Don't read this paper! Reverse psychology, contrast and position effects in a magician forcing technique.

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ABSTRACT

Reverse psychology is increasingly being used in marketing to enhance a brand's attractivity and product differentiation. Even though this concept is well known in popular culture, very little research has investigated its effectiveness in simple decision-making processes. We investigated a magician force – techniques that covertly influence the spectator's choice – to study how reverse psychology influences people's selection process. The Five Card Mental Force is thought to rely on reverse psychology instructions to lead the audience member to choose a specific card among four others that are presented in a horizontal line. In four experiments, we investigated the effectiveness of reverse psychology instructions, position and contrast effects on participants' choice. Our results suggest that reverse psychology significantly influences participants' choices toward the force card, but that the position of the cards did not have a significant impact. Moreover, contrary to what the magic literature suggests, using contrasting effects did not enhance the likelihood of participants selecting the force card.

KEYWORDS

Magic, psychology, forcing, free will, attention, volition

"Don't buy this jacket". This is what Patagonia's campaign displayed on their advertisement in the run-up to Christmas 2011. Despite this counterintuitive strategy, the company saw its revenues grow by nearly 30% in the following year. In order to attract customers' attention and differentiate themselves from their competitors, firms need innovative marketing approaches. Lately, these strategies have deployed rather atypical measures, such as telling customers to distrust advertising (Krix, 2007) and building shops without signs (e.g. Hollister) or shuttered-down store windows (e.g. Abercrombie & Fitch). These tactics are commonly referred to as "reverse psychology marketing" (Cook, 2010; I. Sinha & Foscht, 2007), and they are now frequently used to enhance product differentiation. There are even "secret brands", where companies do not advertise or overtly label their products. Even though the concept of reverse psychology is well known in popular culture, very few researchers have investigated its effectiveness or the cognitive mechanisms that underpin it.

Magicians, like good salesmen, are masters at influencing our decisions, and have been known to use reverse psychology to influence their spectators' choices (Pailhès, Rensink, et al., 2020). For centuries, magicians have developed techniques called *forcing*, or simply forces, to influence people's choices of such things as cards, words, or numbers (Annemann, 1933; Banachek, 2002b; Turner, 2015). Conjurers' and marketing companies share a common goal – manipulating decisions. However, there is a crucial difference between the two approaches: marketing campaigns' have explicit goals, whilst magicians use their tactics covertly. Indeed, as we have argued elsewhere (Pailhès & Kuhn, 2020c), a successful forcing technique is one for which the spectator's choice is affected and in which the person is not aware that the magician influenced a particular outcome. A large number of forcing techniques exist, and several of them have recently been scientifically investigated. As we have argued elsewhere (Pailhès, Rensink & Kuhn; 2020), two main type of forcing can be distinguished: *Outcome* forces are techniques in which the spectator has, and makes a genuinely free decision, but unknown to them, this decision has no impact on the outcome of the trick. Here, a key principle is that the spectator does not understand that their choice cannot affect the outcome of the procedure. For instance, the Equivoque technique is based on participants' ambiguity blindness – the failure to recognize ambiguous situations (Pailhès, Kumari, et al., 2020). The second category, closer to what advertising campaigns and marketing strategies do, are known as *Decision* forces. These techniques rely on the magician directly manipulating the person's decisions - for example, the magician increases the likelihood that a particular card will be selected by making it more visually salient (Olson et al., 2015; Shalom et al.,

2013a), physically accessible (Kuhn et al., 2020; Pailhès & Kuhn, 2020b), or even using unconscious priming techniques such as through subtle iconic gestures (Pailhès & Kuhn, 2020a). As it has been argued by others (Cole, 2021), magicians often state that psychology is used in a magic performance when it is not, and the majority of forcing techniques do not rely on subtle psychological influences (i.e. Decision forces), but rather on sleights of hand and other magic principles (i.e. Outcome forces). However, Decision forces are frequently incorporated within a magic performance, and we believe that there is great value in studying these principles scientifically (Pailhès & Kuhn, 2021).

THE FIVE CARD MENTAL FORCE

The present paper investigates a Decision force known as the *Five card mental force* (Hugard, 1974). Created by Dai Vernon, this technique uses what amounts to reverse psychology. It consists of spreading five specific cards on a table and asking the spectator to select one of them: the King of Hearts, seven of Clubs, Ace of Diamonds, four of Hearts and nine of Diamonds, presented from left to right (see Figure 1). These cards are chosen to make some of them less appealing than the others. Moreover, the magician uses reverse psychology instructions to bias the decision process toward the desired foce card: the spectator is implicitly encouraged to choose the "least obvious" card. The magic literature reports that these instructions will result in most people selecting the four of Hearts, followed by the nine of Diamonds (Banachek, 2002b; Hugard, 1974).

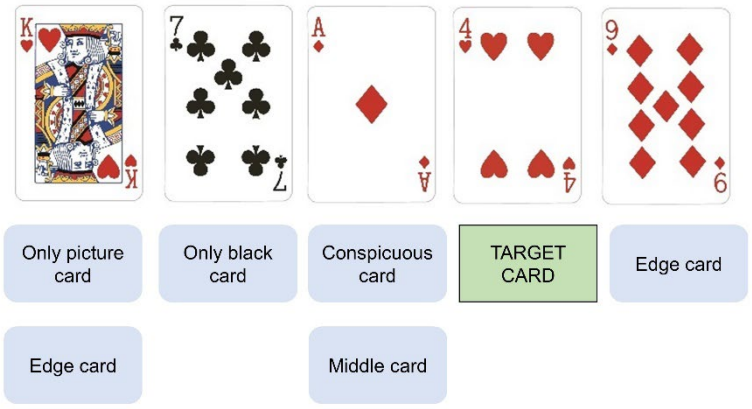

Figure 1. *The five cards used in the Five card mental force, presented in the present order to the spectator. The target card is the four of Hearts, considered the 'least obvious' card among the others, and placed in the 4th position, the most likely chosen among five cards presented in a row.*

In the original version (Hugard, 1974), Vernon suggests that the magician should stress that the spectator has to make an unrestricted choice and must not think that the magician influenced them in any way. Likewise, Banachek's version asks the spectator to mentally choose a card without letting the magician influence them, and he emphasises that the spectator must have a completely free choice and feel that they were not influenced by the performer at all (Banachek, 2002b). Finally, in Robert Nelson's book Still More Miracles in Mentalism (Nelson, 1961), Dick Johnson explains that for the force to be successful, the magician has to get the audience to "reason negatively". Nelson suggests that the performer must encourage the audience to try to outwit them, feel they are free to make their own choice and not to allow the magician to influence their thinking. Additionally, the original script draws the spectator's attention towards two cards: the conjurer points out that the Ace is placed in the middle of the row and that the seven of Clubs is the only black card of the spread. The magic literature suggests that doing so eliminates these two cards by making them more salient and pushing the spectator to feel suspicious about them (Banachek, 2002b; Hugard, 1974; Nelson, 1961). Moreover, it is argued that the King of Hearts is not chosen because it is too conspicuous as it is the only picture card and that the nine of Diamonds will not be chosen because it is at the end of the row and its physical location prevents it from being chosen (Banachek, 2002b).

REVERSE PSYCHOLOGY, CONTRAST AND POSITION EFFECTS

Three psychological mechanisms therefore seem to be involved in the success of this force. Firstly, reverse psychology is used to misrepresents the magician's desires. Secondly some cards are made more salient than others to make them more suspicious. Thirdly strategic physical positioning is used so that the target card is placed in a position that should enhance the likelihood of it being selected.

Reverse psychology, also known as Strategic self-anticonformity (MacDonald, Nail, & Harper, 2011), appears to be the most important influence here. As a compliance technique, SSA has been adapted from the diamond model of social response (Nail et al., 2013; Nail & Sznajd-Weron, 2016) and has been shown to influence decisions in the real-world as well as the laboratory (Cialdini, 2001; MacDonald et al., 2011). For instance, it has been shown that most participants are able to describe a case of SSA from their own experience – that is, saying the opposite of their true position in the hope of gaining compliance (MacDonald et al., 2011). Indeed, SSA involves the idea that the requester's initial position is the opposite of their true one. For instance,

Patagonia's "Don't buy this jacket" advertisement misrepresents the companies' true desires. This strategy is thought to be related to two psychological concept (J. I. Sinha & Foscht, 2016) – reactance and contrast (J. W. Brehm, 1966). We believe that this also applies to the Five card mental force. The concept of reactance is the psychological process which occurs when one's freedom is perceived as threatened, and one acts to re-establish this freedom (J. W. Brehm, 1966; S. S. Brehm & Brehm, 1981; Steindl, Jonas, Sittenthaler, Traut-Mattausch, & Greenberg, 2015; Torrance & Brehm, 1968). This can happen, for instance, when a consumer feels pressurised to buy a product because of high-pressure sales tactics. In this case, the consumer tends to try to restore their freedom of choice by displaying actions that actively contrast with the salesman's desired behaviour. In the Five card mental force, this behaviour is directly incited by the magician's script, emphasising that the spectator must have a free choice and not let the magician influence them. The spectator is incited to restore their freedom of choice, thereby falling into the trap of selecting the 'most odd' and 'least obvious' card.

The second psychological process involved in this force is contrast – making some cards more salient than others. Contrasting advertising aims to attract a consumer's attention and interest which should entice them to buy the product (Cook, 2010; J. I. Sinha & Foscht, 2016). Reverse psychology provides an effective marketing strategy to pique the consumer's attention. Likewise, in the Five card mental force, the cards are chosen to provide this kind of contrasting effect: the King of Hearts is the only picture card, the seven is the only black card and the Ace is considered too conspicuous, next to the four of Hearts which therefore appears as less 'salient'. Moreover, the force's script emphasises that the Ace is in the middle of the spread and the unique colour of the seven, making them even more suspicious to the spectator's eyes (Banachek, 2002b; Hugard, 1974).

Finally, Banachek (2002) mentions that the four of Hearts is also more likely to be chosen than the nine of Diamonds as it is positioned as fourth from the left of the spectator (see Experiment 2 for more details). Indeed, both the psychology and magic literature show that the physical position of items can influence people's decisions. The magic literature argues that when presented with four (Hugard, 1974) or five cards (Banachek, 2002b) in an horizontal row, people tend to choose the second card from their right. In the Position Force technique (Kuhn et al., 2020; Pailhès & Kuhn, 2020b), people's choice for random objects is influenced by the object's physical position – the target object being third from their left in a spread of four cards. Moreover, empirical research shows that there is a general bias towards items located in the middle

positions rather than at the edges. Indeed, we observe an edge aversion when people are asked to choose from different objects such as highlighters or paper rolls from a stall (Bar-Hillel, 2015b; Chae & Hoegg, 2013; Missbach & König, 2016).

An online survey of 34 magicians revealed that the Five card mental force is a well-known technique in the field (76.5% reported knowing the technique before the survey), although not often used (20.6% reported having performed it). The magic literature reports high success rates, as Vernon describes that "it is almost inevitably the four of Hearts" (Hugard, 1974) is chosen. Johnson declares that half or more of a group will choose it (Nelson, 1961), and Banachek wrote that the spectator will "more than likely" end up with the target card (Banachek, 2002b). However, to the best of our knowledge, the technique has not been empirically investigated. The present paper sought to investigate the success rate of the force, as well as the main psychological mechanisms underpinning its efficiency. Experiment 1 focuses on the necessity of using reverse psychology instructions. Experiments 2 and 3 investigates position effects on participants' choice of card, and further investigate the effect of reverse psychology (Experiment 3). Our last experiment examined whether the contrasting effect produced by emphasising two of the cards influenced people's selection.

EXPERIMENT 1

The first experiment aimed to investigate whether reverse psychology had a significant impact on participants' choice of card. Based on the magic literature, we hypothesised that the four of Hearts would be the most frequently chosen card in a reverse psychology context only, followed by the nine of Diamonds. We also predicted that the four of Hearts would be chosen significantly more often in a reverse psychology context than in a simple choice one. One of the key components of a successful force is that participants feel free about their choice even when the choice was manipulated. We therefore expected no difference in participants' feelings of freedom and its components when reverse psychology instructions were used.

Our online survey asked magicians how many people out of 100 would choose the four of Hearts in the two different experimental conditions. Magicians expected spectators to choose the card more often with reverse psychology instructions (M=54.9, SD=20.9) than without them (M=43.5, SD=18.4, t(33) =2.94, p=.006, d=.503).

METHODS

Participants

132 participants (111 female) between 18 and 60 years old (M=31, SD=10.9), who were all recruited via social media, took part in the experiment. Goldsmiths Psychology Department provided ethical approval for all of the experiments.

The sample size was calculated thanks to a power analysis for a Chi-squared test with w=.25, α=.05, df=1 and a power of .80. We based our estimation of the effect size on the magic literature and expecting for a medium effect of the reverse psychology instructions. The output of the calculation was 126 participants.

Procedure

The survey was implemented online via Qualtrics and the link was shared on social media. After reading the information page and General Data Protection Regulations, participants confirmed they accepted to take part in the study and signed the consent form. Then, we displayed the five Vernon cards in a row and randomly attributed each participant to one of two experimental conditions: Simple choice or Reverse psychology. In the Simple choice condition, participants were told that the cards were randomly chosen and to simply choose one of them. In the Reverse psychology condition, they were told that the cards had been carefully selected with the intention of influencing their choice and they were asked to try to catch us out. We emphasized that they had to make a free choice. This script used reverse psychology by misrepresenting our true desire in order to fool participants. After choosing one of the five cards, participants had to state how impulsive/deliberate they felt about their choice, how much control they felt they had over their choice, how restricted they felt about their choice and how free they felt on scales from 0 to 100. We took these measures as one of the components of a good forcing technique is to provide the spectator a strong sense of freedom of choice even though they were influenced by the conjurer (Pailhès, Rensink, et al., 2020). These measures were based on Thompson's definition of freedom (Thompson et al., 1990). Finally gender and age were asked before the debriefing page was displayed.

Results and Discussion

First, we looked at participants' choice of card (see figure 2a). Overall, the four of Hearts was the most frequently chosen card (26.5%), followed by the Ace of Diamonds (23.5%), the seven of Clubs (19.7%) and finally the nine of Diamonds and King of Hearts (both 15.2%). These results suggest that regardless of the

script, the four of Hearts is a commonly chosen card. A study on commonly chosen playing cards showed that the Ace of Diamonds and the King of Hearts are commonly chosen when participants are asked to name any card out of the 52 (6th most commonly chosen, (Olson, Amlani, & Rensink, 2012). The four of Hearts, nine of Diamonds and seven of Clubs are not common choices. Our results suggest that the context in which we presented the cards and the framing influenced participants' choice.

Looking at the effect of the instructions on participants' choice (Figure 2b), in the Simple choice condition the most frequently chosen card was the Ace of Diamonds (33.3%) followed by the seven of Clubs and four of Hearts (each 21.2%). In the Reverse psychology condition, the four of Hearts was the most chosen card (31.8%), followed by the nine of Diamonds (25.8%). This confirms our prediction - the four of Hearts was the most frequently chosen card only when the reverse psychology instructions were used and this was indeed followed by the nine of Diamonds.

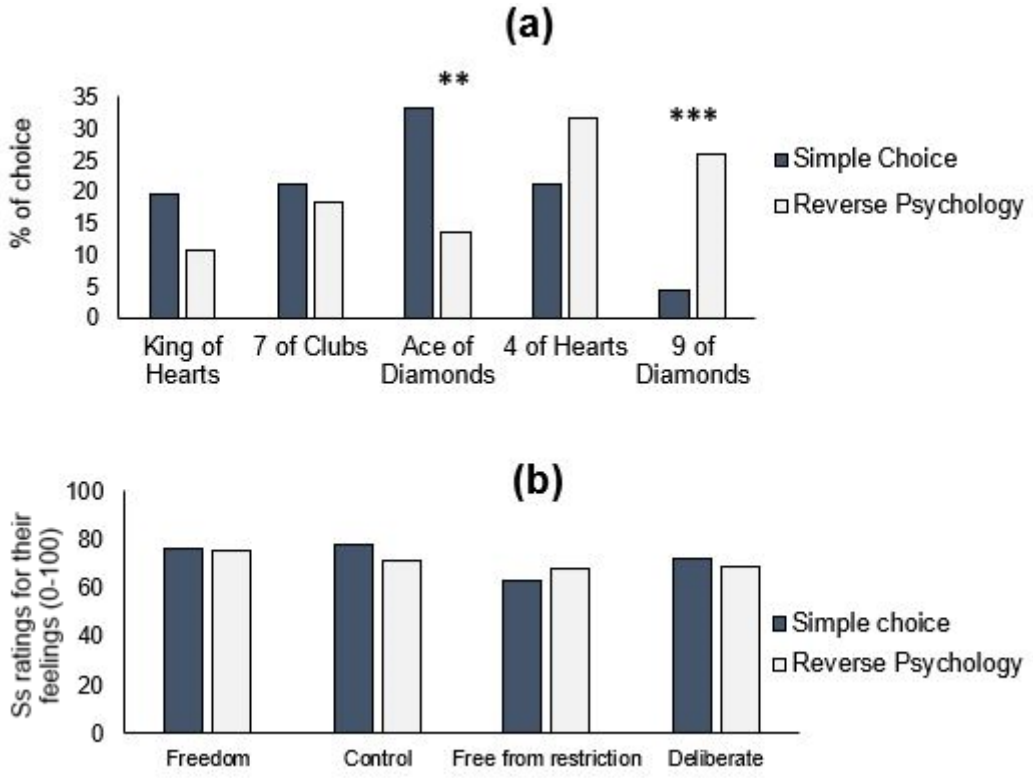

Figure 2 . *In a) Effect of the type of instructions on participants' card choices and in b) on their feelings of freedom over their choice.*

A Chi-squared[1] test showed that the instructions had a significant effect on the distributions of participants' choices (X^2 (4, N=132) 18.6, p<.001, φ =.351). Participants chose the nine of Diamonds significantly more often in the Reverse Psychology condition than in the Simple Choice one (X^2 (1, N=132) 11.5, p<.001, φ=.284). On the contrary, the Ace of Diamonds was chosen significantly less often in the Reverse Psychology condition than in the Simple Choice one (X^2 (1, N=132) 7.13, p=.008, φ =.226). However, the results were not significantly different for the seven of Clubs (X^2 (1, N=132) 0.19, p=.662, φ =.038), the four of Hearts (X^2 (1, N=132) 1.91, p=.168, φ =.119) and the King of Hearts (X^2 (1, N=132) 2.12, p=.145, φ =.126). This suggests that, contrary to what we predicted, using reverse psychology did not significantly influenced participants to choose the four of Hearts more often, even though the descriptive results lean in the expected direction. This might be due to a lack of power, as we did not have prior empirical data to base our sample calculation on a 'real' effect size. However, a relatively large proportion of the participants chose the four of Hearts, and the Reverse Psychology instructions increased participants' choice of the nine of Diamonds and decreased their choice of the Ace of Diamonds. It is therefore possible that magicians wrongly attributed spectators' common choice of the four of Hearts to the script used, and overestimate the probability of a spectator choosing it. Indeed, comparing our results to the online survey, we observe that participants chose the four of Hearts less often (31%) than what magicians predicted (55%). Nevertheless, their intuition that the script would make the nine of Diamonds the second most commonly chosen card seems accurate. It is also important to point out that a performer might have different – and maybe higher – success rate with a live performance rather than our experimental online survey.

Next, we analysed participants' feelings of freedom for their choice. Overall, participants felt free (M=75.5), in control (M=74.6), free from restrictions (M=65.6) and that their choice was deliberate rather than impulsive (M=70.4). Participants did not report feeling any significantly different degree of freedom (W=2166, p=.802, rrb=.025), control (W= 2450, p=.105, rrb=.160), restriction (W=1996, p=.583, rrb=-.055) or deliberation (W= 2315, p=.345, rrb=.096) over their choice of cards in the two experimental conditions. Likewise, whether participants chose the four of Hearts or another card did not affect their sense of freedom (W= 1536, p=.495, rrb=-.076), control (W= 1643 p=.916, rrb=-.012), restriction (W= 1577, p=.648, rrb=-.052) or deliberation for their choice (W=1825, p=.394, rrb=.097). As predicted, these results suggest that using reverse

[1] A chi-squared test is a statistical test used to examine whether two categorical variables are independent in influencing the values within the table.

psychology instructions to influence participants' choice does not taint how free they feel about their choice. Using this type of instructions therefore seems efficient to covertly bias people's choices.

This first experiment suggests that the four of Hearts is a common choice among the Five card force, regardless of whether reverse psychology is used or not. However, the reverse psychology instructions do have an impact on participants' choices of the nine and the Ace of Diamonds, while leaving participants feel free for their choice. Our second experiment investigated a second psychological mechanism that seems involved: position effect of the card.

EXPERIMENT 2

The second experiment aimed to investigate another possible mechanism that could explain why the four of Hearts was the most frequently chosen card. As we mentioned in the introduction, the physical positioning influences peoples' choices, and both magicians (Banachek, 2002b; Binet, 1894) and consumer psychologists (Bucher et al., 2016; Chae & Hoegg, 2013; Dayan & Bar-Hillel, 2011; Kim et al., 2019) at times rely on manipulating an object's location to influence people's selection. Results from our online survey show that under the current experimental circumstances magicians expect spectators to choose the target card significantly more often when it is placed 4th in the row (M=58.29, SD= 21.35) than when it is 5th in the row (M=38.62, SD=20.11, t(33) = -5.71, p<.001). The results from experiment 1 suggests that spectators' selection might follow an edge aversion (the 1st and last card of the row being the less selected ones), and we therefore hypothesised that the physical position of the cards can play a role in the efficiency of the technique.

We predicted that the four of Hearts would be the most frequently chosen card only when it is presented in the fourth position from participants' left (middle condition), but not when it is presented as the fifth card from their left (edge position).

METHODS

Participants

101 participants (74 female) between 18 and 60 years old (M=27, SD=7.73) recruited via social media took part in the experimenter. The sample size was calculated thanks to a power analysis for a Chi-squared test with w=.28, α=.05, df=1 and a power of .80. We based our estimation of the effect size on results from our previous research investigating position effects on participants' choice of card (Pailhès & Kuhn, 2020b). The output was 101 participants.

Procedure

The procedure was the same as in Experiment 1, except for two points. First, we used the Reverse Psychology instructions for all of our participants. Second, we had two experimental conditions that manipulated the physical location of the target card: a middle condition and an edge condition. In the middle condition, the four of Hearts was placed in the fourth position in the row from the left, and the nine of Diamonds in fifth (see figure 3). In the edge condition, this order was inverted and the nine of Diamonds was placed in the fourth place in the row from the left, with the four of Hearts at the end of the row in fifth position. We chose to put the 9 of Diamonds on the right end to avoid any bias linked to the side of the card (left vs right) rather than to its 'centeredness'. The same measures of feelings of freedom, restriction, deliberation and control as in experiment 1 were taken after participants chose their card.

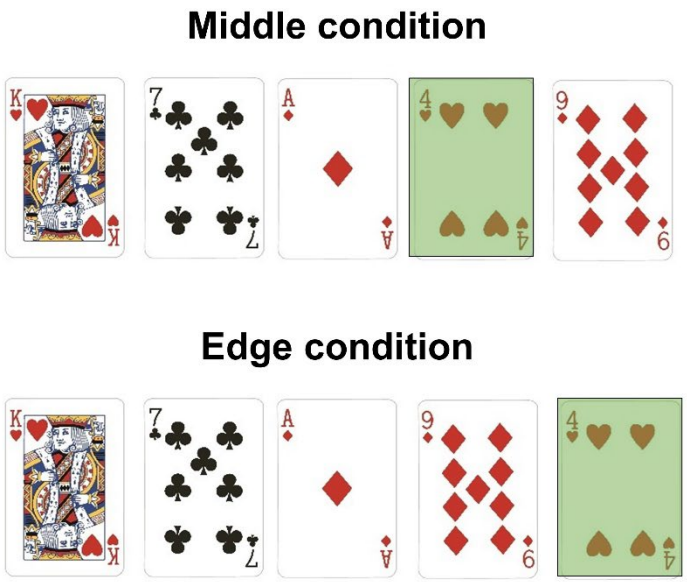

Figure 3. *Experimental conditions in which the target card highlighted in green here – the four of Hearts – is either in the middle position (4th from the participants' left) or in the edge of the spread (5th from their left).*

Results and Discussion

First, we looked at participants' choice of card (see figure 4). Overall, the four of Hearts was the most frequently chosen card (32.7%), followed by the nine of Diamonds (30.7%). We replicate results from experiment 1, confirming magicians' knowledge about the most commonly chosen cards with reverse psychology instructions. Looking at participants' feelings of freedom, overall, participants felt free (*M*=72.7), in control (*M*=72.4), free from restrictions (*M*=60.4) and that their choice was deliberate (*M*=67.6).

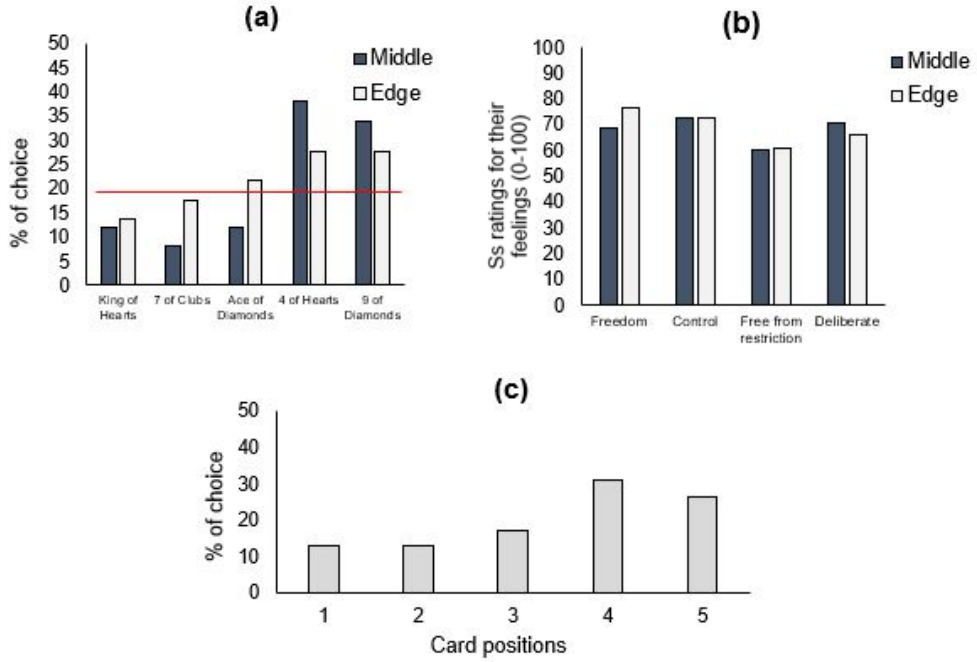

Figure 4. *In (a) Position effect on participants' card choices. Middle position refers to when the four of Hearts was fourth form the participants' left, and the nine of Diamonds was fifth. Edge position refers to when this order was inversed. (b) displays the position effect on participants' feelings of freedom and (c) illustrate participants' overall choices of the cards based on their position in the spread.*

Looking at the position of the cards, (figure 4c) as predicted, regardless of its value, the fourth card in the row was the most commonly chosen card (31%), followed by the fifth one (26%). Then came the third card in the row (17%), and finally the second and first ones (each 13%).

Next, we analysed the effect of the cards' position on participants' choices (figure 4a). When the 4 of Hearts was in the middle position, it was the most chosen card (38%), followed by the 9 of Diamonds (34%). However, when the 4 of Hearts was in the edge position, both the 9 of Diamonds and 4 of Hearts arrived first (27.5%). Although the trend was in the predicted direction, participants did not choose the four of Hearts significantly more often when it was in the middle position than in the edge one (X^2 (1, N=101) 1.28, p=.258, φ=.112). Likewise, the 9 of Diamonds was not chosen more often when it was placed in fourth position (X^2 (1, N=101) 0.509, p=476, φ=.071).

We finally analysed participants' feelings of freedom for their choice. Participants did not report feeling any significantly different degree of freedom

(*W*=1077, *p*=.133, *rrb*=-.172), control (*W*=1326, *p*=.868, *rr*b=.019), restriction (*W*=1307, *p*=.833, *rrb*=-.025) or deliberation (*W*=1238, *p*=.934, *rrb*=-.010) over their choice of cards in the two experimental conditions. Likewise, whether participants chose the four of Hearts or another card did not affect their sense of freedom (*W*=1204, *p*=.261, *rrb*=.140), control (*W*=1060 *p*=.979, *rrb*=-.004), restriction (*W*=1030, *p*=.939, *rrb*=--.010) or deliberation for their choice (*W*= 1095, *p*=.583, *rrb*=069).

This experiment replicates the results from experiment one and confirms that when we use reverse psychology instructions, the most commonly chosen card is the four of Hearts, followed by the nine of Diamonds. Moreover, as predicted, regardless of the value of the target card, participants showed a bias towards the fourth card in the row, which was the most frequently chosen one. These results dovetail magicians' intuitions as well as the psychological literature on position effects. However, changing the position of the target card did not significantly impact participants' choice. Previous investigations of the Position force showed that 60% of participants chose the target card – this time the third one in a row of four. There are several reasons why our results may differ from the previous findings. First of all, the present study was conducted online rather than face to face. The reachability bias is likely to have an impact on the position effects, and since participants were merely asked to mentally select a card, its impact may be reduced. Secondly, in the current experiment, participants were explicitly asked to choose one of the cards, rather than physically touching one of them (or in this specific case, what could have been asked as simply clicking on). Previous results have shown that explicitly stating that participants are making a decision (i.e. "choose a card" rather than "touch a card") has a significant impact on participants' choice. Indeed, in this case, the percentage of people choosing the most reachable card dropped from 60 to 35% - a result close to what we observe here in the Five card mental force. Thirdly, in the previous studies, the cards were presented face down, and thus the choice would have seemed more arbitrary than when participants are asked to deliberate about the different face up cards. It seems that the four of Hearts is commonly chosen regardless of its position (i.e. being in the middle or edge of the row).

EXPERIMENT 3

For the third experiment, we aimed to (1) replicate findings from Experiment 1 on the effect of reverse psychology instructions by using a bigger sample, and to further investigate the position effects. In Experiment 2, results on position effects trended in the expected direction but were not statistically significant: the target card was chosen more often when placed in the middle position

rather than on the edge. As participants seemed to exhibit a right bias in their choice (57% of participants choosing the two cards of the end of the row), we aimed to investigate a possible right-side bias in choosing the card from the five presented.

Indeed, previous research shows that when objects are horizontally aligned, people show either middle or right-position bias (Bar-Hillel, 2015a; Christenfeld, 1995a; Nakakima et al., 2016; Nisbett & Wilson, 1977). For instance, Nisbett and Wilson's classic stocking experiment (1977) showed a strong right-side bias in choosing one of four pairs of identical stockings. The percentages of choices made by participant were 12%, 17%, 31% and 40% from the leftmost to rightmost stocking. Similar right-side biases were observed in choosing different objects and items presented horizontally (Karev, 2000; Nakakima et al., 2016; Weyers et al., 2006).

We expected participants to choose the four of Hearts significantly more often when the cards were presented with reverse psychology instructions than without. Moreover, based on findings from Experiment 2 and results from previous studies, we hypothesized that participants would demonstrate a right-side bias. We expected them to choose the four of Hearts significantly more often when presented in the fourth position from the left rather than in the first position.

METHODS

Participants

340 participants (177 female) between 18 and 60 years old (M=24, SD=10.5), who were recruited via the Goldsmiths participant scheme and Prolific, took part in the experiment. The sample size was calculated thanks to a power analysis for a Chi-squared test with w=.16, α=.05, df=1 and a power of .80. We based our estimation of the effect size on our previous results and expecting for a stronger effect size of the right-side bias than the middle position one. The output of the calculation was 307 participants.

Procedure

The procedure was the same as in previous experiments, except that this time, we used a 2x2 factorial design. The first variable we manipulated, as in Experiment 1, was the use of reverse psychology instructions. The same instructions were used, either presenting the cards as a simple decision-making task, or asking participants to catch us out and take the card they thought we did not predict them to take. The second variable, as in Experiment 2, was the

placement of the target card, the four of Hearts. This time, as we were investigating a possible right-side bias, the card was either in first (left position condition), or fourth position (right position condition) from the left of the row (see Figure 5)

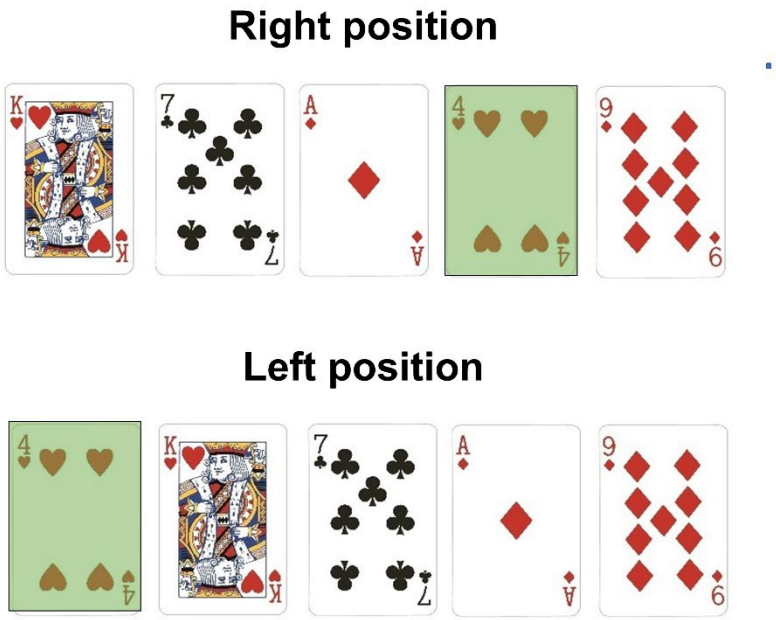

Figure 5. *Experimental conditions in which the target card highlighted in green here – the four of Hearts – is either in the right position (4th from the participants' left) or in the left position (1th from their left).*

Results and Discussion

First, looking at participants' choice of card, overall the four of Hearts was the most frequently chosen card (26.9%), followed by the Ace of Diamonds (24.5%), the nine of Diamonds (18.4%), the King of Hearts (18.7%) and the 7 of Clubs (11.5%).

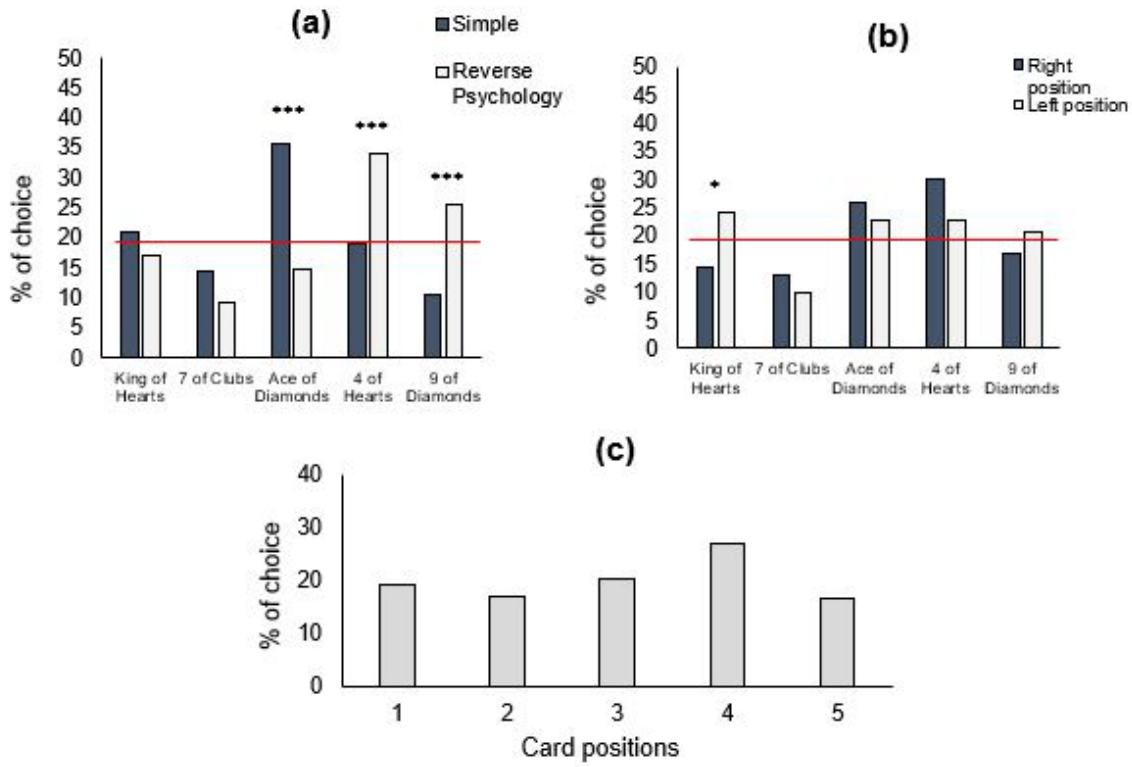

Figure 6. *In (a) Instruction effects on participants' card choices. (b) Position effects on card choices and (c) displays participants' overall choices of the cards based on their position in the spread.*

We firstly examined the effect of the instructions on participants' choice (figure 6a). In the Simple choice condition, the most the most frequently chosen card was the Ace of Diamonds (35.7%) followed by the King of Hearts (20.8%). In the Reverse psychology condition, the 4 of Hearts was the most chosen card (33.9%), followed by the nine of Diamonds (25.4%).

A Chi-squared test showed that the instructions had a significant effect on the distributions of participants' choices (X^2 (4, N=340) 34.6, p<.001, V=.323). As we expected, participants chose the four of Hearts significantly more often in the Reverse Psychology condition than in the Simple Choice one (X^2 (1, N=340) 10.14, p=.001, φ=.170). The same pattern occurred for the nine of Diamonds (X^2 (1, N=340) 12.95, p<.001, φ=.192). On the contrary, the Ace of Diamonds was chosen significantly less often in the Reverse Psychology condition than in the Simple Choice one (X^2 (1, N=340) 18.5, p<.001, φ =.227). However, the results were not significantly different for the seven of Clubs (X^2 (1, N=340) 2.02, p=.156, φ =.077) and the King of Hearts (X^2 (1, N=340) 0.63, p=.427, φ =.043). This replicates the results from our first experiment and confirms our prediction regarding the four of Hearts.

Next, we analysed the effect of the cards' position on participants' choices (figure 3a). Looking at the position of the cards, (figure 6c) as in Experiment 2, regardless of its value, the fourth card in the row was the most commonly chosen card (27%). It was followed by the third one (20.2%), then came the first card in the row (19.2%), and finally the second and fifth ones (16.9% and 16.6%). When the four of Hearts was in the right position, it was the most frequently chosen card (30.1%), followed by the Ace of Diamonds (25.8%). Participants chose the King of Hearts significantly more often in the left position than in the right (X^2 (1, N=340) 4.91, p=.027, φ=.119), that is, when the King was in second rather than first position (see figure 6). However, the position of the cards did not significantly impact the four of Hearts (X^2 (1, N=340) 2.228, p=.136, φ=.081), or any other card. This can be explained by the fact that, besides the four of Hearts, the King was the only card which switched position between and edge of the row and a middle position. The literature on position biases has repeatedly revealed edge aversion effects in different contexts (see Bar-Hillel 2015 for review), which explains this result.

Finally, we looked at participants' feelings of freedom for their choice. Overall, participants felt free (M=77.5), in control (M=78.9), free from restrictions (M=67.1) and that their choice was deliberate (M=62.3). Contrary to Experiment 1, participants reported significantly different feelings of freedom (W=10752, p<.001, rrb=-.244), control (W=11241, p<.001, rrb=.203) and restriction (W=11181, p=.001, rrb=-.205) over their choice. Participants felt freer, more in control and less restricted in their decision with simple instructions than with reverse psychology ones (see figure 7). As we did not find these differences in our first experiment, we suggest that our larger sample size allowed us to detect effects that were too small to observe during our first experiment. Finally, participants did not report significantly different feelings of deliberation for their choice (W=15099, p=.332, rrb=-.061).

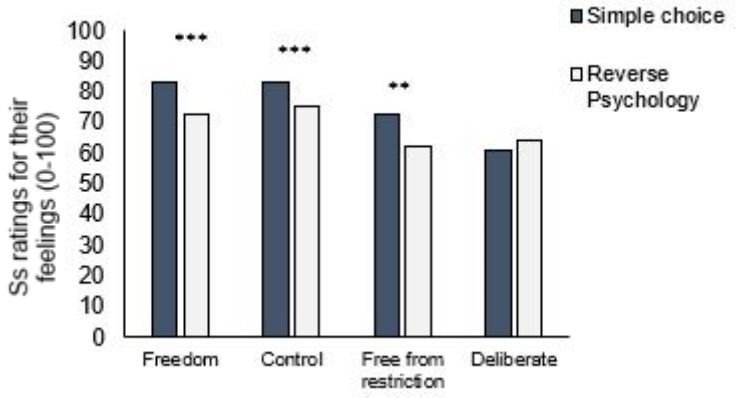

Figure 7. *Effect of the instructions on participants' feelings of freedom, control, restriction and deliberate over their choice.*

This third experiment replicates findings from the first two studies, showing that the four of Hearts is the most commonly chosen card among the cards of Vernon's force. Moreover, we replicated results with regards to the reverse psychology, showing that such instructions impact participants' decision-making process. As predicted, we show that the four of Hearts was significantly and positively impacted by the reverse psychology instructions. However, contrary to our predictions, the target card did not seem to be impacted by its position among the four other cards. Following Experiment 2, which showed no significant middle bias on the four of Hearts, this experiment suggests that a right-side bias does not impact participants' choice toward this card either. However, it is important to note that unlike all of the other studies, the current experiment was run online, and participants were not required to physically touch the card. We can therefore conclude that contrary to our, and magicians' predictions, the position of the cards is not a factor impacting the success of the Five card mental force. Our next experiment sought to investigate another mechanism commonly cited by magicians as a way to enhance the success of the force: making some cards more salient in order to enhance spectators' suspicion towards them and strengthen the reverse psychology strategy.

EXPERIMENT 4

The last experiment aimed to investigate whether the original script of the force, making two of the five cards more salient than the others, would enhance its success. As we discussed in the introduction, in reverse psychology marketing, contrast, alongside reactance is considered to be the most successful strategy (J. I. Sinha & Foscht, 2016). Contrasting messages pique buyers' attention and interest to make them want to investigate further (e.g. a secret

shop with closed windows and no sign next to flashy stores). The magic literature suggests that the same mechanism is used in the Five card force. In Vernon's original script (Hugard, 1974), the magician emphasizes that the Ace is a famous card and is in the middle, and that the seven is the only black card, which is supposed to increase the spectator's suspicion. Banachek states that "by mentioning [this], that leaves them with the King of Hearts, which is very suspicious because it is a picture card" and that the four of Hearts, as we just saw, is more likely to be chosen as it is in fourth position (Banachek, 2002a). This subterfuge, contrasts the four of Hearts from the other cards, making it less salient and obvious and therfore increaseing the chances of it being selected.

The magic literature always presents the Five card mental force with a specific script that emphasizing the cards that the magician does not want the spectator to choose, but the results from our online survey suggest that magicians do not think this to be necessary. Indeed, when asked how many people out of 100 would choose the four of Hearts, respondents overall considered that simple reverse psychology would nearly equal the original script (M=51.85 vs 56.15). We predicted that the original script, making the Ace of Diamonds and the seven of Clubs more salient, would enhance the likelihood of participants' choosing the four of Hearts compared to simple reverse psychology instructions. Our previous experiments showed that instructions affected the chances of participants choosing the nine of Diamonds and the four of Hearts. We therefore predicted that the contrasting manipulation would increase the frequency by which both of these cards were selected.

METHODS

Participants

102 participants (73 female) between 18 and 65 years old (M=26, SD=6.36) recruited via social media took part in the experimenter. The sample size was calculated thanks to a power analysis for a Chi-squared test with w=.3, α=.05, df=1 and a power of .80. We based our estimation of the effect size on what seemed to be a reasonably worth-finding effect of the script on participants' choices (medium effect size) and on the results from Experiment 1. The output was 88 participants.

Procedure

The procedure was identical to Experiment 1, however this time, instead of comparing a Reverse psychology script to a simple choice, we compared it to a script based on Vernon's original technique and following Banachek's

recommendations (Banachek, 2002b). Therefore, in the simple Reverse psychology condition, participants were told that the cards had been selected carefully with the intention of influencing their choice and asked to try to catch us out and choose the one they thought we had not predicted to be their choice. In the Contrasting condition, participants were asked not to let us influence their choice and we emphasized that: they might think we placed the Ace of Diamonds in the centre because we wanted them to select it. Then we highlighted that maybe they could think we placed the seven of Clubs in the group hoping they would select it because it is different, being the only black card in the group. Finally, they were told that they must make a completely free choice and feel they were not influenced at all. The same measures as in previous experiments were then taken.

Results

Overall, the 4 of Hearts was the most frequently chosen card again (31.4%), this time followed by the Ace of Diamonds (24.5%) (see figure 8). The 9 of Diamonds and King of Hearts both arrived in third position (each 18.6%). The seven of Clubs was the least chosen card (6.85% of choices).

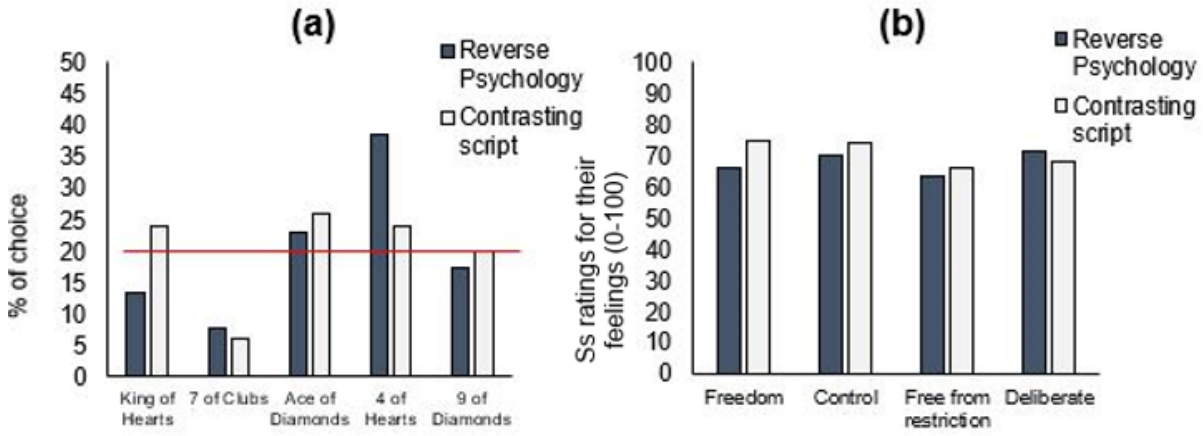

Figure 8. *In (a) Contrasting effect on participants' card choices and (b) on their feelings of freedom.*

We then analysed the effect of the script on participants' card choices. Participants' choice of card did not significantly differ when the Contrasting script was used rather than the simple Reverse psychology one (X^2 (4, N=102) 2.513, p=.476, φ=.182). More specifically, participants did not choose the four of Heart significantly more often with the Contrasting script than with the Reverse psychology one (X^2 (1, N=102) 2.476, p=.116, φ=.154). Therefore, it appears that emphasis on other cards than the target one is not necessary to increase the chances of the spectator selecting the four of Hearts. If anything,

our results even lean the other way (38.5% of choices with reverse psychology vs. 24% with Contrasting script). Likewise, the scripts did not impact the chances of the nine of Diamonds being selected (X^2 (1, N=102) 0.12, p=.727, φ=.035). However, results from our online survey showed that magicians would not expect the original script, to have a significant impact on spectators' card choices: magicians estimated that about 52% of participants would select the four of Hearts with simple reverse psychology instructions, and that 56% would select it with a contrasting script. Our results confirm their intuition.

Looking at the feelings of freedom, overall, participants felt free (M=70.34), in control (M=72.16), free from restrictions (M=64.9) and that their choice was deliberate (M=69.9). The script did not significantly affect how free (W= 1004, p=.163 rrb=-.163), in control (W=1143, p=.681, rrb=.000), free from restriction (W=1165, p=.805, rrb=-.029) participants felt, or how deliberate was their choice (W=1253, p=.708, rrb=.044). Likewise, whether participants chose the four of Hearts or another card did not affect their sense of freedom (W= 1087.5, p=.496, rrb=.087), control (W=1069.5 p=.588, rrb=-.069), restriction (W=979, p=.869, rrb=--.021) or deliberation for their choice (W=1033.5, p=.800, rrb=.033).

To conclude, this last experiment suggests that the original script of the Five card mental force is no more efficient than simple reverse psychology instructions. In other words, it appears that there is no need to make some cards more salient than others.

Experiment 1 Investigated whether reverse psychology can be used to influence participants' choice of card. **Sample**: 132 participants **Key Results:** Reverse psychology instructions significantly increased participants' chances of choosing the force card. The force had no significant impact on participants' sense of freedom, control, free from restriction or deliberation.
Experiment 2 Investigated how the strategic physical positioning of the card influenced participants' choice of card (fourth position from the left rather than fifth, on the edge of the spread). **Sample**: 101 participants **Key Results:** Replication of the reverse psychology effect. The fourth card from the left was the most frequently chosen card. However, the positioning did not significantly increase the chances of participants choosing the force card. The force had no significant impact on participants' sense of freedom, control, free from restriction or deliberation.
Experiment 3 Further investigated whether participants are more likely to choose a card that is placed in a more prominent physical location (fourth position from the left, on the right of the spread, rather than in the first position on the left of the spread). **Sample**: 340 participants **Key Results:** Replication of the reverse psychology effect. However, the positioning did not significantly increase the chances of participants choosing the force card. The force had no significant impact on participants' sense of freedom, control, free from restriction or deliberation.
Experiment 4 Investigated whether the original script of the force, making two of the five cards more salient (contrasting scripts) than the using the reverse psychology script, would enhance its success. **Sample**: 102 participants **Results**: Participants did not choose the force card significantly more often with the contrasting script than with the reverse psychology one. Emphasising other cards is therefore not necessary to increase the chances of the spectator selecting the force card

Table 1: *Summary of the key findings of the experiments.*

GENERAL DISCUSSION

We report four studies that investigate the Five card mental force, a forcing technique that is thought to rely on reverse psychology. In all experiments, we aimed to influence participants' choice toward a target card – the four of Hearts – among four others – the King of Hearts, seven of Clubs, Ace of Diamonds and nine of Diamonds. We investigated three possible factors involved in the success of this technique: reverse psychology instructions, position and contrasting effects. Across all experiments, reverse psychology resulted in 34% of participants choosing the four of Hearts, which was always the most frequently chosen card. These results show that, the force is relatively effective, although less than what is commonly reported in the magic literature (stating that at the minimum half of the participants would choose the target card, (Hugard, 1974; Nelson, 1961)). However, it is important to note that our experimental setup was very different to how magicians would normally perform this force (i.e. online studies vs real-life performance integrated within a broader show), which may have decreased the success rates of the force. Most forcing techniques are thought to rely on real social interactions and to work better when some sort of 'rapport'/relationship is established between the spectator and the magician (Brown, 2002; Turner, 2015). Previous empirical studies on forcing have indeed found smaller success rates with computer-presented tricks than when they are performed live (Olson et al., 2015; Shalom et al., 2013b). However, this is not the case for all forcing techniques, as some of our previous research using the Mental Priming force showed that it is as effective with a video as with a live performance (Pailhès & Kuhn, 2020a).

Regarding reverse psychology, using instructions that misrepresent our true desires/goals (i.e. stating to participants that they must made a free choice and catch us out) significantly impacted participants' choices. Overall, the reverse psychology instructions increased the chances of people selecting the nine of Diamonds and four of Hearts, and decreased the chances of them selecting the Ace of Diamonds. This suggests that, as predicted by the magic literature, the four of Hearts and nine of Diamonds appeared as the 'least obvious' cards, while, not surprisingly, the Ace appears as too conspicuous. The Five card mental force is a nice example of how magicians' knowledge and experience in psychological deception precedes that of other applied psychologists (i.e. branding companies). This confirms what we and others have argued elsewhere (Kuhn, 2019; Kuhn et al., 2008; Pailhès & Kuhn, 2019; Rensink & Kuhn, 2015), that magicians' techniques can provide important insights into psychological processes, and highlight new methodologies. Our results also show that even under reverse psychology instructions, participants felt high feelings of freedom for their choice (M=71.6). However, experiment 3 suggests

that these feelings, even though quite high, were significantly impaired compared to simple instructions.

Our second and third experiments assessed whether the physical positioning of the card had an impact on it being selected. Consumer psychologists and magicians suggest that position effects influence people's choices, resulting in right side bias and edge aversion effects (Banachek, 2002b; Bar-Hillel, 2015b; Christenfeld, 1995b; Missbach & König, 2016). Across the two studies, the fourth card of the spread was the most commonly chosen one, regardless of its value (29% of choices). It is important to note that the present studies were all conducted online, and that position effects are thought to rely heavily on the reachability bias – the fact that most people tend to choose the item that is most easily reached among the ones presented. There are probably less chances that a reachability bias affects participants' decision in an online study compared to a live one (i.e. where participants have to physically grab or touch a card). This setup might therefore have affected our results and weaken the cards' position effects. This would also explain why we found a weaker percentage of participants choosing the four of Hearts than what the magic literature and magicians from our online survey suggested. Moreover, although overall the fourth card of the spread was the most frequently chosen one, the position of the target card – whether it was first, fourth or fifth in the spread – did not significantly affect how often it was chosen. We suggest that this force strongly relies on the instructions presenting the task, making the position of the cards irrelevant for this particular decision.

Finally, our fourth experiment investigated contrasting effect: how making some cards more salient than others could influence participants' choice away from them during a task using reverse psychology instructions. The results showed that contrary to what the magic literature suggests, attracting participants' attention towards the Ace of Diamonds and seven of Clubs does not enhance the success of the force. Moreover, the target card was chosen significantly more often than chance only when we used simple reverse psychology instructions. This suggests that the selection of cards (King of Hearts, seven of Clubs, Ace of Diamonds, four of Hearts and nine of Diamonds) is sufficient to contrast the target card with the others and influence participants towards it.

To conclude, we show that reverse psychology can have a significant impact on people's decision making, leading them towards items which appear less salient than others, without lessening their sense of freedom. This corroborates with what recent marketing strategies have employed and suggests that

further research is worth conducting. Several factors, combining positions of the items and framing of the choice seem to be involved in the Five card mental force, making the four of Hearts more likely to be chosen than chance. These findings open up the possibility of applying these principles to areas where it is desirable to lead people towards inconspicuous options.

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