The effect of pseudo-psychic demonstrations as dependent on belief in paranormal phenomena and suggestibility

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Abstract

This paper describes two experiments which investigate the effects of pseudo-psychic demonstrations (i.e. conjuring tricks which could be misinterpreted as genuine paranormal phenomena). In the first study, a demonstration of a supposed medium was presented to 91 subjects individually, in which the playing card selected by a subject was identified “telepathically”. It was found that hypnotic suggestibility and belief in paranormal phenomena had a large effect on how the demonstrations were assessed. Suggestible persons or believers in paranormal phenomena were more impressed by a phenomenon and were more likely to rule out the possibility of fraud than were persons who were less suggestible or believed less in paranormal phenomena. In the second study, two trick demonstrations were shown. In each case, half the subjects (n = 68) were given the information that this was a magic trick, and the other half were told that this was a paranormal demonstration by a medium. The results with respect to belief in paranormal phenomena confirm the results of Study 1. Believers in paranormal phenomena, as compared with sceptics, tended to view the demonstrations as examples of paranormal phenomena, regardless of the information they had received, they tended to rule out the possibility of fraud and had a greater tendency to react with amazement. Interrogative suggestibility had no effect.

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1. Introduction

Conjuring tricks are to this day associated with the history of parapsychology, i.e. the endeavour to scientifically comprehend paranormal phenomena such as extra-sensory perception or...
psycho-kinesis. During the age of Spiritism in the nineteenth Century virtually every medium was accused of fraud, and the majority of mediums were also caught using (usually very simple) manipulations to achieve their “inexplicable” phenomena. Prominent mediums such as Eusapia Palladino, Florence Cook or Henry Slade were found guilty of deception (Beloff, 1993). Although parapsychology since the beginning of the twentieth Century has concentrated more on the experimental, quantitative investigation of the paranormal (parapsychology refers to Rhine’s Revolution), there were, and still are some mediumistic tricksters who are in the public eye and have been scientifically examined. The best-known example is Uri Geller, who set off a veritable “spoon-bending hysteria” in the 1970s and whose effects, in the opinion of most scientists (even the parapsychologists) were accomplished by means of simple magic tricks. However, a number of parapsychologists have endorsed such “psychics” as having genuine psychic powers (e.g. Cox, 1993). Moreover, as a somewhat naive stance, other parapsychologists seriously wanted to investigate the paranormal powers of professional magicians (as was the case with Beloff and the mentalist Glenn Falkenstein, whose tricks can easily be studied by buying one of his marketed videos, Beloff, 1984). As Palmer (1988, p. 109) noted: “Psychic fraud (...) has been the single most important factor in damaging the reputation of parapsychology” (for an overview of the relationship between parapsychology and trickery see Hansen, 1990).

Although since Max Dessoir (1893) or Alfred Binet (1894) psychologists have shown some interest in conjuring (e.g. Gregory, 1982; Kelley, 1980; Nardi, 1984) there still is some lack of a general theoretical framework for deception (Hyman, 1989; Wiseman, 1996). Existing attempts in the field of conjuring either try to develop the “folk psychology” of magicians or give valuable information on the art of conjuring, i.e. how to perform tricks to really impress the audience (excellent treatises for psychologists as well as magicians provide Lamont & Wiseman, 1999; excellent sources for magicians are, e.g. Fitzkee, 1975; Tamariz, 1988 or Ortiz, 1995). However, the question of why it is so fascinating (at least for some people) to see a conjurer perform, is not yet fully understood (the answer often heard, that we want to see real magic, rather begs the question than answering it).

In contrast to the elaborate research on young children, magical beliefs and reactions to conjuring tricks (Phelps & Wooley, 1994; see also Vol. 12 from 1994 of the British Journal of Developmental Psychology, which focuses on this theme), there are few empirical studies on the effects of conjuring tricks with adults. Singer and Benassi (1981) conducted a series of experiments in which an amateur conjurer performed various magic tricks in front of introductory psychology classes. Regardless of whether the performer was introduced as a magician or a genuine psychic, nearly three-quarters of the subjects believed strongly that the performer was psychic. Smith (1992–1993) in his study showed 40 subjects a video-taped demonstration of ostensible psychic ability (a psychic surgeon was filmed). Believers in paranormal phenomena and non-believers did not differ in their observation of the demonstration. Wiseman and Morris (1995) also showed their subjects videotapes of supposed paranormal phenomena (guessing ESP cards by means of telepathy, bending or breaking a fork by means of psychokinesis). The tapes actually showed a magician demonstrating tricks. Believers in paranormal phenomena (so-called sheep, Schmeidler & McConnell, 1958) viewed the psychokinesis demonstration as significantly more “paranormal” than did disbelievers (goats), while the differences for guessing ESP cards were not significant. In a study by Rübeling and Wachholz (1997), the subjects (n = 32) were shown a “psycho-magnetic” effect within the context of a demonstration of perception experiments. The
experimenters collected the explanations the subjects gave for the phenomenon. Contrary to their expectations, no influence of belief in paranormal phenomena was observed in the explanations. It was shown, however, that subjects with “physical contact” with the experimenter during the experiment gave non-physical explanations (naming a mental phenomenon such as “my concentration influenced the magnet”) significantly more often as compared to physical explanations (in addition to the explicit mention of physical principles or causes, statements such as “This is a trick” is assigned to this category), than did subjects “without physical contact”.

As conjuring tricks were and are the method of choice in simulating spectacular paranormal phenomena, it made sense to investigate whether there is a connection between the effects of conjuring tricks and the belief in paranormal phenomena. The starting assumption was the hypothesis that persons who believe in paranormal phenomena are more likely to be impressed by magic tricks than are sceptical persons. The current study should clarify this issue, as the studies previously undertaken have revealed inconclusive results. As reported, Singer and Benassi (1981) were the first who demonstrated the general tendency to view magicians’ feats as paranormal effects. While Smith (1992–1993) as well as Rübeling and Wachholz (1997) found no differences between believers in paranormal phenomena and non-believers, in the study of Wiseman and Morris (1995) there were indications that believers in paranormal phenomena viewed their demonstrations (at least the demonstration of psycho-kinesis) as more paranormal than did sceptics. The hypothesis of a greater effect of pseudo-psychic demonstrations on believers in psi is supported by research on social cognition, where numerous studies have found an effect of interpreting or seeking information in favour of pre-existing beliefs or expectations (for an overview s. Nickerson, 1998).

As conjuring tricks can be demonstrated especially well using suggestion (whereby the demonstrator exerts an especially suggestive effect by his or her appearance alone or by making suggestive claims, such that believing in the trick is important for it to work), it also made sense to examine the influence of suggestibility on the effects of conjuring tricks.

Basically, the term “suggestibility” is used for a wide range of constructs which concern themselves with human susceptibility, such as hypnotic suggestibility, interrogative suggestibility, sensory suggestibility or reactions to authority (for a theoretical overview see Schumaker, 1991). The common core of these different constructs is that they all imply some sort of uncritical and non-volitional acceptance of a proposition or course of action (Gudjonsson, 1987). In our work we were interested in two operationalisations of suggestibility: hypnotic suggestibility (for the current state of research cf. Council, 2002) and interrogative suggestibility (cf. Gudjonsson, 2003). On the one hand, practical considerations led us to limit ourselves to these two operationalisations, on the other, hypnotic suggestibility and interrogative suggestibility seem to involve elements which are decisive variables in conjuring. Thus, in a magic show the conjurer often makes suggestive statements (“You have shuffled the cards yourselves thoroughly, and I have not even touched the cards myself”), and he is ideally a person with quasi-hypnotical appeal to the spectators.

The relationship between hypnotic suggestibility and interrogative suggestibility is not yet clear. There exist studies which document few relations between the two constructs (Gudjonsson, 1987; Register & Kihlstrom, 1988) and others which have found considerable relations (Linton & Sheehan, 1994).

Suggestibility and belief in the paranormal are related to each other. Wagner and Ratzeburg (1987) reported positive correlations between hypnotic suggestibility (measured using the Harvard
Group Scale of Hypnotic Susceptibility, Shor & Orne, 1962) and belief in the paranormal, the number of parapsychological experiences and attitudes towards parapsychology and supernatural powers. In the study of Saucer, Cahoon, and Edmonds (1992) hypnotic suggestibility, as measured by recall score after hypnotic induction which suggested amnesia, was not significantly related to belief in the paranormal. Hergovich (2003) found a rather strong significant positive correlation ($r = 0.46$) between hypnotic suggestibility and belief in the paranormal.

With respect to interrogative suggestibility, in one study done by Haraldson (1985), 79 subjects completed the Gudjonsson Suggestibility Scale (GSS, Gudjonsson, 1984) and the Paranormal Belief Scale (PBS, Tobacyk & Milford, 1983). The suggestibility scores correlated significantly (the coefficients were between 0.19 and 0.32) with the sub-scales “witchcraft”, “spiritualism” and “precognition” of the PBS. In the study by Hergovich (2003), interrogative suggestibility correlated significantly only with the sub-scale “superstition” of the PBS (the coefficients were between 0.21 and 0.38).

2. Study 1

Study 1 investigated the effects of belief in paranormal phenomena and suggestibility on the reception of pseudo-psychic demonstrations. Suggestibility was operationalised as hypnotic suggestibility. Because belief in paranormal phenomena and hypnotic suggestibility are related to each other, we expected to also find an interaction between these two constructs.

2.1. Methods

2.1.1. Sample

A total of 91 subjects were tested. The age of the subjects lay between 18 and 60 years (with a mean of 34.15 years and a standard deviation of 13.98). 39 persons (42.9%) were male and 52 (57.1%) female.

2.1.2. Procedure

All persons completed the “Occultism Scale” of Böttinger (1976), in order to test their belief in paranormal phenomena. A test for measuring field dependence was also administered, the results of which are not reported here. The pseudo-psychic demonstration was then demonstrated. Hypnosis took place in a separate session (according to Weitzenhofer, 1989). The subjects reclined on a couch and listened to the instructions on tape. It was suggested to them that they could not open their eyes. They were then told to try to open their eyes before the hypnosis session was concluded by repealing the suggestions. The administrator observed the process and evaluated the depth of hypnosis. In addition, the subjects reported how difficult it was for them to open their eyes during hypnosis.

During the trick demonstration, a “medium” was introduced to the subject, who had the ability to correctly identify a card which the subject had previously selected from a deck of playing cards. More specifically: after the medium had left the testing room, the subject was given a deck of playing cards consisting of 52 cards (of the brand Bicycle). They were allowed to shuffle the cards thoroughly—for as long as they wanted. After that they were asked to cut the deck. This procedure was repeated as many times as the subject wanted. The subject then had to look at the
uppermost card of the cut deck, memorise it and put it into their pocket (or sit on it or hide it somewhere else). The subject asked the medium back into the room. The subject then had to concentrate on the memorised card. The medium sat down across from the subject and after some effort finally managed to guess the card.

The medium was actually collaborating with the experimenter. The experimenter and the medium had agreed on a code, by means of which the experimenter could communicate the identity of each card to the medium. At the beginning of the experiment, the medium left the room. The experimenter then gave the subject the instructions while walking around the room. When the subject was asked to look at and remember the topmost card of the deck, the experimenter was always right behind the subject and was therefore able to see the value of the card which was raised. To eliminate the possibility of doubt, the experimenter immediately moved in front of the subject and said: “Look carefully at the card and remember it, but please don’t show it to me. I mustn’t see it. Please put the card in your pocket or just sit on it”. The subject was then told that the medium would try, by means of telepathic ability, to figure out the identity of the card chosen. The task of the subject consisted solely of concentrating on the identity of the chosen card. At this point, the subject was sent to get the medium. Once again, the medium explained that the subject should concentrate on the chosen card very intensely and make an effort to visualise the card. The experimenter did not speak another word until the card was identified.

Through visual cues the experimenter communicated the card’s suit (hearts, diamonds, spades or clubs) to the medium. The experimenter achieved this by dividing up the room into four imaginary quadrants. The quadrant above and to the left corresponded to hearts, above and to the right to diamonds, etc. For example, if the subject drew a diamond card, the experimenter would look up and to the right shortly after the medium returned to the room. For a club card, the experimenter would look down and to the right. The number value of the card was communicated by means of a code. The 13 possible number results (ace to king) were encoded as powers of two. Each number was represented by four signs (bits). Each sign was assigned to a bit. The signs were: hand touches face (yes/no), right leg extended (yes/no) (according to $2^3$). For example, if the subject picked the seven of spades, the administrator would quickly look to the lower left corner, touch her face with both hands (bits $2^0$ and $2^1$) and extend his or her right leg (bit $2^2$). Because $2^0 + 2^1 + 2^2 = 7$, the medium would know that the value was 7.

The subject and the medium had practised coding in an intensive training phase and in a series of pre-tests according to the instructions of a conjurer of the “Magical Cercle of Vienna”, so that the trick was flawless and proceeded smoothly and the medium could concentrate on the acting and performance aspects of the experiment.

At the end of the experiment the subject was handed a questionnaire consisting of 12 items for evaluating the demonstration, which were to be answered according to a six-point scale ranging from “is not true at all” to “is completely true”. Later on all subjects were informed of the real aim and nature of the experiment.

2.2. Results and discussion

The reliability of the Occultism Scale was determined: the internal consistency (Cronbach’s alpha) was 0.91. The analysis of the hypnosis sessions showed that hypnosis had proved to be successful. On the six-point scale about a third of the subjects had values from 4 to 6 on both
measures of suggestibility (34.1% on self-assessed suggestibility and 37.4% on experimenter-assessed suggestibility). 35.2% indicated no effect of hypnosis on both measures. The mean suggestibility was 2.76 for self-assessed suggestibility (S.D. = 1.74) and 2.87 for experimenter-assessed suggestibility (S.D. = 1.81). As the correlation between the two measures of depth of hypnosis was very high ($r = 0.85$), the sum of self- and experimenter-assessed depth of hypnosis was used as a measure of suggestibility for the following calculations. The ratings of the questionnaire for the assessment of the deception demonstration were subjected to a factor analysis (principal component analysis) with a varimax rotation. Four factors could be extracted which explained 70.5% of the variance and had eigenvalues greater than one. The negatively loaded items were re-polled and the individual variables were added to the corresponding factor value (Table 1). The percentages of explained variance for the factors were as follows: 32.4% for factor 1 (“fraud”), 17.2% for factor 2 (“amazement”), 11.9% for factor 3 (“no explanation”) and 9.0% for factor 4 (“suggestion”).

The effects of suggestibility and belief in the occult on the evaluation of the trick demonstration was tested using a 2×2 MANOVA. The independent variables were suggestibility (low/high) and belief in the occult (low/high), acquired using a median split in the occult scale and the suggestibility scale. The dependent variables were the factors “Fraud”, “Amazement”, “No explanation” and “Suggestion”. The results provided significant multi-variate main effects of suggestibility [$F(4, 84) = 4.01, P < 0.01$] and belief in the occult [$F(4, 84) = 6.98, P < 0.001$], and a significant interaction effect between suggestibility and belief in the occult [$F(4, 84) = 3.79, P < 0.01$]. Suggestibility and belief in the occult had an univariate significant effect on the variables “Fraud” and “Amazement” (Table 2). Besides, the interaction between “Suggestibility” and “Belief in the occult” had a highly significant effect on the variable “Suggestion” [$F(1, 87) = 14.61, P < 0.001$].

As expected, both suggestibility and belief in occult phenomena had an effect on the reception of magic tricks. Suggestible persons tended to rule out fraud in the trick demonstration and were more impressed than the persons with lower suggestibility. The same pattern appeared for the belief in paranormal phenomena. Persons who believed in the occult also had a significantly lower tendency to see fraud behind the trick demonstration and were significantly more impressed by

Table 1  
Principal component analysis of the trick demonstration in study 1

<table>
<thead>
<tr>
<th>Item</th>
<th>“Fraud”</th>
<th>“Amazement”</th>
<th>“No explanation”</th>
<th>“Suggestion”</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that a simple trick was at play in the demonstration.</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe the demonstration had to do with deception.</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that fraud was at play in the demonstration.</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that thought transference was at play in the demonstration.</td>
<td>−0.82</td>
<td>0.24</td>
<td></td>
<td>0.17</td>
</tr>
<tr>
<td>Supernatural powers were at play in the demonstration.</td>
<td>−0.66</td>
<td>0.31</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>The demonstration was amazing.</td>
<td></td>
<td>0.90</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>The demonstration was impressive.</td>
<td>−0.15</td>
<td>0.86</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>I have no explanation for the demonstration.</td>
<td></td>
<td>0.17</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>I consider the demonstration to be a miracle.</td>
<td>−0.30</td>
<td></td>
<td>0.58</td>
<td>0.17</td>
</tr>
<tr>
<td>The demonstration was achieved only by chance.</td>
<td></td>
<td>−0.62</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td>I never experienced anything like this before in my entire life.</td>
<td>−0.11</td>
<td>0.24</td>
<td>0.49</td>
<td>−0.49</td>
</tr>
<tr>
<td>I believe suggestion was at play in the demonstration.</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.91</td>
</tr>
</tbody>
</table>

For clarity, loadings smaller than ±0.10 are not displayed.
the phenomenon. An interesting interaction between suggestibility and “belief in the occult” appeared with respect to the factor “suggestion”. Although the less suggestible were more likely to assume that “suggestion was involved”, in high belief in paranormal phenomena (mean = 3.93), than in low belief in paranormal phenomena (mean = 2.41), this was reversed for the “highly suggestible”. Persons with high suggestibility tend to assume that suggestion was involved if they have low belief in paranormal phenomena (mean = 3.36), and decide against the factor “suggestion” if their “belief in the occult” is high (mean = 2.22). i.e. exactly those persons who have a high belief in paranormal phenomena and high suggestibility rule out suggestion as the cause of such a phenomenon, while “believers in the occult” who are not as suggestible have a high tendency to take the factor “suggestion” into account.

Critically it should be said of Study 1 that the expectations of the subjects were not tested. It would thus theoretically be possible that the suggestible or believers in paranormal phenomena are more impressed by a trick demonstration, because the announcement that a medium would demonstrate a paranormal effect leads them to expect a “real phenomenon”, unlike sceptics. In this case it would not be the trick itself which would cause these effects, but rather the different expectations. For example, studies such as that by Massad, Hubbard, and Newison (1979) have demonstrated that prior sets introduced by the experimenter influence subjects’ perception of subsequent events, and that the resulting biased sample of information that subjects acquire may restrict their “retrospective” interpretation of the event as measured through recall. For this reason the trick demonstrations in Study 2 were presented with two different sets of instructions, a trick and a medium instruction (Smith, 1992–1993).

3. Study 2

In Study 2 some changes were made. This time suggestibility was operationalised as interrogative suggestibility (Gudjonsson, 1984). Interrogative suggestibility can be regarded as the

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
<th>Univariate Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(F)</td>
</tr>
<tr>
<td></td>
<td>Suggestibility</td>
<td>Fraud</td>
</tr>
<tr>
<td></td>
<td>18.47</td>
<td>14.00</td>
</tr>
<tr>
<td></td>
<td>8.40</td>
<td>9.65</td>
</tr>
<tr>
<td></td>
<td>11.43</td>
<td>12.28</td>
</tr>
<tr>
<td></td>
<td>3.17</td>
<td>2.79</td>
</tr>
<tr>
<td></td>
<td>Belief in the occult</td>
<td>Fraud</td>
</tr>
<tr>
<td></td>
<td>19.00</td>
<td>13.48</td>
</tr>
<tr>
<td></td>
<td>8.08</td>
<td>9.96</td>
</tr>
<tr>
<td></td>
<td>11.94</td>
<td>11.77</td>
</tr>
<tr>
<td></td>
<td>2.89</td>
<td>3.07</td>
</tr>
</tbody>
</table>
tendency of an individual to alter their account of events because of misleading information and interpersonal pressure between interviews. The GSS was used for this purpose (Gudjonsson, 1984).

The belief in paranormal phenomena was tested in Study 2 using the Paranormal Belief Scale (Tobaczyk & Milford, 1983), as this is the most widely used and recognized scale. Two trick demonstrations are presented, an experiment with cards and one with dice. In both cases a “medium” demonstrated his or her “paranormal ability”. This was actually a psychology student who had practised the demonstrations under the guidance of a magician of the Magic Circle of Vienna.

3.1. Method

3.1.1. Sample

A total of 68 persons between the ages of 17 and 70 were tested in individual sessions. The mean age was 30.38 years, with a standard deviation of 10.50. 29 persons (42.6%) were male and 39 (57.4%) were female.

3.1.2. Procedure

All subjects were first given the GSS and the PBS. The GSS was presented as a memory task. Each trick demonstration was presented in a separate session. Half of the subjects received instructions to the effect that they were about to see a paranormal demonstration by a medium (Medium group), the other half was told that they would be shown two magic tricks (Trick group). Immediately after the trick demonstrations the subjects received the 12-item questionnaire already used in Study 1, which was expanded by an additional item requesting a concluding assessment on a six-point scale (“The demonstrated phenomenon is definitely not paranormal vs. definitely paranormal”). The subjects were also given six questions rated on a five-point scale ranging from “completely wrong” to “very true” for every demonstration, which asked for “important”, “unimportant” and “pseudo-important” information according to Wiseman and Morris (1995). This was supposed to test first, whether the subjects had seen through the trick method and second, whether response sets played a role. It was thus to be expected that disbelievers in paranormal phenomena would not only look more carefully for trick manipulations due to their expectations, but also assess the subsequent questionnaire more sceptically (report less amazement etc.), because they always react to such questions with a sceptical response set, without even taking what they have seen into account in their assessment. Important questions were questions referring to contents relevant for the administration of the effect (represent a key to the method of the trick). Unimportant questions referred to aspects which were not important for doing the trick and pseudo-important questions were supposed to give the impression of revealing the method of the trick, but were not significant for this trick (Wiseman & Morris, 1995). A response-set effect can be assumed if sceptics, as compared with believers in paranormal phenomena, assess significantly more important and pseudo-important contents in the medium condition as correct than in the trick condition, if there is thus an interaction between belief in paranormal phenomena and group with reference to important and pseudo-important questions.

Description of the dice demonstration: Each subject was given a die with three red and three blue faces. While the medium waited outside the room, the subject was requested to shake the die
in a box, put the box back on the table and note the colour facing up. There were a total of 10 runs, in which the administrator precisely recorded the way the dice were shaken and the way the colour was noted. The sequence of the two colours was transformed by the administrator into a binary code and also noted (see Study 1). After the subject had noted the die results, the list of results was put into an envelope, sealed and placed in a prominent position. After this the subject asked the medium back into the experiment room, and the administrator began to communicate the code. For every subject, the first two attempts were communicated incorrectly on purpose, so that the presentation would “not seem too perfect”. After the two unsuccessful attempts, the medium asked the subject to put their left hand in his in order to “enable better energy flow”. The subject was asked to remember the die sequence. The medium now began to write down the colours he had supposedly received “telepathically”. After one attempt the colours written down by the medium were compared with the colours on the list in the envelope.

The description of the card demonstration: During the entire presentation the subject, the administrator and the medium were present in the experiment room. The administrator showed the subject a deck of playing cards (a total of 52 cards, of the brand Bicycle), shuffled it once and asked the subject to also shuffle the deck. As in the die demonstration the subject was asked by the medium to put their left hand in his/hers in order to “enable better energy flow”. The subject was told to concentrate and slowly lift each card up from the deck on the table and put it back on the table face-down. As soon as the subject had a feeling of energy from a certain card, s/he was told to look at the face of the card, memorise it and seal it in an envelope lying on the table. After a certain amount of concentration the medium wrote down a card on a piece of paper. This card value was then compared with the card in the envelope and was found to match this card. Marked cards were used to enable the medium to figure out the value of the face of the card just by looking at the back of it. These marks were not visible to the subject. The demonstration was shown only once to each subject.

3.2. Results and discussion

The reliability of the PBS was 0.91. The “total suggestibility” as the sum of “yield 1” and “shift” was calculated as a measure of suggestibility. Paranormal belief and total suggestibility did not differ significantly between the medium and the trick group \([t(66)=1.570, P=0.121\) for paranormal belief and \(t(66)=0.540, P=0.591\) for total suggestibility].

A factor analysis of the questionnaire (principal component analysis) used to rate the die demonstration provided four factors, which taken together explained 69.3% of the variance. The results were rather similar to those of Study 1. On factor 1 (“Psi”) with 23.4% explained variance loaded items which suggest the existence of a genuine paranormal phenomenon (sample item: “Supernatural powers played a role in this demonstration”). Factor 2 (“Fraud”) explained 18.8% of the variance (sample item: “I believe this demonstration was based on fraud”). Factor 3 (“Amazement”, 16.4% explained variance) assesses the amazement of the demonstrations (sample item: “The demonstration was amazing”) and Factor 4 (“No explanation”, 10.6% explained variance) assesses the lack of explanations (sample items: “I have no explanation for the demonstration”).

For the “die-demonstration” we performed a \(2\times2\times2\) MANOVA using the factors belief in paranormal phenomena (low/high), suggestibility (low/high) and instruction (performance of a
magic trick/paranormal phenomenon) and the dependent variables “psi”, “fraud”, “amazement”, and “no explanation”. This analysis revealed significant multivariate effects of belief in paranormal phenomena, $[F(4, 57) = 3.54, P < 0.05]$, instruction $[F(4, 57) = 4.96, P < 0.005]$ and a two-way interaction between belief in paranormal phenomena and instruction $[F(4, 57) = 3.16, P < 0.05]$. At the univariate level, the effect of belief in paranormal phenomena emerged for the variables “psi” as well as “fraud”, and the effect of the instructions was significant for the variable “psi” and “no explanation” (Table 3). The effect of belief in paranormal phenomena on the variable “amazement” and the interaction between belief in paranormal phenomena and instructions on the variable “amazement” also tended in the direction of significance. Believers in paranormal phenomena tended to view the presentation as a manifestation of “psi” and to rule out the possibility of fraud. Persons in the medium group, as opposed to persons in the trick group, also tended to assume that they had witnessed a demonstration of a “psi-phenomenon”. They also could not explain this phenomenon as well as the persons of the “trick group”. This result proves the efficacy of the instructions.

A topic of interest is the interaction between belief in paranormal phenomena and instructions with respect to the variable “amazement” $[F(1, 60) = 2.95, P = 0.091]$. Although sceptics tended to be more amazed after witnessing the magic trick (mean amazement of 14.57 under the instruction “magic trick” vs. 12.73 under the instruction “paranormal phenomenon”), the opposite was true in the case of believers in paranormal phenomena. Their amazement after the demonstration of a “paranormal phenomenon” (in the Medium group) was higher (mean amazement of 16.58 vs. 14.72 under the instruction “magic trick”). This result indicated that each group was only amazed by a phenomenon which accords with their view of the world, sceptics by a well-performed magic trick and believers in paranormal phenomena by a successful paranormal demonstration. For magicians this could mean that they should adapt the promotion of their magic tricks accordingly to their particular public.

Table 3
Univariate effects of belief in psi and instructions on the evaluation of the die demonstration in Study 2

<table>
<thead>
<tr>
<th>Belief in psi</th>
<th>Low</th>
<th>High</th>
<th>Univariate Tests</th>
<th></th>
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<tr>
<td></td>
<td>Cell means</td>
<td>F</td>
<td>df</td>
<td>P</td>
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<td>7.76</td>
<td>10.69</td>
<td>7.83</td>
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<td>8.28</td>
<td>4.79</td>
<td>1,60</td>
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<td>13.65</td>
<td>15.65</td>
<td>3.47</td>
<td>1,60</td>
</tr>
<tr>
<td>No explanation</td>
<td>6.65</td>
<td>6.29</td>
<td>0.26</td>
<td>1,60</td>
</tr>
<tr>
<td>Instructions</td>
<td>Paranormal effect</td>
<td>Trick</td>
<td></td>
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<td></td>
<td>Cell means</td>
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<td>7.32</td>
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<td>8.87</td>
<td>0.03</td>
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<td>14.64</td>
<td>0.00</td>
<td>1,60</td>
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<tr>
<td>No explanation</td>
<td>7.31</td>
<td>5.63</td>
<td>5.54</td>
<td>1,60</td>
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</table>
A factor analysis of the questionnaire used to rate the card demonstration provided again four factors which taken together explained 74.2% of the variance. The resulting factors were “Psi” (26.3% explained variance), “No fraud” (17% explained variance), “Amazement” (16.3% explained variance) and “No explanation” (14.6% explained variance).

For the card demonstration we again implemented a $2 \times 2 \times 2$ MANOVA using the factors belief in paranormal phenomena (low/high), suggestibility and instruction (magic trick/paranormal phenomenon). Significant multivariate effects of belief in paranormal phenomena [$F(4, 57)=4.33, P < 0.005$] and instruction [$F(4, 57)=5.98, P < 0.001$] were revealed. Suggestibility, like the interactions, had no significant effect. Univariate significance was found for the effect of belief in paranormal phenomena with respect to the variables “psi” and “no fraud”. The effect of belief in paranormal phenomena on the factor “amazement” tended in the direction of significance (see Table 4). This means that believers in paranormal phenomena tended to believe that the demonstration was a genuine “psi-phenomenon” and that no fraud was involved. They also tended to be more amazed by this demonstration. Subjects who had received the instructions that this was a “paranormal phenomenon” obviously also tended to view the demonstration as more paranormal, they also excluded the possibility of fraud to a greater extent, and they tended to be more amazed. The results thus show that independently of the instructions, believers in paranormal phenomena rated the demonstration witnessed as more “paranormal” and assumed to a greater extent that there was no fraud. The effect of the instructions is similar to the effect of belief in paranormal phenomena: that declaring the demonstration to be a “trick” causes the demonstration to be evaluated as non-paranormal and assumed to be based on fraud. Multivariate, multi-factorial analyses of variance were also carried out to evaluate the efficacy of the trick demonstrations. Dependent variables were the six questions concerning the manipulation check, independent variables were the belief in paranormal phenomena (low/high), the instructions (trick demonstration/paranormal phenomenon) and total suggestibility (low/high).

Table 4
Univariate effects of belief in psi and instructions on the evaluation of the card demonstration in Study 2

<table>
<thead>
<tr>
<th>Belief in psi</th>
<th>Low</th>
<th>High</th>
<th>Univariate Tests</th>
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</thead>
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<tr>
<td></td>
<td>Cell means</td>
<td></td>
<td>$F$</td>
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<tr>
<td>Psi</td>
<td>10.60</td>
<td>15.34</td>
<td>12.06</td>
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<tr>
<td>No fraud</td>
<td>6.87</td>
<td>9.06</td>
<td>8.86</td>
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<tr>
<td>Amazement</td>
<td>13.33</td>
<td>15.01</td>
<td>3.14</td>
</tr>
<tr>
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<td>8.88</td>
<td>9.04</td>
<td>0.31</td>
</tr>
<tr>
<td>Instructions</td>
<td></td>
<td>Paranormal effect</td>
<td>Trick</td>
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<td></td>
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<td>Cell means</td>
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<tr>
<td>Psi-Phenomenon</td>
<td>16.17</td>
<td>9.77</td>
<td>21.95</td>
</tr>
<tr>
<td>No fraud</td>
<td>8.92</td>
<td>7.02</td>
<td>6.60</td>
</tr>
<tr>
<td>Amazement</td>
<td>14.74</td>
<td>13.60</td>
<td>1.47</td>
</tr>
<tr>
<td>No explanation</td>
<td>9.89</td>
<td>8.03</td>
<td>4.18</td>
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</table>
There appeared multivariate effects of the variables belief in paranormal phenomena \(F(6, 55)=2.27, P=0.05\) and group \(F(6, 55)=2.39, P<0.05\). The effects of belief in paranormal phenomena on the rating of the pseudo-important questions on the die experiment \(F(1, 60)=4.94, P<0.05\) and the effect of instructions on the evaluation of pseudo-important questions on the card experiment \(F(1, 60)=10.11, P<0.005\) were univariately significant. This means that believers in paranormal phenomena (\(M=8.34\)) were more likely to confirm pseudo-important questions on the die-experiment than were non-believers (\(M=7.32\)). This is the most important indication that believers in paranormal phenomena are more likely to form false hypotheses concerning the trick method on the die experiment than are non-believers. Comparably, persons in the trick-group (\(M=7.18\)) rated pseudo-important questions on the card experiment as more significant than did persons in the medium group (\(M=6.18\)). This result reflects only the fact that the focus of attention in the trick-group, at least on the card experiment, was turned more towards the trick method. However, the data do not allow a judgement on whether attention was concentrated on the trick method while the trick was being demonstrated or only while the questions were answered. At any rate, the data available do not provide indications of a differential response set of believers in paranormal phenomena as opposed to non-believers.

4. General discussion

The two studies indicate that belief in paranormal phenomena has a major effect on the reception of pseudo-psychic demonstrations. Independently of whether a magic trick or a paranormal demonstration is expected, believers in paranormal phenomena in line with the results of Wiseman and Morris (1995) have a greater tendency to categorise the presentation as paranormal than do sceptics. They exhibit a greater degree of amazement and do not assume that such phenomena are based on fraud or a simple trick. The same mechanism of “immunisation” of one’s own position also seems to apply to sceptics. They remain sceptical even after being told that they are about to witness a paranormal phenomenon. They have a greater tendency to assume fraud or dismiss the whole thing as a trick. Moreover, they are less amazed than believers in paranormal phenomena. Sceptics tend to be more impressed when the trick is declared to be a magic trick from the start, while the opposite is true for believers in paranormal phenomena. They are more amazed when told that they are about to witness a demonstration of a paranormal phenomenon.

Hypnotic suggestibility may have a similar, though weaker, effect than belief in paranormal phenomena. One can speculate about the underlying mechanism which links hypnotic suggestibility to belief in paranormal phenomena. It is suggested that fantasy-proneness may be this conceptual link between the constructs (Wilson & Barber, 1978; 1983). Wilson and Barber had found that excellent hypnotic subjects reported much more fantasising than did subjects who were not as susceptible to hypnosis. These subjects spent at least half of their waking hours fantasising, they also reported the ability to hallucinate objects and to experience them “as real as real”. They also complained about difficulty in differentiating between fantasised and real events. Rhue and Lynn (1991) carefully investigated the relationship between fantasy-proneness and hypnotic suggestibility further. Generally, Wilsons and Barbers results were confirmed. However, the relationship between fantasy-proneness and hypnotic suggestibility was somewhat weaker, the obtained correlation between the variables was only 0.29. On the other hand, there exists ample
evidence that belief in paranormal phenomena and paranormal experiences are related to fantasy-proneness (for an overview cf. Irwin, 1993). Thus, it is possible that fantasy-prone individuals who are able to imagine in accordance with hypnotic suggestions (Hilgard, 1974) also fantasise about the experimental situation, imagining a real psychic. This would explain why regardless of the different instructions in Study 2, believers in paranormal phenomena, as compared with non-believers, were ready to see the demonstration as more paranormal and involving no fraud. Another possible explanation is given by the theory of self-awareness (Carver & Scheier, 1981; Gibbons, 1990). According to this theory, directing attention to the self activates the self-schema, i.e. the cognitive representation of the self. Research shows that suggestions are less effective when they are inconsistent with this self-schema (Gibbons & McCoy, 1992). Possibly, the instruction that a demonstration is either a conjuring trick or a paranormal demonstration depending on belief or disbelief in paranormal phenomena activates appropriate self-schemata like past personal experiences with conjurers/mediums, or the emotions that were caused by these experiences. If these memories are consistent with external information (instructions), one would assume stronger reactions in dependence on the instructions. Only the interaction between instructions and belief in paranormal phenomena in Study 2 (die demonstration), where believers in paranormal phenomena were more amazed if the instruction announces a paranormal demonstration, corresponds to this assumption. In sum, the results of our study speak against this mechanism. However, future research is necessary to clarify this issue.

No influence on the reception of tricks was found for interrogative suggestibility, although there seems to be some correspondence between the situation of a trick demonstration and the operationalisation of interrogative suggestibility. The reason for the lack of an effect of interrogative suggestibility may lie in the distinctiveness of interrogative suggestibility from hypnotic suggestibility. As Gudjonsson (1987) already pointed out, interrogative suggestibility has some features which distinguish his concept from other types of suggestibility: (a) the questioning procedure within a close context, (b) the questioning is concerned with past experiences and (c) there exists a strong “uncertainty” component. All these components were not present in the hypnotic induction. And there is no evidence of a relationship between the involvement of fantasies and interrogative suggestibility, the former postulated as the mediator between hypnotic suggestibility and reactions to trick demonstrations. In accordance with this interpretation, Heaps and Nash (1999) found a relation between subjects hypnotic suggestibility and the extent to which subjects judged imagined childhood events subsequently as more likely to have occurred than not-imagined events (imagination inflation). This relationship was not found for interrogative suggestibility.

The claim that either a magic trick or a paranormal phenomenon is about to be demonstrated, independently of belief in paranormal phenomena, has the effect that the demonstration is evaluated according to the claim. But the interesting thing about the results is that the willingness to evaluate a phenomenon as either paranormal or not depends not only on this claim but also on belief in paranormal phenomena. Analysing only Question 13 of the questionnaire on the card demonstration of Study 2 (“Please make a final judgement on the demonstration.”), on which the subjects had to rate the phenomenon according to a 6-point Likert scale of “definitely not paranormal” to “definitely paranormal”, shows that the evaluation of the phenomenon by sceptics who were told that they were about to witness two paranormal phenomena matches the evaluation of the believers in paranormal phenomena who were told that they were about to witness two magic tricks. Sceptics in the medium group had a mean of 3.00 on this question, believers in
paranormal phenomena in the trick group had a mean of 3.07 (sceptics in the trick group exhibited a score of 1.29, i.e. they evaluate the phenomenon as definitely not paranormal, psi-believers in the medium group had a score of 3.81). The results on the die-demonstration are almost identical. This result also matches the personal experiences of many magicians (oral accounts), who report that some members of the audience stubbornly insist that “something was paranormal” about the trick, even when the magician explicitly stated that s/he was only performing magic tricks.

Perhaps it is necessary to make a short comment on ethical concerns, because one reviewer of this article found the procedure in our study to be a rather extreme case of deception. The use of deception is frequently discussed in psychology from different point of views (e.g. Broeder, 1998; Ortmann & Hertwig, 1997). The authors opinion is that deception is justified in this case, for the subjects were debriefed and had apparently not suffered from the deception. Moreover, it is difficult to imagine studying deceptions themselves without making use of them.

Although it is tempting to draw the conclusion from our results that the belief in paranormal phenomena per se is some sort of cognitive illusion (for example, Singer & Benassi, 1981, already articulated this opinion), we have some reservations against this point of view. As a consequence of the fact that the ontological reality of paranormal phenomena could not be proven by science (Irwin, 1993), though this may be also an inherent sign of naturalistic epistemology, it is impossible to say whether the proneness to deception which was shown in our study concerns only believers in paranormal phenomena. One may speculate that sceptics will be deceived as easily as believers in our experiments if a seemingly magical trick is in reality performed by paranormal power. As a matter of fact this is not possible up to this time. And if one follows Kant’s thoughts about the limits of human reason, it is in principle impossible to design an experiment without confounding belief in phenomena currently unexplained by science and current scientific epistemology (although there are attempts, e.g. Wetzelman, Gering, & Verhoeven, 1997). Therefore, this paper could not provide arguments with regard to the reality of paranormal phenomena, but some insights into the effect of trickery in dependence on belief in paranormal phenomena and suggestibility.

References


