and interestingly different ones), even though their scope is on the whole larger than the newspapers’ scope.

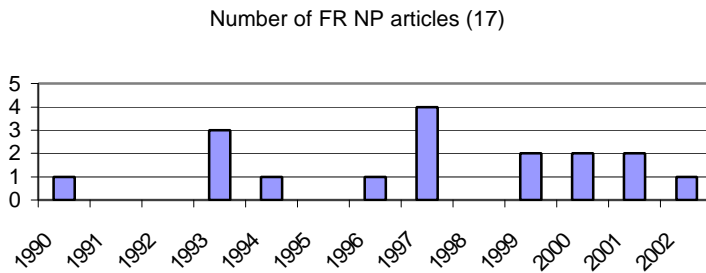
A more detailed summary of the results is given in Table 5.

3. French Newspapers

Dissemination

The dissemination of articles dealing with parapsychology during the past two years is so poor (Figure 16), that I had to go back to 1990 to get enough material to analyse (Figure 30).

Figure 30: French articles containing the word « parapsychologie » - past twelve years



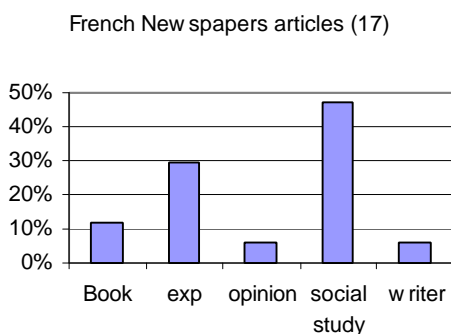
Type of articles

The 17 articles have been categorised according to the different kind of approaches that have been found. *No articles have been found describing any parapsychological experiment; yet some mention their existence, and have been categorised in "exp".* The articles categorised as "social study", are dealing with the increase in paranormal belief; they suggest possible causes for that increase, and ways to fight it.

Book	Presentation of a book
exp	Mention of the existence of scientific research
opinion	Reaction to a previous article
social study	Belief in paranormal in France
writer	Biography of a writer

The breakdown between the different categories is given as follow:

Figure 31: breakdown of the French articles



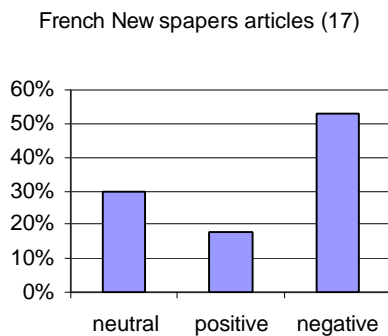
Almost half of the French articles selected (47%) are dealing with belief in parapsychology within the French population, the origin of such belief and the possible 'bad' consequences.

29% of the articles mention that experiments are being done, but no specific psi experiments is reported.

Attitudes

The attitude of the article towards the existence of genuine psi has been evaluated in the same way it has been done with the UK newspapers (Figure 32).

Figure 32: French newspapers attitude towards psi - 17 articles



The majority of the French articles (53%) are negative as to the possible existence of real psi effects. Only one of them suggest some rational explanation to account for them.

Scientific institutions

The lack of experimental report is reflected in the very small number of universities and bodies cited: one French institution (the International Metapsychic Institute), and the parapsychology unit of Edinburgh are both cited once. Only two scientists, both working in France, are quoted once: Mario Varvoglis and Yves Lignon. Indeed, 82% of the French articles don't make any kind of such citations (neither universities nor scientists).

4. French scientific magazines

A search in the *Pour La Science* magazine from 1995 to 2000 with "parapsychologie" as a key word brings back three articles: one is a letter published in reaction to Bertrand Méheust's article mentioned in the introduction, another is Bertrand Méheust's answer, and the third is an historical article that uses the word "parapsychologie" only once. This reflects a general situation as described to me by Yves Lignon (my translation):

"The main scientific magazines adopt a rationalist stance but without any aggressive or polemic tone. *Sciences et Vie* is an exception: in the fifties it was very open to parapsychology and has then gone through a time of militant rationalism".

To summarize, the French newspapers coverage is very poor. Five (29%) of the articles mention the existence of experiments, yet without reporting them. More than half dismiss paranormal phenomena, and most of them (82%) don't mention any researchers or institutions. In fact, almost half of the articles are dealing with beliefs in the paranormal.

Summary of the results

Table 5 : Comparative analysis of the coverage of psi research in UK newspapers, New Scientists and French Newspapers

UK Newspapers	New Scientist	French Newspapers
Dissemination		
Extensive coverage, especially as far as Scottish coverage is concerned (41%)	Relatively important coverage (compared to French scientific magazines)	Very poor coverage
Types of articles		
67% of the articles analysed have a scientific approach (43% of case studies and 21% of scientific experiments)	Almost one third of the articles (32%) consists in reviewing or reporting experimental work	29 % of the articles mention experiments 47% report surveys on paranormal beliefs
Attitude to psi		
a majority of the articles studied (63%) are not promoting the belief in paranormal (either neutral, 22% or negative, 41%). The negative attitude mainly comes from reports on rational case studies on paranormal phenomena.	Overall, New Scientist attitude towards parapsychology is relatively balanced, with a slight majority of articles relatively positive	a majority of the articles dismiss paranormal phenomena (53%)
the results of the experiments are usually not reported (twice out of 11, which were negative). Experiments are reported mainly to call for volunteers.	The results of the experiments are reported and discussed	No experiment is reported
Scientific institutions and researchers		
<ul style="list-style-type: none"> - 72 % of the articles make references to either a researcher or a scientific institution dealing with parapsychology. - These institutions are mostly British ones (77%). 	<ul style="list-style-type: none"> - 88 % of the articles make references to either a researcher or a scientific institution dealing with parapsychology - Non UK universities (mainly US), are more represented than UK bodies (54%). 	82% of the articles <i>don't</i> mention any scientist or institutions
They are focused on a restricted range of institutions (63% of the citations consist in the same two UK universities), and of scientists (45% of the quotations consist in the three same British researchers, and there are 24 distinctive names out 51 names cited).	<ul style="list-style-type: none"> - They are focused to a (less) restricted range of institutions and scientists (30% of the citations consist in the same two UK universities and three scientists' names account for 39% of the quotations) - The names are different from three main names quoted by the newspapers. - One of those names is American. - There is proportionally a wider diversity of scientists cited, including many from non-UK universities (18 distinctive names out 23 names cited). 	

5. Discussion

The UK press is not bad in dealing with scientific aspects of paranormal phenomena: there is regular coverage over the years, and 67 % of the articles have a scientific approach. They tend to dismiss the spectacular (especially in the case studies) as a rational trick, and report the fact that there is “more serious” research being done. The public is informed about the existence of a scientific community, as newspapers take care to quote scientists and make references to authoritative bodies most (72%) of the time. This is obviously simplified. Only a restricted sample get publicity: two British bodies and three British scientists' names account for respectively 63% and 45% of the number of citations, whereas there are seven institutions in the UK with ongoing research projects. In addition, research outside the UK is under-represented: 13% of the bodies cited in Newspapers are non-UK. But the main thing is that people can “get the idea” that something scientific is going on there. And even though many of the newspapers don't care to report the results of the experiments they describe, the results I found reported were negative; overall, 63 % of the articles have adopted a careful stance towards the reality of genuine paranormal phenomena (neutral or negative). Thus, UK newspaper coverage tends to show people that the “real” paranormal phenomena are not so spectacular and easy to identify as it is usually thought.

Moreover, those who would be interested in getting more details on experiments and results can find these in the scientific magazine *New Scientist*. In *New Scientist*, many experiments are described, results presented and discussed. Difficulties are debated and the coverage is balanced. Most of the articles (88%) give references to research institutions or researchers. There is still a tendency to focus on a few names (three names account for 40 % of the quotations). However, *New Scientist* provides a more general overview about the research going on around the world, especially in the United States: one of the three most cited researchers is American, and 54 % of the bodies cited are non-UK bodies.

In France, the coverage regarding parapsychology is completely different in terms of quantity and content. Half of the rare articles dealing with parapsychology have a social approach. The scientific aspects are acknowledged in 5 (29%) of the articles, but never addressed precisely, as reflected by the poor number of bodies and scientists' citations (82% of the articles don't make any such references). No more information regarding scientific research in parapsychology can be found in the French scientific magazines. Thus, the only sources of information regarding psi phenomena in France are the internet, TV and popular magazines, where there is a huge selection to be made!

This perfectly reflect the situation described in *Le Monde* (1993):

“One of the paradoxes of modernity is that the new means of communication given by scientific research, minitel, audio tapes, video tapes etc... are used to foster a massive diffusion of obscurantism” (my translation).

Finally the UK and France show us two different situations:

One where scientific paranormal research is acknowledged and addressed, a least partly; one where it is widely ignored. This is a good opportunity to check if this has any impact in public belief towards paranormal phenomena. Is Bertrand Méheust right? In other words is the following assessment, made by Yves Lignon, true?

"I have to repeat that it is by informing the public about this reality [psi research] thus in showing that the scientific community don't reject everything but on the contrary manage to sort out the good things that we will have the irrational redraw". (Le monde, February 1993, my translation)

If it is true, surveys should point out that irrational belief is weaker in the UK, where the public is apparently much more informed by the press media and scientific magazines than it is in France.

Chapter 3: PARANORMAL BELIEF

Many surveys have been conducted in France, UK and the US to assess the extent of irrational belief in those countries. The main figures are shown in Table 6.

Table 6 : surveys on irrational beliefs

		UK	Scotland	France	USA
PSI	Power of psychics	67% , 16% are actually influenced 28%**	26% are actually influenced by psychics	24%	EPS: 50%
	Telepathy	54%**		40-55 %	36%
	Psychic healing	32%**		55%	54%
	Precognitive dreams	30%**		35%	
Spirite	Ghosts	57% 37%**	43%	11%	33%**
	reincarnation	Almost 33% (1/3), 24%**			25%
	Communication with the dead	More than 50%		21%	28%
others	astrology	38%**		46%	
	Intelligent life on another planet	47%		51 % (OVNI) 18% (came on earth)	33% (Roswell)**

UK and Scotland:

The Survey was carried out by the Consumer Analysis Group. The sample consisted of interviewing 1,000 people were interviewed for the, the biggest research of its kind ever undertaken in the UK. 2002.
 **: UK Research study conducted for *The Sun Newspaper*. MORI interviewed a representative quota sample of 721 adults aged 18+ across Great Britain by telephone between 4-5 February 1998.

France:

Poll conducted by the SOFRES on behalf of the "Cite des sciences" of La Villette, le Monde newspaper and the « Fondation Electricite de France », 1993.

US:

Gallup poll results 2001
 ** *Gallup Poll 1996*

The comparison between France and UK as far as irrational belief is concerned does not foster the hypothesis suggested (irrational belief negatively correlated to the dissemination of scientific research in the field).

The extent of irrational belief does not only depend on the country but also on the type of belief which is considered. The belief of the French population is more important as far as astrology and psychic healing are concerned. Yet irrational belief is still important in the UK, especially belief in spirits.

British population widely believes in ghosts (57% against 11% in France) and in communication with the dead (50% vs. 21%). Moreover, they widely trust the power of psychics (67% according to the latest survey, against 24 % in France). Sixteen percent of the interviewees have already cancelled their plans according to the prediction of one psychic. We have seen previously that the Scottish population happens to be the more informed about scientific research in the area, which highlights the difficulties and the elusiveness of the phenomena. However, it is also the more likely to cancel its plans after listening to a psychic.

A comparison with the figures found in the US shows that the situation is pretty much the same (and somewhere in between). The Americans believe less in telepathy, but half believe in the power of psychic and one third to ghosts.

It is quite clear that the conduct and popularisation of scientific study of the paranormal result in neither the attenuation of irrational belief, nor its critical evaluation. The existence of ghosts has never been demonstrated by the parapsychologists, nor has the relevance of astrology, and those two beliefs are still widespread among the UK population. The spirit explanation, which seems to be especially favoured by the British, is far from being the prevalent scientific hypothesis to account for the paranormal phenomena. The trend even seems to be opposite to what was expected: the English stick more to those old traditional beliefs (ghosts and spirits) than the French, although the media coverage should make them aware of the recent scientific investigations providing some alternative explanations.

One may argue that many British don't read the newspapers and most of them don't read New Scientist. This may be true. It is quite possible that a majority of them still don't know that serious scientific investigation of paranormal phenomena is going on. However, the same situation is found in the US, where irrational beliefs are blooming; and US citizens definitely know about the existence of scientific research. They don't need to read the newspaper to be informed: proliferation of fantastic movies on the subject (one of the most famous: *Poltergeist*) are there to do the job.

Thus Bertrand Méheust's assumption that the proliferation of irrational beliefs prevailing in France would disappear with the development and acknowledgment of paranormal research appears to be a wishful thinking.

CONCLUSION

Bertrand Méheust is right about the situation in France. Paranormal research is regarded as pseudoscience by most scientists (who actually don't know about it) and completely ignored by the media. This contemptuous attitude is not really justified. Indeed, there is research going on elsewhere; and this research fulfils most of the scientific methodological criteria that I believe do characterize "real" science. As shown by the analysis of their communication, the researchers in parapsychology have what is the essence of a scientific attitude: they constantly question their work, confront theories and facts, and seek critical comments from their peers. Their particular status regarding the mainstream scientific community nevertheless accounts for a good number of significant quantitative differences from the orthodox communication process. These are not only negative ones, far from it. Mainstream science could learn from the diversity of their interdisciplinary approach (whereas most sciences are certainly losing out to over-specialisation) and the richness of their epistemological reflection (completely dismissed by most scientists). Mainstream scientists could also learn from the general extreme rigour of their experimental approach aiming to address any kind of possible criticisms, and necessary to separate a very elusive phenomenon from the background noise. They could learn from their concern to publish unsuccessful experiments, whereas mainstream scientists often neglect to report negative data (although it is without any doubt very useful). Finally, they could learn from their tolerance and open-mindedness, which are usually not altered by prejudice for authority and previous personal credentials, nor by individual ambition (if it was, they would do something else...).

Yet the quantitative differences found also have negative aspects. Researchers of the paranormal have a tendency to quote their own work, they rely overly on books of general opinion and popular magazines, they publish less experiments and tend to use data that cannot be measured. These significant differences reflect some of the difficulties parapsychologists encounter: the smallness of the community, the specific character of their subject, the lack of resources, along with their dispersion and lack of focus have an important negative follow on. Even though they consider that they produce results (cf. quotations of Zingrone and Tart in chapter1), these results are not stable enough to be built upon. Coming back to the introduction, they lack the three tools: reproducibility, falsifiability and predictability that make a science successful. Isabelle Stengers, a French philosopher of science, explains their status with a parallel taken from mathematics (personal communication). There are theorems of existence and theorems of construction. Parapsychology is a science of existence, whereas a successful science is a science of construction. Indeed, parapsychologists attempt to prove the existence of an anomaly. Unless this anomaly is at last completely stabilised, nothing can be built upon it, and no consensus will ever be reached within the scientific community. Mainstream scientists

use many epistemological criteria to dismiss parapsychology as a pseudo-science. These are only rhetorical tools, which they would find difficult to apply to their own work. The main criterion is more straightforward: they will accept it if they can use it.

It may be useful to warn against such a process, because it may slow down the acquisition of fundamental knowledge. If a science needs large resources to develop itself on one hand, and if resources are given only to a successful science which is developed enough to provide useful material (the others being conveniently regarded as pseudoscience) on the other, there is not much space available for original and innovative ideas to bloom. And one has to be very pretentious or at least very clairvoyant to assess with certainty that no promising applications should ever be expected from the investigation of the paranormal. On the contrary, practical applications may not be so far away as is commonly believed: psychic healing, remote viewing, psychic location of archaeological sites, and psychic help in criminal investigations have already shown to be very efficient in some cases.

In fact, failing to provide useful material may not be the only reason why parapsychology is regarded as a pseudoscience. It doesn't account for the strong taboo that exists in the French academic community. Indeed, another reason could be related to a fundamental assumption about science. I have already mentioned it in relation to the vocabulary issue: science inherently reject any kind of superstition and popular belief. Scientists have thus to overcome a very strong prejudice to consider it as a possible research subject. In this respect, their attitude is close to the attitude of the pseudoscientists they despise: it is based on beliefs rather than real questioning. As pointed out by Rémy Chauvin in his latest book (2002), this conservative and dogmatic attitude appears to be particularly strong in France. It is not the first time that French scholars are very reluctant to accept new scientific concepts. As an example, they were still deriding the continental drift theory when the rest of the world had already accepted it. I wonder whether it has something to do with the fact that French society and academic life is mainly controlled by elderly people.

Thus, Bertrand Méheust -and other French sociologists or philosophers, such as Pierre Lagrange and Isabelle Stengers- appear to be right on that point. The disregard of the "Metapsychic" issue is political. It is not justified according to genuine scientific criteria. On the contrary:

"Science must begin with myths, and with the criticism of myths." (Popper, 1957).

This investigation of myths seems even more justified regarding the long-lasting irrational beliefs still prevailing in our societies. This is indeed the other assumption of Bertrand Méheust: irrational belief would decrease if paranormal research findings were acknowledged by society. However, the second part of this study does not seem to fit this hypothesis. In the UK, paranormal research is conducted in seven universities; this research is reported to the public and dealt with in more detail by the scientific magazine *New Scientist*. The latter even reports the debate that goes on at an international level. Yet, in spite of this, irrational thinking is still widely developed within the British public sphere, no matter how informed. British people are even keener to believe in the existence of traditional spirits and

ghosts (that have never been proved by scientific research) than people in France, where very little research is done and none reported. This observation could be confirmed by an analysis of the situation in the US, where it is more likely that everybody is aware of the scientific aspects, but still believe in whatever they fancy. Thus it seems that there is no connection between scientific interest and developments on the one hand, and popular belief on the other. In fact, there is one, but the correlation appears to be the opposite to what is expected. Five SOFRES polls (the last one dating from November 2000) highlighted:

“one of the paradoxes ... is that interest in science is positively correlated to the level of belief in parascience... Similarly, the population which has a very poor knowledge of science is on the average less credulous than the population which has a very good knowledge of science. The polls also reveal that parascience didn't develop in reaction to or against scientific institutions.”

(Le Monde, may 2001, my translation)

These surveys show that paranormal belief doesn't reflect a rejection of science, as is sometimes suggested. It is not the result of an increased awareness of the limits of what science can offer. And it does not rest on science either, as shown by the relative independence of the nature and intensity of paranormal belief to the scientific development of parapsychological research.

Thus, popular paranormal belief rather seems to refer to faith and doesn't need any external justification to develop. As it happens, the same statement appeared to be a central point in the talk given at the PA meeting by Peter Lamont (mentioned above), a researcher and historian who works in the Koestler Parapsychological Unit in Edinburgh. He focused his presentation on the nature of religious belief and its transformation with respect to the development of science during the Victorian period. The following quotation, which he took from Fraser's magazine, summarizes his point:

“The majority of the world...will always believe, not according to [scientific] evidence at all, but simply as their previous habits of thought lead them to think” (cited in Lamont, 2002, p. 122)¹.

Indeed, Science has never been for the intellectual benefit of the average human being. Unlike our ancestors, we have known for a long time that mankind is not at the centre of the universe. Has it made us evolve? Has it fundamentally changed our way of thinking? I doubt it. One quarter of the population (at least in France) still believe that the sun goes round the earth, and a consistent part of the American population reject the theory of evolution in spite of all the evidence. Nevertheless, I agree with Bertrand Méheust: the “Metapsychic” issue is relevant. But the real question is: is there any interest in Science apart from the technological advances it provides? The answer of our materialistic world tends more and more to be no. And in fact, to be honest, the rational answer would actually be: there isn't any, except for the fun that, somehow, a few among us have in exerting their intelligence towards a better understanding of the world. This “fun” is part of the package provided by the evolution along with the brain. Let's not spoil it! If some of us are keen to investigate an area which is beyond our present understanding, and unlikely to provide many reliable practical applications in the very short term, I don't see any reason to discourage them.

Note 1: This referred to religious belief, but is also a good assessment of the nature of belief in general (and paranormal belief in particular).

As for the question “why do people believe weird things?”, this obviously remains open. If the answer has nothing to do with cultural knowledge, then what is the very nature of belief? This may be a subject for another thesis...

Annexe 1 : possible criteria for pseudoscience

Table 7 : Thagard’s criteria

	SCIENCE	PSEUDOSCIENCE
E	Uses correlation thinking (e.g. A regularly follows B in controlled experiments)	Uses resemblance thinking (e.g. Mars is red, red is the color of blood, therefore Mars rules war and anger)
E	Seeks empirical confirmations and disconfirmations	Neglects empirical matters
Q	Practitioners care about evaluating theories in relation to alternative theories	Practitioners oblivious to alternative theories
R	Uses highly consilient (i.e. explains many facts) and simple theories	Non-simple theories: many ad hoc hypotheses
R	Progresses over time: develops new theories that explain new facts	Stagnant in doctrine and applications

Thagard cited by Steven E. Phelan of the University of Texas, Dallas

This doesn’t seem to be exhaustive. Arthur Strahler (1999) is more complete as to the methodological criteria:

Table 8 : Strahler’s criteria

	Typical attitudes and activities	Scientist	Pseudoscientist
E	Admits own ignorance, hence need for more research	Yes	No
E	Gather or uses data, particularly quantitative ones	Yes	Optional
E	Looks for counterexamples	Yes	No
E	Invents or applies objective checking procedures	Yes	Optional
E	Settles disputes by experimentation of computation	Yes	No
E	Falls back consistently on authority		
E	Suppresses or distorts unfavourable data	No	Yes
E	Overreliance on testimonials and anecdotal evidence	No	Yes
Q	Finds own field difficult and full of holes	Yes	No
Q	Advances by posing and solving new problems	Yes	No
Q	Falls back consistently on authority	No	Yes
Q	Updates own information	Yes	No
Q	Seeks critical comments from others	Yes	No
T	Welcomes new hypotheses and methods	Yes	No
T	Proposes and tries out new hypotheses	Yes	Optional
T	Attempts to find or apply new laws	Yes	No
T	Cherishes the unity of science	Yes	No
T	Relies on logic	Yes	Optional
T	Uses mathematics	Yes	Optional
C	Writes papers that can be understood by everyone	No	Yes
C	Is likely to achieve instant celebrity	No	Yes

In the opposite direction, Bunge chose to focus on the definition of science by its results:

Table 9 : Bunge's criteria for pseudoscience

C	Theory of subjective knowledge, with aspects accessible only to the initiated
E	A worldview admitting elusive immaterial entities
E	Overreliance on testimonials and anecdotal evidence
T	Formal background modest, little mathematics or logic
R	Untestable hypotheses in conflict with a larger body of knowledge
R	Methods neither checkable by alternative methods nor justifiable in terms of well-confirmed theories
R	No overlap with another field of research
R	No specific background of well-confirmed theory
R	And unchanging body of belief

Note 1: *Kuhn posits that in the conduct of normal, everyday science, researchers sometimes obtain anomalous results; the scrupulous scientist investigates these oddities through experiments intended to disprove the anomalies and reinforce the current reigning paradigm. If the anomalies persist, this process often gives rise to a period of intense debate and experimental work, with one community attacking the correctness of the paradigm and another defending it. A key result may suddenly emerge, supporting the paradigm and revealing the challenging anomaly as pathological (and pseudoscientific); on rare and treasured occasions, a key result convincingly supports a significant revision of the paradigm. (Nobel Prizes often follow.)*

Note 2: *During the past century [Max Planck](#) published some mathematical computations intended to describe an anomaly in the classical theory of light. The anomaly was termed the "[ultraviolet catastrophe](#)," which will give some idea of how severely it disturbed the physics community. Planck made the sensational suggestion that if light were "quantized" and consisted of bits of energy rather than a continuum of energy, which was the dogma of the classical theory of light, the anomaly disappeared. At the time (and now, to some) this was a preposterous suggestion, contrary to all known experience. Yet a few years after the paper, Einstein connected Planck's suggestion to another anomaly involving the way light causes electrons to be ejected from a metal (the basis of the "electric eyes" that operate security doors everywhere). For the next several decades the physics community endured a battle royale, with the ideas of quantum mechanics emerging triumphant, if still resiliently resistant to explanation in terms of ordinary experience.*

Annexe 2 – list of main universities and bodies

Body	Department	Main figures	Field of investigation	Comments
UK				
Edinburgh University: Koestler Parapsychology Unit	psychology department	Robert Morris, Dr Caroline Watt, Dr Paul Stevens	Psi and non-psi mechanisms; social and scientific contexts; Ganzfeld ESP; DMILS; microPK;	Arthur Koesler legation in 1982
University College Northampton	psychology department	Prof Deborah Delanoy, Dr Chris Roe, Dr Simon Sherwoo	Ganzfeld; hypnagogic/hypnopompic states; Psychology of belief in the paranormal; DMILS	
Hertfordshire University: Perrott-Warrick Research Unit	psychology department	Dr Richard Wiseman	Critical evaluation of evidence for the paranormal; Psychology of deception	
Cambridge University	Cavendish Laboratory	Prof. Brian Josephson	Mind-Matter Unification Project	
Society for Psychical Research		Bernard Carr	ESP, OBE, NDE	Oldest body. Founded in 1882. Publish the Journal of the Society for Psychical Research
GERMANY				
Institut fur Grenzgebiete der Psychologie und Psychohygiene (IGPP)	Universität die Freiburg	Pr Johannes Mischo	Spontaneous phenomena (poltergeists) and experimentation	Most important center of Parapsy. in Europe (40 researchers). Private funds
NETHERLANDS				
Amsterdam and Utrecht Universities	Cognitive science and parapsy depts (resp)	Pr Dick Bierrman		
FRANCE				
Institut Métapsychique International (IMI)	Fondation privée d'utilité publique	Mario Varvoglis	Telepathie, clairvoyance, precognition	Founded in 1919
Université Catholique de Lyon		Dr Paul-Louis Rabeyron	Module "Sciences, société et Phénomènes dits paranormaux "	
Org. pour Recherche en Parapsy. et sur les Phénomènes dits Paranormaux (ORP3)		Yves Lignon	Communication	Publish " La Revue Française de Parapsychologie "

Body	Department	Main figures	Field of investigation	Comments
US				
Princeton Engineering Anomalies Research Laboratory (PEAR)	Princeton university	Pr Robert Jahn, Brenda Dunne, contact:Dr. Roger Nelson	Computer REG	
Rhine Research Center	Institute for Parapsychology , North Carolina	Dr Richard Broughton, Dr John Palmer	Ganzfeld-ESP; Neurophysiological correlates of psi; General psi research	In the continuation of the Duke University Parapsychology Laboratory founded by Joseph B. Rhine. Publish the Journal of Parapsychology
Society for Scientific Exploration (SSE)	Stanford University		Fringe science – large scope from UFOs to ESP to homeopathy	Created by a pluridisciplinary group of scientists. Publish the journal of Scientific Exploration
Stanford Research Institute			Remote viewing experiments (1974)	
Psychophysical Research Laboratory	Mac Donnell Fondation	Charles Honorton	1980s: introduction de la méthode Ganzfeld de privation sensorielle	
Boeing	Seattle	Helmut Schmidt	1969: REG	
Consciousness Research Laboratory	University of Nevada	Dr Dean Radin		
University of California, Davis	Department of Statistics	Prof Jessica Utts		
JFK University, Saybrook Institute, Institute for Transpersonal Psychology.	California	Dr Stanley Krippner (Saybrook), Prof William Braud(ITP)		
Division of Personality Studies	University of Virginia, Charlottesville	Dr Ian Stevenson		

Annexe 3 – Presentation of the different fringe journals –Yves Lignon’s interview

- JSPR « Journal of the Society for Psychical Research » : c'est la revue académique (dans le sens un peu poussiéreux du terme) et ses rédacteurs ont parfois l'état d'esprit des gentlemen victoriens mais sur la durée le niveau reste intéressant même si les travaux originaux publiés ne sont pas toujours d'avant garde.

- JP est intéressant mais irrégulier : si certains numéros sont presque entièrement consacrés aux abstracts c'est faute de mieux.

- JSE : C'est sans doute dans "The Journal of Scientific Exploration" qu'on trouve ce qui se fait de mieux actuellement (Jahn et Dunne d'abord mais aussi d'autres chercheurs notoires soumettent à JSE en premier et régulièrement) mais la volonté de ne pas s'en tenir à la parapsychologie donne parfois un caractère fourre-tout aux sommaires.

- JASPR ("Journal of the American Society for Psychical Research") et EJP ("European Journal of Parapsychology") se rangent indiscutablement dans la catégorie inférieure. EJP, qui ne paraît qu'une fois par an, est actuellement publiée à Goeteborg après l'avoir longtemps été par la Koestler Unit d'Edimbourg.

- RFP paraît depuis 1988. Quand on considère l'ensemble des articles force est quand même de constater que leur niveau est resté significativement inférieur à celui des revues anglo-saxonnes. D'ailleurs depuis les années 60 seuls quatre français ont publié la (j'exclue quelques papiers sur l'astrologie, les OVNIS...tous parus dans JSE). Parmi eux R. Peoc'h dont vous avez trouvé l'article (écrit à ma demande en anglais pour qu'il soit lu ailleurs qu'entre Dunkerque et Perpignan) mais dans l'ensemble les travaux français sont des productions d'amateurs, rigoureux et talentueux souvent, mais sans moyens et les referees anglo-saxons ont l'oeil sur les faiblesses logistiques parce qu'ils estiment (pas tout à fait à tort à mon avis) qu'elles peuvent déboucher sur des insuffisances méthodologiques. RFP a donc pour objectif essentiel de tenter de sensibiliser le milieu universitaire français.

En définitive il n'y a pas actuellement de revue de rang 1 et si l'on veut suivre les grands auteurs à la trace il faut au moins lire en permanence JSPR, JP et JSE et souvent JASPR.

Annexe 4- Liste of journal references (RFP and JSPR)

Journal name	Type
JSPR	PSIJ
JASPR	PSIJ
JSE	PSIJ
JP	PSIJ
EJP	PSIJ
IJP	PSIJ
RFP	PSIProc
Proc ASPR	PSIProc
Proc SPR	PSIProc
Proc PA	PSIProc
BJP	PSYCHO
Ark Review	PSIP
Off J Noah's Ark Society	PSIP
the Newsletter	SCIENCE
the anomalist	PSIP
bulletin ODIER	PSIP
Thesis	SCIENCE
Journal of Popular Culture	SOCIO
Behavioral and Brain sciences	PSYCHO
American Scientist	SCIENCE
American Psychologist	PSYCHO
Perceptual and Motor skills	NEURO
J creative behavior	PSYCHO
The psychology of interpersonal relations	PSYCHO
J Personality	PSYCHO
J Research in Personality	PSYCHO
J Personality ans social psychology	PSYCHO
J social behavior and personality	PSYCHO
J consulting and clinical psychology	PSYCHO
Psychological bulletin	PSYCHO
Psychological reports	PSYCHO
J Anxiety disorders	PSYCHO
Wisconsin sociologist	SOCIO
PR	PSIJ
J the psychology of religion	PSYCHO
Personality and individual differences	PSYCHO
J Drug development and clin pract	MED
Proc Nat Ac of Science USA	SCIENCE
American J Psychiatry	MED
The Lancet	MED
Neuroscience	NEURO
Science	SCIENCE
Psychopharmacology	PSYCHO
Annals of the NY Ac of Sciences	SOCIO
Neurobiological Aging	NEURO
Behavioral Neural Biology	NEURO
Nature Neuroscience	NEURO
Neuropsychopharmacology	NEURO
RIP	PSIP
Annual Review of Neurosciences	NEUR
Abstracts of Int Conf of SPR	PSIProc
J Clinical Psychiatry	MED
Drugs of the Future	MED
Biological Psychiatry	MED
Annals of Neurology	NEURO
Dreaming	PSIP
The Psychologist	PSYCHO
Skeptical Inquirer	PSIP
Fortean Times	PSIP

Annexe 5– Classification of terminologies found in titles

PSI

Anomalous Phenomena
 Apparitions
 Astrologie (2)
 Boundless mind
 distant psychokinesis
 dream precognition
 ectoplasmie
 Expériences paranormales
 haunting
 Homeopathy
 Magic
 Mind/Matter
 Mind/Matter Manifestations
 Paranormal (3)
 parapsychology (8)
 Past Life
 precognition (2)
 Precognitive
 Precognitive dreaming
 psychic claimant
 Psychic Phenomena
 psychokinesis
 Reincarnation
 Religiosity/spirituality
 Signs
 spirit
 Spiritual
 Unexplained
 Unidentified
 Unusual

Mixed

Speed of Thought
 Mind/Matter Manifestations
 Model of Mind/Matter
 Model of Paranormal

Science

Anomalies (2)
 Anomalous (2)
 artifact
 autoganzfeld
 Cerebral hemisphere dominance
 cholinesterase
 Coincidence
 Coincident
 Complex Space-Time
 Complex Space-Time Metric
 Crystallization
 Device-Mediated
 Dirac'
 Electronic Device-Mediated PH
 Electronic Voice Phenomenon
 Enhancement
 Enzyme Activity
 ESP performance
 facilitation
 ganzfeld
 Generic
 Healing
 Nonlocal Interpretation
 Optical
 Pepsin Enzyme
 pH Changes
 Quantum Physics
 Relativity
 remote facilitation
 Space-Time Metric
 Unexplained Temporal
 Coincidence
 Voice Phenomenon

Psychology

attention focusing
 Belief (3)
 dream
 dreaming
 facilitation of attention
 hallucinations
 Intended Eye Gaze
 Intent
 mind
 Paranormal Belief
 Psychological research
 psychology
 Real Communication
 Self-Deception
 Spiritual Beliefs
 Thought
 transpersonal psychology

Methodology

alleged stagnation
 Correlation
 critical overview
 discovery
 Expériences
 Experiment
 Experimental Study
 Experimenter effects
 explained
 exploratory investigation
 Failure to Replicate
 Generic Approach
 Interpretation
 Investigating
 Investigations
 Irreducible
 manifest
 Manifestations
 méthode scientifique
 Model (2)
 Modular Model
 Paradigm
 performance
 problems
 Referee report
 Replicate
 report (3)
 Reports
 research
 response (2)

science
 Scientific Enterprise
 Show
 Statistical Data Included
 studies
 Sytematically
 tests
 Theories
 Two-Factor Model
 Verification

Epistemology

Challenging
 Controversy
 debate
 éthiques

Annexe 6 : interviews of editors : John Palmer from JP and Henry Bauer from JSE.

Hello,

I'm currently doing a master thesis in science communication in Dublin, and I chose to deal with the communication within the community of scientists dealing with paranormal phenomena.

I would like to have some information about the editorial board of JSE. How are they selected? (What kind of backgrounds and disciplines were you looking for? What is the proportion of mainstream scientists if any ? Was it difficult to get their approval?). How do you choose your referees, and how many referees do you ask for advice on one paper?

Or anything that you think could be interesting in understanding the selection process of the articles.

I will send you a copy of my final report if you are interested!

Thank you for your help
Best Regards

Marie-Catherine Mousseau

John Palmer:

"My main criterion for selection of referees is familiarity with the topic of the paper submitted. Thus, most of my referees are professional parapsychologists who are members of our professional society, the Parapsychological Association. They are often contributors themselves to our journal. Most of them I know personally. As most parapsychology papers intersect with a mainstream discipline, I will also try to choose referees who have some background in that discipline. Thus if a paper deals with physical theories that explain psi, I will choose a person with a physics background. Some of my referees have jobs in mainstream fields in addition to their parapsychology work, but it is quite rare for me to have a referee who has never published in parapsychology. They are usually quite willing to referee if they have the time. I usually have 2 referees per paper, occasionally 3 if it is a particularly difficult one or I want to get more perspectives. I make the final decision when the referees disagree. I go with the dissenting referee if I don't feel the author adequately addresses this referee's critique either in a revised version of the paper or a cover letter to me."

I hope this helps.

Cordially,

John Palmer, Ph.D.

Editor, Journal of Parapsychology

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john@rhine.org

Henry Bauer:

" I became Editor-in-Chief in 2000. I believe the Board was selected by the previous Editor, Dr. Bernard Haisch.

From my own interaction with them, I can say that they are outstandingly competent in their special fields. Some have actually done research on unorthodox matters but others have worked only in mainstream sciences while remaining open-minded to the fact that science changes as it progresses. Several have been very helpful to me in some difficult situations where referees and authors disagree on substantive issues

I typically ask two referees.

The referees are not members of the Editorial Board, and I think that is quite usual for scientific or academic societies. The Editorial Board is established to advise on matters of major policy, and if necessary to arbitrate problems that cannot be settled without them.

I inherited from the previous editors a roster of perhaps 100 or so people in various disciplines who are suitable referees for the type of material our Society is interested in. I have added some names from personal acquaintance, and continue to add others whenever possible."

- > Do you have any statistician within the board? Because it seems that
- > statistics are a central point in psi phenomenon (as it is in biology
- > actually, and I have seen -I have a biological background- that the lack of
- > statistical skill can sometimes be misleading in biology as well).

"Mickel Aickin is expert on matters of medical protocols, statistical evaluation and the like. Among our referees there are quite a few with expertise in statistics and probability, and I do call on them frequently. I couldn't agree with you more, that misapplication of statistics in widespread, in mainstream disciplines perhaps as much as in unorthodoxies."

- > Or anything that you think could be interesting in understanding the selection process of
- > the articles.

"As it happens, the latest issue of the journal (16 no.2) has my essay about this. I attach the text of it from my files"

- > Thank you very much for taking care of my request. I will send you a copy of my
- > final report if you are interested!

"Please do, I am *VERY* interested"

Henry H. Bauer
Editor-in-Chief
Journal of Scientific Exploration
<http://www.scientificexploration.org/>

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