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Explaining apparently impossible phenomena: difference between physical and mental effects

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Abstract

Practitioners of mentalism can perform apparently impossible feats, but when performing for an audience these feats are attributed to pseudoscientific explanations such as advanced psychological skills. Research that has investigated the psychological foundations of mentalism has found a strong tendency for people to believe these explanations. In three experiments, we investigated the strength of this belief by comparing apparently impossible effects relating to mental phenomena with physical phenomena. We observed that mental magic tricks are readily explained in terms of advanced psychological skills, whereas physical tricks are not. This was true: i) even when alternative feasible explanations are explicitly presented; ii) when they are presented as mentalism effects but the effects themselves are classical card tricks; iii) regardless of the context in which the effects are observed (a research laboratory vs. a theater). We interpreted the tendency to appeal to this pseudo-explanation (and the changes in narratives employed by mentalists across the decades) in terms of the community of knowledge framework.

Keywords: science of magic; illusionism; explanation; pseudo-explanation; context effects; impossible phenomena; community of knowledge.

Introduction

A central concept within illusionism is misdirection, i.e., manipulating the spectator away from the cause of a magic effect. A crucial component of misdirection (Kuhn et al., 2014) is effectively influencing the spectators' reasoning processes. Several elements contribute to this, in particular the performance context and the accompanying narrative. On this matter, the magicians community is aware of the crucial differences between physical-based effects (e.g., levitation, card magic, objects' disappearance, sawing a person in half) and mental magic (reading minds, influencing behavior). With regard to the former, magicians acknowledge that in today's context, spectators may be less gullible than they were decades ago. Given the educational, cultural, and technological shifts in Western society, explanations based on the supernatural have become implausible for well-known tricks like card magic or grand theatrical illusions. It is generally assumed that spectators suspend disbelief to enjoy a magic show while pondering how the feats are accomplished (Kuhn, 2019).

Mentalism is completely different. It can be defined as an illusionism subfield in which practitioners (commonly called mentalists) appear to demonstrate a wide range of parapsychological phenomena (e.g., mind reading, see Lesaffre et al., 2018). Without going into the details of the complex history of illusionism (Micheli, 2012), during the 20th century practitioners of mental magic progressively split from the community of generic illusionists. Until the 1980s, mentalists presented themselves as psychics. Their cover stories were frequently based on paranormal abilities. Around the 1980s this cover story became unconvincing. Mentalists today prefer a more science-oriented framework. Usually,

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they introduce themselves as experts of some pseudoscience (for example, Neuro-linguistic programming) that allows them to predict or control the mind. According to them, this kind of cover story is a more credible explanation nowadays. The point is that the cover story must be credible in the specific cultural context where the mentalist (and, generally, the illusionist) is performing. This is strictly associated with the importance of giving an explanation for a magician's act: for a skilled illusionist, it is relatively easy to predict a word written on a piece of paper by a spectator. However, if the mentalist just reveals the written word, without any other details, the prediction becomes trivial. If the mentalist pretends to be an expert of non-verbal behavior by emphasizing the direction of the gaze or asking questions for studying the non-verbal reactions of the other person, the effect become credible.

In previous literature, it was observed that people were particularly prone to believe that it is possible to condition others' behavior via non-verbal, advanced psychological techniques (Gronchi & Zemla, 2021; Lan et al., 2018; Mohr & Kuhn, 2020). However these works have some limitations. In particular, participants may have accepted the mentalist's psychological explanation in part because the true explanation is difficult to generate. In addition, the context of the experiment (mostly psychology students participating in a psychology experiment) may have introduced a demand effect prompting participants to look for a psychological explanation. Finally, the tricks employed were limited in scope and it is unclear whether the effect would generalize to other types of magic tricks and mechanisms for those tricks.

In this paper, we address these concerns by: i) employ a forced-choice task, explicitly presenting feasible alternatives (Experiment 1), ii) simultaneously manipulate the modality of presentation (mental-based or physical-based) and the kind of trick (manipulation or automatic) along with an induction of analytical or intuitive thinking (Experiment 2) and iii) investigate the role of the context in which a physical or a mental-based apparently impossible event is observed (Experiment 3).

Experiment 1

In a previous study (Gronchi & Zemla, 2021), participants witnessed a mental magic trick and were asked to explain the trick in an open-ended format. It was observed that the majority of participants (psychology and engineering students) were prone to explain a mental magic trick referring to advanced psychological skills (e.g., reading non-verbal behavior, conditioning other's behavior with gestures) consistent with the explanation supplied by the mentalist. Given that the question is posed in an open format, if a readily apparent procedure to achieve the effect does not come to mind, the inclination to rely on the mentalist's pseudo-explanation (advanced psychological skills) can be quite strong. In contrast, it is often very difficult to generate a plausible alternative for such tricks. In this experiment we reduced the demand on participants by asking them to choose between two alternative explanations to a mental magic trick: a feasible one (actual ways to perform the effect) and an unfeasible one (advanced psychological skills). Responses to the mental magic trick were compared to responses prompted by a card magic trick as a control. Also, we compared the performance of psychology students with that of students studying technical subjects (engineering, architecture) given that it was previously observed that engineering students who may differ in their preference for psychological explanations.

Methods

Participants 654 college students (211 male) enrolled in either a Psychology major (n = 413) or technical major (Engineering or Architecture, n = 241) of the University of Florence with mean age was 19.7 (sd = 3.1), range 18-56 participated in the research on voluntary basis.

Procedure. Participants were randomly assigned to one of two conditions: a mental magic video or a card magic video. The mental magic video was the same employed in Gronchi and Zemla (2021) where a mentalist engages in conversation with a chess grandmaster. Afterward, the mentalist presents a chessboard with pieces arranged in the starting position and instructs him to select one piece. The grandmaster makes his choice (a white bishop) and places the piece in the center of the chessboard. Holding the chosen piece, the mentalist speculates on various factors that may have influenced the choice. Ultimately, the mentalist asserts foreknowledge of the grandmaster's choice and invites them to pick another piece. The video concludes by revealing that, aside from the white bishop, all other pieces are seemingly affixed to the chessboard, making it seemingly impossible for the grandmaster to have chosen any other piece.

The card magic video was taken from the final round of a magic championship held on a local TV network. A spectator chooses freely a card (the five of hearts) and then the magician asks the spectator what they want the chosen card to do (e.g., end up on top of the deck, end up at the bottom, transform a random card into the chosen card, etc.). The spectator requests that the card ends up in the middle of the deck. The magician performs a riffle shuffle with half of the cards facing up and half facing down, demonstrating that the cards are mixed with some facing up and some facing down. Then, the magician hands the deck to the spectator, asking him to utter a magic word. The magician takes back the deck, fans it, and all the cards are facing up except for one. The card facing down is revealed to be the five of hearts.

After watching the assigned video, participants were requested to select one of two explanations that were compatible with each video: a feasible explanation (based on a physical mechanism) and an unfeasible explanation (based on psychological skills). In particular, they read: Assuming what you witnessed occurred without cinematic tricks, and the spectator is not an accomplice, how do you explain the effect you just observed? Two possible answers followed: i) it can be explained in terms of a physical mechanism (magnets, adhesives, manual manipulation skills); ii) it can

be explained in terms of advanced psychological manipulation abilities over the spectator's choices (through gazes, gestures, movements). Incomplete questionnaire or with unclear responses were excluded (n = 8).

Results

With regard to the psychology students' group, 118 out of 207 participants that watched the card magic video explained the effect with the unfeasible procedure (57%). 183 (out of 201) students that evaluated the mental magic video appealed to the unfeasible explanation (91%). Thus, in both conditions most psychology students chose the advanced psychological manipulation-based explanation even if the proportion of this kind of account was statistically higher in the mental magic condition, $\chi^2 = (1, N = 408) = 61.07$, $p < .001$.

Regarding the students enrolled in technical majors, 45 out of 106 participants appealed to the unfeasible explanation (42%) in the card magic condition. On the contrary, a proportion of 75 out of 132 students chose the unfeasible explanation (57%) in the mental magic condition. The proportions of the two explanations were statistically different between conditions, $\chi^2 = (1, N = 238) = 4.85$, $p < .028$.

Discussion

Surprisingly, the tendency of explaining the mental magic trick in terms of advanced psychological skills was observed even if an actual, feasible explanation was provided to participants. This was observed not only in the psychology students' sample, but also in engineering and architecture students. However, the type of degree program has had an influence. The majority of psychology students chose the advanced psychological skills explanation in both videos, with a stronger tendency when observing the mental magic trick. Instead, most engineering and architecture students chose the feasible explanation when observing the card trick and the unfeasible explanation when observing the mental magic trick. A limitation of this experiment to consider for future research is the unequal sample sizes between the psychology student sample and the engineering/architecture student sample.

Experiment 2

In this experiment, we further explore how the way of presenting an effect that seems impossible (in terms of mentalism or classical, card-magic effect) influences the type of explanation. We compared these two different ways of presenting an apparently impossible effect taking into account also the kind of trick that is employed: a manipulation trick (that requires explicit sleight of hand skills and involves the direct manipulation) vs. an automatic trick (the effect works on its own automatically and does not require direct manipulations by the magician). We expect that the mental magic presentation with an automatic trick should be more challenging to explain in feasible terms. Also, previous research (Gronchi & Zemla, 2021) has observed that the explanation given may be affected by the tendency to use analytical or intuitive thinking as defined by the dual process theory of thought, see Evans, 2006; Kahneman, 2011; Sloman, 1996). According to it, intuitive thinking is fast, relatively effortless, automatic, and associative whereas analytical thinking is slow, effortless, controlled and deliberative. We employed the manipulation suggested by Shenhav et al. (2012) to prompt thinking style. Following previous literature, we expected that intuitive thinking would be associated with a tendency to endorse the pseudo-explanation suggested by the magician whereas analytical thinking should be associated with a stronger tendency to explain the effect in feasible terms.

Methods

Participants 278 college students (61 male) enrolled in the Psychology major of the University of Florence with mean age was 22.2 (sd = 3.5), range 20-58 (4 of unknown age) participated to the research on voluntary basis.

Procedure Regarding the thinking style, following Shenav et al. (2012), we primed analytical or intuitive cognitive style using a writing exercise. Participants were tasked with recalling a life episode where they employed either intuition or analytical thinking to address a challenge, leading to a favorable outcome. Those in the intuitive condition were presented with the following prompt: *Please write a paragraph (approximately 8–10 sentences) describing a time your intuition/first instinct led you in the right direction and resulted in a good outcome.* Participants assigned to the analytical condition responded to a comparable prompt, focusing on a situation where they employed "*carefully reasoning through a situation*" (as opposed to intuition/first instinct). After the induction of either analytical or intuitive thinking style, participants watched one of four videos (each one with a particular combination of presentation and type of effect).

The four videos were the result of the combination of type of illusionism effect (manipulation vs automatic) and type of presentation (card magic vs mental magic). The manipulation effect required explicit sleight of hand skills and involved the direct manipulation of the cards. Specifically, the magician shuffled the deck, asked the spectator to choose a card (who observed the selected card), and then the spectator returned the card to the deck (while the magician rapidly moved each card from the right hand to the left hand). Subsequently, the magician spread all the cards face-up on the table and turned away. The spectator identified the chosen card, relocated it to another position in the deck, and then "closed" the deck. At this point, the magician turned back toward the spectator and finally revealed the name of the selected card. The automatic effect did not require the magician to touch the cards. The deck was placed on the table, and the spectator silently selected a number between 1 and 12. With the magician

facing away, the spectator then removed from the top of the deck an equivalent number of cards and placed them in her pocket. Upon turning back towards the spectator, the magician observed as the spectator took the deck again and arranged the first 12 cards (face up) in a clockwise manner, resembling the hours of a clock. The magician recorded on a blank sheet the initially chosen number by the spectator. In the finale, the magician's prediction, and the number of cards in the spectator's pocket matched. So, the critical difference between the two types of effect refers to the way the magical effect is accomplished: the manipulation effect requires sleight of hand to be executed whereas the automatic effect does not require sleight of hand and is based simply on the fact that the magician knows the order of the first 15 cards in advance (indeed, at the beginning the deck is never shuffled).

With regard to presentation, in the card magic scenario, there was a preliminary introduction where the magician explained how a simple deck, in the hands of a magician, can acquire magical properties (in the meantime he showed his sleight-of-hand abilities with cards). In both types of effects (manipulation and automatic), the performance was accompanied by a narrative from the magician based on the idea that cards were communicating to the magician either the position of the chosen card (manipulation effect) or the number of cards in the pocket (automatic effect). In the mental magic presentation, there was a preliminary introduction where the magician explains what mental magic is (i.e., reading the mind of people, influencing people behaviors, increase perceptive or memory abilities) without touching the deck. The effects were accompanied by mind-based comments such "visualize the numbers of the clock and choose an hour between 1 and 12" (instead of choosing a number between 1 and 12).

Thus, the following four videos were employed: Card magic presentation with Manipulation effect (shortened CM), Mental magic presentation with Manipulation effect (MM), Card magic presentation with Automatic effect (CA) and Mental magic presentation and Automatic effect (MA). Videos were recorded on a stage of a theatre and a professional magician performed the effect while a non-professional actress (who did not know the magical effects) participated as the volunteer spectator.

After watching the video, participants were asked to explain with an open-format question to explain the effect they just saw. Responses were classified based on whether they referred to a feasible or not feasible procedure. Mental-based explanations (e.g., "the magician influenced the choice of the card with his gestures/voice/eyes", "the magician was able to understand which card was chosen due to his ability in reading non-verbal behavior", "The magician was able to memorize the entire deck of cards with a glimpse thanks to psychological techniques") were considered unfeasible. Physical procedures could be feasible (e.g., "the magician knew the order of the deck", "the magician saw the card in a mirror") or not feasible (e.g., "The magicians understood the number on the basis of the sounds produced by the cards"). Two independent judges classified the responses in these two categories. Blank or "I do not know" responses were classified as "Other". In case of disagreement (less than 2%), a third judge was consulted. After removing the "Other" cases (6%), the remaining data were analyzed by means of a logistic regression.

Results

The proportions of feasible explanations across combinations of presentation/effect and conditions are reported in Figure 1. In the case of the CA video (n = 65) and CM video (n = 56), the majority of participants gave a feasible explanation independently from cognitive style. The opposite was observed in the MM video (n = 80). Finally, in the case of MA video (n = 77), most of the intuitive group participants gave an unfeasible explanation whereas most of the analytical group reported a feasible explanation. The only statistically significant difference was observed for the main effect of presentation (Card magic vs Mentalism), z = 2.13, p = .033.

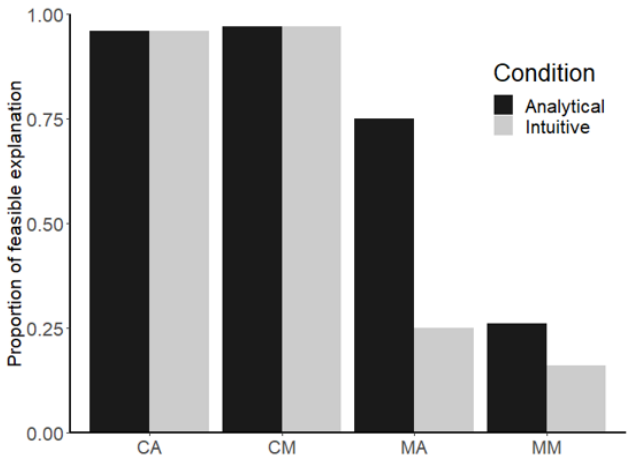


Figure 1: Proportions of feasible explanations across combinations of presentation/effect (CA, Card Magic Automatic; CM, Card Magic Manipulation; Mentalism Automatic; Mentalism Manipulation) and conditions (Analytical vs Intuitive).

Discussion

We observed that in the case of a card magic effect, independently from the kind of trick and the induced thinking style, the majority of participants gave a feasible explanation. In the case of the mental magic video, the manipulation effect prompted a majority of unfeasible explanations (based on advanced psychological skills), independently from the thinking style. The manipulation of the type of thinking played a role only in the mental magic effect with an automatic trick: in this case, intuitive thinking style was associated with a majority of unfeasible explanations (and analytical thinking with feasible explanations). Compared to

previous literature (who have investigated a single type of mental magic effect), these results suggest how the role of thinking style in inducing more feasible explanations depends on the kind of magical effect.
Also, our prediction that automatic trick should support the mental presentation compared to a manipulation trick was not observed. A potential confounding variable that may have affected this result is the general efficacy of the trick: we can hypothesize that the mental magic effect with manipulation was more believable (in mentalistic terms) per se than the mental magic trick with the automatic effect. Future research could systematically investigate this aspect keeping into account the limited sample size of this experiment relative to the independent variables considered.

Experiment 3

In this experiment we explored the different explanations given to physical and mental-based apparently impossible effects in relation to the context where such phenomena are observed. We compare a theater scenario (where it is likely to observe stage tricks) with a research lab scenario (where uncommon or strange phenomenon may be the result of cutting-edge research). We predict that physical-based apparently impossible phenomenon will be perceived as a trick in a theatrical context and as an actual phenomenon in a research lab. However, given the strong tendency to believe in the efficacy of advanced psychological skills (in general, but specifically in psychology students), we predict that mental-based apparently impossible effect will be perceived as a real phenomenon in both contexts.

Participants 236 college students (48 male) enrolled in the Psychology major of the University of Florence with mean age was 21.2 (sd = 4.1), range 18-51(1 of unknown age) participated to the research on voluntary basis.

Procedure Participants were randomly assigned to one of four written scenarios and were asked to explain the phenomenon described in the passage (the task was part of a larger experiment). The paragraph started with a specific context, either a Theater or a Research Lab. In the case of the Theater the text was: *Imagine going to see a magic show in a large theater. The show consists of a variety of different acts and effects. However, among them all, this particular act stands out to you*. In the case of the Research Lab, the paragraph recited: *Imagine visiting a major scientific research institute where a book written by an acquaintance of yours is being presented. During the break, you take a look around and pass by a laboratory where researchers are observing an experiment; one of them gestures for you to be quiet, inviting you to watch what is about to happen.*
After the introductive text, the description of an apparently impossible phenomenon followed, either a mental effect or a physical effect. In the case of the mental effect, the participant read: *A woman is sitting at a table, waiting. A man arrives, they introduce themselves, and the woman claims to have never seen him in her life. The man hands her a sheet of paper and a pen: the woman is asked to write a number from 1 to 100 of her choice on the paper and then fold it so that the writing is not visible. The man steps away, and the woman completes the task: she takes a few seconds to reflect, writes the number on the paper, and folds it. Once finished, the man returns and asks the woman to stand up, telling her that he will ask a series of questions to which she can answer either truthfully or falsely. While the man observes her closely (particularly focusing on her face and posture), he poses the following questions in order: 1) Did you take a train this week? The woman, with an indecipherable expression, answers YES. 2) Did you eat chocolate yesterday? The woman, hinting at a small smile, answers NO. 3) Does the number you thought of represent something to you, such as a date? The woman, attempting to control herself to maintain an indecipherable expression, says NO. 4) Is the number you thought of greater than 50?*
The woman, after a moment of hesitation, answers YES. 5) Is the number you thought of even? The woman, almost instantly, answers NO. After a few seconds of reflection, the man states that the number written on the sheet is 47. The woman smiles and, opening the sheet, confirms that she had indeed written the number 47.
In the case of the physical effect, the phenomenon was described as follows: *A man is sitting at a table on which a cube, seemingly made of metal, is placed. The man carefully observes the object, which, after a moment, begins to detach from the tabletop, lifting into the air without any physical support. The object reaches a height of about half a meter above the table surface, swaying slightly. Then, under the man's watchful gaze, it swiftly performs a crescent shape in the air, first to the right and then to the left. Finally, it comes to a stop again, suspended above the center of the table, and then descends, slowly, back onto the table surface.*

Responses were classified based two different criteria. The first was whether they referred to a feasible or not feasible procedure. For example, levitating the object through magnetic forces or using invisible wires have been considered feasible procedures. Employing the power of the mind or presumed quantum-mechanical effects has not. In the case of the scenario were the magician revealed the number written on a sheet, using an accomplice, or reading the number through a mirror has been considered plausible explanations; utilizing non-verbal cues, has been considered unfeasible explanation.
The second criterion was whether people believe that what the man was doing was truly what he did (Real effect) or if they believe that what the man was doing was different from what he showed (Trick). Two independent judges classified the responses in these two categories. Blank or “I do not know” responses were classified as “Other”. In case of disagreement (less than 1%), a third judge was consulted. After removing the “Other” cases, the remaining data were analyzed by means of a logistic regression.

Results

With regard to the feasibility criterion, in the case of a physical effect, a feasible explanation was given by 55 out of 59 participants who read the Theater scenario (1 classified as "Other") and by 44 out of 53 students who read the Research Lab scenario (5 classified as "Other"). On the contrary, in the case of the mental effect, a feasible explanation was reported by 9 out of 67 participants assigned to the Theater scenario (8 classified as "Other) and by 7 out of 57 participants who read the Research Lab context (4 "Other"). Only the effect type (physical vs. mental) factor was statistically significant, $z = 6.66$, $p < .001$.

According to the real/trick criterion, most participants believe that the effect was real in the Research Lab context with a physical effect (29 out of 53, 7 "Other") and with a mental effect (46 out of 57, 4 "Other") and in the Theater context with a mental effect (47 out of 67, 8 "Other"). Instead, the majority of participants interpreted the effect as a trick in the Theater scenario with a physical effect (57 out of 59, 1 "Other"). A statistically significant difference was observed for the effect type (physical vs. mental), $z = 5.11$, $p < .001$, the context (Theater vs. Research Lab), $z = 4.34$, $p < .001$., as well as their interaction, $z = 5.06$, $p < .001$.

Discussion

When observing a physical, apparently impossible effect such as levitation, participants were able to explain it in feasible terms in both contexts. However, as predicted, they perceived it as an actual effect in a research lab and as a trick when the context was a theater. Conversely, the mentalism effect was explained in unfeasible terms (recurring, again, to advanced psychological skills) and perceived as an actual effect, both in the theater and in the research lab scenario. This is further evidence of the difference between physical and mental-based apparently impossible events. The tendency to believe in the reality and effectiveness in behavior manipulation of advanced psychological abilities is so strong that it is not influenced by the context in which this type of effects is observed (differently from seemingly impossible events of a physical nature)

General Discussion

In three experiments, we showed that the tendency to explain mental magic effects in terms of advanced psychological skills is very strong. This holds true not only for psychology students, but also among students in technical degree programs such as engineering or architecture. One interpretation of this result in terms of the community of knowledge hypothesis (Sloman & Fernbach, 2017; Raab et al., 2019). Based on this perspective, individuals possess expertise in only a limited number of domains. Consequently, they delegate their conclusions, relying on others to decide which beliefs to support. In the case of illusionism, the narrative employed by magicians has been modified with changes in societal beliefs and technologies (Micheli, 2012). Before the half of the 19th century, there was not a distinction between (generic) illusionism effects and mentalism. During the Enlightenment and Positivism, the narrative employed by magicians offered a mix between illusionism and science: for example, the famous magician Pinetti (1750-1800) presented himself as a 'professor of mathematics and natural philosophy' aligning with the Enlightenment principles fashionable in the late 18th century. He always preferred to make the audience believe that his tricks had a physical and mechanical foundation. With the technological and educational changes of the 20th century, magician who specialize in mental magic began to distance themselves (at least publicly) from the community of illusionists, presenting themselves as mediums or psychics (until around 1980) and later as experts in advanced psychological techniques. This is due to the fact that the narrative based on paranormal powers, which could be accepted until the 1980s, has progressively become unbelievable in Western society (but see Lesaffre et al., 2021 for empirical evidence that shows how experiencing paranormal phenomena increases belief in supernatural explanations even nowadays). Simultaneously, the pseudo-explanation based on advanced psychological skills is something accepted, shared, and plausible in our society: just think of the widespread popularity of Neuro-linguistic programming courses (or similar) in the fields of marketing and sales or in training courses aimed at managers of large corporations. The proliferation of these practices in our community makes this type of explanation plausible and acceptable, regardless of its actual applicability. For the purpose of validating this interpretation, it is desirable to replicate these experiments in different cultural contexts (Eastern societies, South American societies or primitive societies) where knowledge communities have characteristics distinct from those in the Western world.

The three experiments have some limitations. The sample was composed only by college students (and the sample size in Experiment 2 should be increased to enhance the number of participants subjected to each experimental condition). Additionally, in each experiment, a single type of stimulus was employed for each experimental condition. It would be advisable to generalize the stimuli by considering, for example, other mentalism and card magic videos (Experiment 1), other videos featuring automatic effects and manipulations with cards or other objects (Experiment 2), and other scenarios involving different physical and mental effects (Experiment 3).

The study of how people explain apparently impossible phenomena and the factors influencing these explanations is still limited but can be very useful in understanding the spread of pseudo-scientific, paranormal, and, more generally, irrational beliefs (Lan et al., 2018; Lesaffre et al., 2018; Mohr & Kuhn, 2020). Understanding and mitigating these aspects has always been significant, but in the contemporary information society marked by the proliferation of opinions and ideas via social media, it takes on a pivotal role.

References

Evans, J. S. B. (2006). The heuristic-analytic theory of reasoning: Extension and evaluation. *Psychonomic Bulletin & Review, 13*(3), 378-395.

Gronchi, G., & Zemla, J. C. (2021). Cognitive style predicts how people explain mental magic tricks. *Acta Psychologica, 218*, 103347.

Kahneman, D. (2011). *Thinking, fast and slow*. London, UK: Macmillan.

Kuhn, G. (2019). *Experiencing the impossible: The science of magic*. Cambridge, MA: MIT Press.

Kuhn, G., Caffaratti, H. A., Teszka, R., & Rensink, R. A. (2014). A psychologically-based taxonomy of misdirection. *Frontiers in Psychology, 5*, 1392.

Lan, Y., Mohr, C., Hu, X., & Kuhn, G. (2018). Fake science: The impact of pseudo-psychological demonstrations on people's beliefs in psychological principles. *PLoS One, 13*(11), e0207629.

Lesaffre, L., Kuhn, G., Abu-Akel, A., Rochat, D., & Mohr, C. (2018). Magic Performances–When Explained in Psychic Terms by University Students. *Frontiers in Psychology, 9*, 2129.

Lesaffre, L., Kuhn, G., Jopp, D. S., Mantzouranis, G., Diouf, C. N., Rochat, D., & Mohr, C. (2021). Talking to the dead in the classroom: How a supposedly psychic event impacts beliefs and feelings. *Psychological Reports, 124*(6), 2427-2452.

Micheli, P. (2012). They lived by tricks.

Mohr, C., Lesaffre, L., & Kuhn, G. (2019). Magical potential: why magic performances should be used to explore the psychological factors contributing to human belief formation. *Integrative Psychological and Behavioral Science, 53*(1), 126-137.

Mohr, C., & Kuhn, G. (2020). How stage magic perpetuates magical beliefs. In Schlicht, L., Seemann, C., & Kassung, C. (Eds.), *Mind reading as a cultural practice*. London, UK: Palgrave Macmillan.

Rabb, N., Fernbach, P. M., & Sloman, S. A. (2019). Individual representation in a community of knowledge. *Trends in Cognitive Sciences, 23*(10), 891-902.

Shenhav, A., Rand, D. G., & Greene, J. D. (2012). Divine intuition: cognitive style influences belief in God. *Journal of Experimental Psychology: General, 141*(3), 423-428.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin, 119*(1), 3-22.

Sloman, S. A., & Fernbach, P. (2017). *The knowledge illusion: the myth of individual thought and the power of collective wisdom*. London, UK: Pan Macmillan.