

# Do people reason when they accept tricky offers? A case of approach and avoidance motivated reasoning



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## ABSTRACT

Tricky or deceptive sales offers are often accepted by people. But how do we explain the acceptance of such disadvantageous offers? We propose that buyers represent offers in terms of costs and benefits in a conditional goal-related mental rule along the lines of “if a cost is paid, a benefit is obtained”. This representation would be influenced by BAS (approach) and BIS (avoidance) motivational systems. Behavioural approach system (BAS) would trigger seeking evidence confirming the offer and would lead us to accept it. Behavioural inhibition system (BIS), on the contrary, seeks disconfirming evidence, leading to rejection of the offer. Activation of approach and avoidance motivation would be influenced by internal variables and the context. We carried out three experiments where participants were told to check if a deceptive conditional offer was a cheat in a thematic Wason Selection Task. Experiment 1 showed that participants preferred confirmatory selection when the benefit was linked to a human need. In Experiment 2, warning information indicating cheating was introduced, while in Experiment 3 information about product alternatives was added to the instructions. We found a weakening of confirmatory card selection in Experiment 2, and a clear preference towards falsifying selection in Experiment 3. These results support the role of approach and avoidance motivated reasoning in buying/selling exchanges. Implications of these results are discussed in comparison with cheater detection algorithm and confirmation bias predictions.

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## 1. Introduction

One type of buying conduct that seems to challenge utility assumptions in human decision-making is the ease with which people accept tricky/deceptive sales offers. In particular, it challenges the assumption that consumers are rational when evaluating information at the moment of taking economic behavioural decisions. Acceptation of tricky offers is difficult to explain using the expected utility theory (Grant & Van Zandt, 2007; Mongin, 1997), where evaluation of outcome probability plays a central role. Deceptive offers usually involve a statement about having desirable things for a buyer (with a high utility), but the reality of the offer is often very improbable. So the expected utility of paying the cost of the product would be very low, and a rational buyer would reject this type of offer.

Economic psychology research is interested in social and cognitive mechanisms that explain human economic decisions. In this research field, human reasoning does not adhere to normative laws of logic and Bayesian probability, but is flexible,

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adaptive, ecological and practical in the economic behavioural ambit (Hands, 2009; Hertwig & Ortmann, 2001; Lunt, 1996; Ortmann & Gigerenzer, 1997). In this paper, we examine the ease with which people accept tricky, deceptive sales offers from this perspective.

Buying and selling offers can be considered as a type of private social contract (Cosmides, 1989). As such, people could interpret them in terms of rules such as “if someone obtains a benefit, he/she has to pay a cost”, activating the cheater detection algorithm to look for evidence that the seller benefits (i.e., takes the buyer’s money) without paying a cost (the product does not work). In accordance with the Social Contract Theory (henceforth, SCT), this is an evolutionary mechanism that has evolved to guarantee reciprocity in social exchanges. Several studies using thematic versions of the Wason Selection Task (henceforth WST, Wason, 1966) as the experimental paradigm have supported that this algorithm regulates reasoning and decision taking in the ambit of social contracts (Cosmides, 1989; Cosmides, Barrett, & Tooby, 2010; Cosmides & Tooby, 2005, 2013; Fiddick, Cosmides, & Tooby, 2000; Fiddick, Spampinato, & Grafman, 2005; Ortmann & Gigerenzer, 1997).

The WST is a paper and pencil problem that tests the use of the logically correct strategy for examining conditional rules. Subjects are invited to see whether a conditional rule of the type “if p then q” has been broken by any one of four instances about which the subject has incomplete information. The cards have “p” or “not-p” on one side and “q” or “not-q” on the other, but only one side is visible (see Fig. 1A). Participants are asked to decide which cards should be turned over in order to test a hypothesis.

In a private social contract version of the task (Cosmides & Tooby, 1992), the goal is to detect a potential cheater among Kaluames, an imaginary Polynesian culture. Participants are told to put themselves in the place of an anthropologist studying how Kaluame “big men” (chieftains) wield power. The social contract establishes a deal between Big Kiku, a headman of a Kaluame tribe, and four men from different bands that stumble into Big Kiku’s village desperate and starving, as they have been kicked out of their respective villages for committing misdeeds. In the deal, Big Kiku agrees to proportion sustaining food (cassava root) to them in exchange for them getting a tattoo on their faces (a face tattoo distinguishes Big Kiku tribe from other Kaluame tribes). The Big Kiku tribe has enemies, and the tattoos help with identification. The conditional social contract rule is worded as “if you get a tattoo on your face, then I’ll give you cassava root”. In addition, the following information is given “you learn that Big Kiku hates some of these men for betraying him to his enemies. You suspect he will cheat and betray some of them. Thus, this is the perfect opportunity for you to see first hand how Big Kiku wields his power” (Cosmides & Tooby, 1992, p. 196).

Four cards are presented, each one representing a man (see Fig. 1B). One side of the cards shows whether the man received the food, or did not, and the other side indicates whether the man got, or did not get, a tattoo on his face. Then the goal-task is introduced “did Big Kiku get away with cheating any of these four men? Indicate only those card(s) you definitely need to turn over to see if Big Kiku has broken his word to any of these four men” (Cosmides & Tooby, 1992, p. 196).

The usual selection in the standard abstract version of the task is that of cards “A” (the “p” card) and “4” (the “q” card) together about 45% of the time (see Wason & Johnson-Laird, 1972). This selection is not correct because it does not consider the logical need to falsify the rule by turning over card “A” (the “p” card to see if it has a 7 on the other side) with card “7” (the “not-q” card to see if it has an A on the other side). The usual selection of the “p” and “q” cards has been explained as the result of a confirmatory bias (Wason & Johnson-Laird, 1972). However, subsequent research has demonstrated that certain thematic versions of this task can lead the subjects to make the logically correct (falsifying) selection (see Gilovich & Griffin, 2010). In the case of the social contract version in the example, falsifying selection of “p” (“got the tattoo”) and “not-q” (“Big Kiku gave him nothing”) cards is the preferred option around 70% of times.

However, the ease with which people tend to accept deceptive offers challenges the role of the cheater detection algorithm in decision taking in the ambit of buying and selling. Cheater detection involves detecting the seller as someone who takes a benefit (the cost, usually money, from the buyer) without paying his/her cost (the benefit of the product he/she has promised to the buyer). This contrasts with real life inasmuch that people usually pay the cost of unbelievable offers without detecting the seller as a cheater (or perhaps ignoring evidence pointing to this); the case of miraculous products for hair growth is a clear example of this.

### 1.1. A Confirmation bias explanation

One plausible explanation for this failure to detect the cheat in buying conduct could be a confirmation bias (Gilovich & Griffin, 2010; Nickerson, 1998; Oswald & Grosjean, 2004). As Nickerson (1998) stated “the continuing susceptibility of people to too-good-to-be-true promises of quick wealth is but one illustration of the fact that people sometimes demand very little in the way of compelling evidence to drive them to a conclusion that they would like to accept” (p. 197). There is now a great deal of evidence that people draw conclusions and search for evidence that would lead to positive outcomes for themselves: they give support to pre-existing opinions, and wish to confirm their success, status and well-being (Kunda, 1987, 1990). In a similar vein, Schwartz (1982) has posited that reasoning would be more aimed at attaining desirable outcomes than at determining the truth or falsity of a certain hypothesis. For people, it would be sufficient to identify a condition that could lead to a desirable outcome, without being compelled to check if this condition is also necessary (to falsify the hypothesis). In accepting deceptive conditional sales offers of the type “if a person acquires a product, then they will obtain a benefit”, people would search for evidence, usually from other people who have acquired the product, which confirms the desirable outcome involved in the offer. The offer would be good if a benefit is obtained from the product.

**(A)**  
Each card has a letter on one side and a number on the other side. Two of these cards have letters so on the hidden side they have numbers. The other two cards have numbers so they have letters on the hidden side. Your task is to select the card/s that you need to turn over to discover if the following statement is true or false  
*"If there is a letter A on one side of the card then there is a number 4 on the other side"*

<b>A</b> "p"	<b>F</b> "Not-P"	<b>4</b> "Q"	<b>7</b> "Not-Q"
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**(B)**  
*"If you get a tattoo on your face, then I'll give you cassava root" ...Did Big Kiku get away with cheating any of these four men? Indicate only those card(s) you definitely need to turn over..."*

<b>Got the tattoo</b> "p"	<b>No tattoo</b> "Not-P"	<b>Big Kiku gave him cassava root</b> "Q"	<b>Big Kiku gave him nothing</b> "Not-Q"
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**(C)**  
*"If someone rubs stinging nettle hair restorer into their bald patches then their hair grows back" ...Detecting if the stinging nettle hair restorer offer is a cheat/if the person that has made the offer wants to cheat you. Indicate only the card(s) you definitely need to turn over..."*

<b>Rubs in stinging nettle hair restorer</b> "p"	<b>Does not rub in stinging nettle hair restore</b> "Not P"	<b>The hair grows back</b> "Q"	<b>The hair does not grow back</b> "Not-Q"
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**(D)**  
*"If someone acquires a watch of the "Moxi" trademark, then he/she never has to take the watch to repair" ...Detecting if the "Moxi" trademark watch offer is a cheat/if the person that has made the offer wants to cheat you. Indicate only the card(s) you definitely need to turn over..."*

<b>Acquires the Moxi watch</b> "p"	<b>Does not acquire the Moxi watch</b> "Not-P"	<b>Never has to take the watch to be repaired</b> "Q"	<b>Has to take the watch to be repaired</b> "Not-Q"
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Fig. 1. Standard Wason selection task (A), Social contract thematic WST version (B) and experimental versions of the WST task (C and D).

The nature of confirmation bias has been discussed from several non-motivational points of view, which all share a cognitive perspective. In this regard, it has been explained in terms of cognitive consistency (Evans, 2002; Kunda, 1990; Taber & Lodge, 2006). More than guided by will, people look for evidence to support conclusions and hypotheses that are consistent with their previous beliefs and expectations. Additionally, confirmation bias has been explained as a result of cognitive limitations or weaknesses in human reasoning (Doherty & Mynatt, 1986; Tweeney, 1984; Tweeney, Doherty, & Kleiter, 2010). In this regard, confirmation bias has been attributed to the tendency of people to consider one hypothesis at a time, and even more, to consider only one of the possibilities, usually that it is true.

Evans (1989) attributed confirmation bias to a lack of understanding that confirmatory evidence is not a good diagnostic tool to evaluate the truthful status of a hypothesis; for this reason, people tend to assume that the hypothesis is true. Another

widely accepted cognitive explanation of confirmation bias is by the action of a positive bias or a positive test-strategy (Baron, 2008; Baron, Beattie, & Hershey, 1988; Gilovich & Griffin, 2010; Klayman & Ha, 1987). According to Klayman and Ha (1987), a positive test strategy consists of people's tendency to test a hypothesis either by examining known instances of its occurrence or by considering conditions under which the hypothesized event is expected to occur. Baron et al. (1988) refer to this strategy as the congruence heuristic.

According to the positive bias explanation (Evans, 1989, 2006, 2014), people tend to represent mentally positive instances of the propositions that they evaluate, as it is much more difficult to represent negative instances, which involve extra cognitive effort. As Evans (1989) has stated "subjects confirm, not because they want to, but because they cannot think of falsity. The cognitive failure is caused by a form of selective processing, which is very fundamental indeed in cognition - a bias to think about positive rather than negative information" (p. 42). Other cognitive factors that influence confirmatory bias are related to the greater availability of confirmatory evidence (Frey, 1986; Gilovich, 1991).

Likewise, confirmation bias has been explained as a failure to use negative information (Davidsson & Wahlund, 1992). In terms of Prospect Theory (Kahneman, 2003; Kahneman & Tversky, 1979), the loss of disconfirming of one's own beliefs and assumptions is valued more negatively than the gain from falsifying wrong ideas (Davidsson & Wahlund, 1992).

### 1.2. A motivated reasoning proposal

Previous explanations have treated falsification or confirmation in the process of checking evidence to evaluate a social proposition (a tricky sales offer in our study) as a result of a quite different mechanism or bias: cheater detection mechanism and confirmation bias. The possibility that either confirmation or falsification could be the result of a cognitively based and motivational process has been taken into account by the motivated reasoning approach (Kunda, 1990; Molden & Higgins, 2005).

According to Kunda (1990) (see also Mercier & Sperber, 2011), self-serving biases cannot be blind to reasoning, or merely heuristic, but have to be based on cognitive processes, and so would constitute a case of motivated reasoning. In this regard, she states that "although cognitive processes cannot fully account for the existence of self-serving biases, it appears that they play a major role in producing these biases in that they provide the mechanism through which motivation affects reasoning. Indeed, it is possible that motivation merely provides an initial trigger for the operation of cognitive processes that lead to the desired conclusions" (p. 493).

In support of the motivated reasoning approach, Dawson, Gilovich, and Regan (2002) have demonstrated that people tend to accept (and confirm) agreeable propositions, and disconfirm threatening ones (see also Demoulin et al., 2005; Jovanović & Žeželj, 2011; Munro & Stansbury, 2009; Scaillet & Leyens 2000).

In one experiment, subjects were presented with versions of the WST where the conditional statement whose true/false status had to be evaluated contained either a threatening or an agreeable-neutral statement relating to death and emotional lability (a tendency to laugh or cry unexpectedly at what might seem the wrong moment). Participants were told that they had been classified as either having high or low emotional lability before testing. The results showed that nearly 50% of the participants presented with a threatening hypothesis (for example, those with an alleged high emotional lability, which tested the hypothesis that persons with such feature would experience an early death) made falsifying "p and not-q" card selection. In contrast, only 10% of the participants presented with a non-threatening hypothesis (those with an alleged low emotional lability, which tested the hypothesis that persons of a high emotional lability would experience an early death) made this selection.

Dawson et al. (2002) explained their results in terms of the different standards of evidence that participants explicitly seek for agreeable-neutral and disagreeable or threatening propositions. Participants would be motivated to confirm the neutral proposition by implicitly asking: Can I accept this? This is a permissive standard when searching for evidence, while they are motivated to falsify the threatening conditional rule by implicitly invoking: Must I accept this? This is a more stringent and strict standard maximizing the chances that any flaws or limitations of the data will be spotted (Dawson et al., 2002).

Motivated reasoning is also associated with goals (Kunda, 1990; Molden & Higgins, 2005). Goals constitute a practical cognitive structure that lead individuals to evaluate possible outcomes, to check for different courses of actions, and therefore to look for evidence in accordance with the adopted course of action (see George, 1991). In the context of research with the WST, George (1991) has demonstrated that falsifying selection of the "not-q" card was enhanced when participants had an explicit goal opposed to the outcome mentioned in the consequence of the conditional statement.

Approach and avoidance are basic motivational tendencies (Elliot, 2006) that adaptively regulate conduct in natural and social environments either to seize opportunities or avoid harm. Buying/selling is a real life behavioural ambit where conduct should be adaptive (seizing opportunities, avoiding cheats), and so approach and avoidance motivation would exert a relevant role in it.

### 1.3. Approach/avoidance motivated reasoning in buying conduct

In the context of motivated reasoning, in this study, we consider the idea that buyers' decisions to accept or reject offers are regulated by approach/avoidance motivation. More specifically, we propose that people spontaneously represent buying and selling offers in a cost-benefit goal-related mental rule as "if a cost is paid a benefit is obtained" where cost refers to

product acquirement and benefit to the advertised desirable outcome from the product. This goal-related representation would be influenced by the behavioural approach system (BAS) and the behavioural inhibition system (BIS) (Carver, 2006; Carver & White, 1994; Corr, 2004; Gray, 1994), which would orientate the process of checking for evidence towards either confirmation or falsification of a conditional offer. The behavioural inhibition system (BIS), the aversive motivational system, is sensitive to signals of punishment, non-reward and novelty and inhibits behaviour that may lead to negative outcomes. Thus, BIS activation causes inhibition of movement towards goals. The behavioural approach system (BAS) is said to be sensitive to signals for reward (or non-punishment) and escape from punishment. Activity in this system causes the person to begin (or to increase) movement towards goals. The hypothesis that the tendency either to verify or to falsify conditional hypotheses has roots in BIS/BAS has been supported by previous research (Marrero, Gámez, & Díaz, 2008). Likewise, it has also been shown that emotions play a role in this tendency, as anger enhances disconfirmation (Young, Tiedens, Jung, & Tsai, 2011). In addition, approach/avoidance motivation has been associated with choice between products options and the so-called endowment effect (Ravaja et al., 2016).

Our proposal of approach/avoidance motivated reasoning in buying conduct is illustrated in Fig. 2.

At the centre of Fig. 2 is the buyer representation of the offer as a goal-related mental rule “if a cost is paid a benefit is obtained”. The buyer representation of the offer is influenced by individual internal factors and context by means of activation of either BAS approach motivation or BIS avoidance motivation. For example, human needs associated with the benefit constitute an internal influence that would activate BAS approach motivation, whereas warnings of cheating constitute a contextual influence that would activate BIS avoidance motivation. Individual differences to sensitivity to either reward or punishment (Corr, 2004) or the incentive value of cost and benefits are other influencing factors. Approach motivation would bias the search for evidence towards looking for evidence of benefit obtention (a potential reward): someone who obtains a benefit and pays a cost (the offer would be a cheat if a benefit is not obtained from the product). By contrast, avoidance motivation would bias it towards looking for evidence of no benefit obtention (potential punishment): someone who does not obtain a benefit and pays a cost.

As can be seen, either confirmation or falsification could occur when people search for evidence to evaluate buying/selling offers. The preference towards one or the other would be motivationally driven and determined by the influence of relevant individual internal factors and context.

In this study, we examine the influence of three internal/contextual variables in promoting either confirmation or falsification in a cheating detection WST with a tricky offer: needs, cheating warnings and information of alternative products. In the case of needs, we propose that a benefit associated with a need increases its subjective incentive value as a reward. As a result, association of benefits with needs would enhance approach motivation and thus promotes confirmatory card selection. By contrast, contextual cues warning the offer is a cheat promote falsifying selection by enhancing avoidance motivation inasmuch as it makes punishment (no benefit obtention) more likely. A third factor is information of alternative products. We propose that approach/avoidance reasoning is modulated by an implicit focus on offers as unique opportunities to be seized. In the case of tricky offers, the focus of this study, offers are presented by cheaters as a unique opportunity to obtain an improbable benefit. In addition, we have to take into account that people would not spontaneously think of alternative products to obtain a benefit, as it involves an extra cognitive effort (see Evans, 1989). Therefore, this cognitive focus on the offer as the only way to obtain an improbable benefit would enhance the offer's positive incentive value resulting in enhancing approach motivation and so confirmatory card selection.

We carried out three experiments to examine our predictions. Participants were told to test if a deceptive sales offer advertised by the seller in the form “if someone acquires product P, he or she then obtains benefit B” was a cheat, with

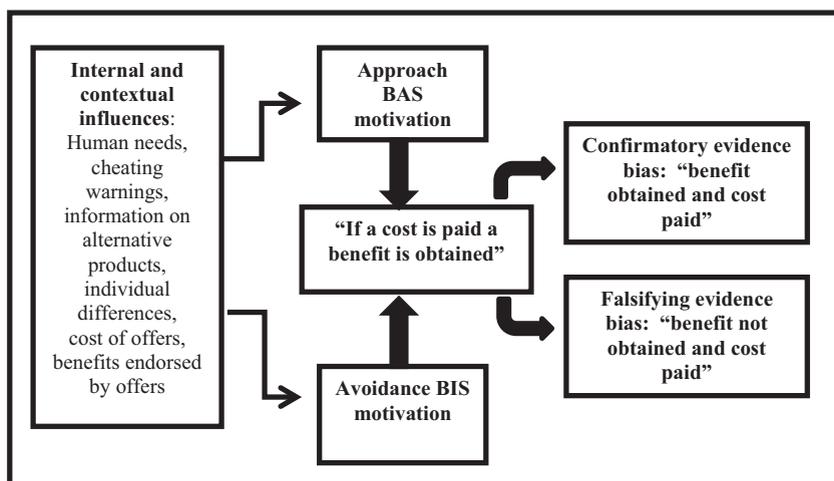


Fig. 2. Model of motivated approach/avoidance reasoning of buyer's conduct.

two task versions, either to detect whether the offer is a cheat or not, or whether the seller is a cheater or not. Thus, four cards were displayed representing partial (and potentially) relevant evidence of persons that “acquire the product” (“p” card), “do not acquire the product” (“not p” card), “obtain the benefit” (“q” card) and “do not obtain a benefit” (“not q” card). Participants were asked to select the cards that were necessary to turn over in order to check if the offer is a cheat/the potential cheater from a buyer’s point of view (see Fig. 1C).

In Experiment 1, we examine the effect of needs in promoting approach confirmatory reasoning. In a version of the task, a benefit was linked to a need: recovering hair to avoid baldness (sexual attractiveness), whereas in the other version it was not: a watch that would never need repairing (see Fig. 1C and D). Experiment 2 and 3 were aimed at demonstrating how to suppress the expected confirmatory influence of the human need, and promote avoidance (falsifying) reasoning. In Experiment 2, cheating warning information was made explicit, while in Experiment 3 information advising on (efficient) alternatives to the product in the market to obtain a benefit was added to the instructions.

## 2. Linking the benefit to a need

### 2.1. Overview

We adopted a buying and selling exchange as the theme in the WST (see Ayal & Klar, 2014; Brown, 2006, and Fiedler & Hertel, 1994 for similar adaptations). The exchange conditional statement was advertised by the seller in the form “if someone acquires product P then he/she obtains benefit B”, and involved a suspicious cheating (deceptive) offer. The conditional offer was varied. In one condition, the benefit claimed for the product in the offer was related to satisfying a human need (sexual attractiveness) by means of a remedy to cure baldness: “If someone rubs stinging nettle hair restorer into their bald patches then the hair grows back”. Participants were asked to put themselves in the situation of a person with a baldness problem (see Appendix A). In the other condition, the offer was not related to satisfying a human need, an unknown trademark watch claimed never to have technical problems: “If someone acquires a watch of the “Moxi” trademark, then he/she never has to take the watch to be repaired”. In the version “offer without a need”, participants were told to put themselves in the situation of a person who has no need to change his/her watch (see Appendix C).

The participants’ task was to detect if the offer was a cheat in one version of the task (and if the seller is a cheater in the other version), by selecting the cards that they considered appropriate for this. They were informed that the rationale of this was to find out if it were better to accept or to reject the offer (see Appendices A and C).

We predict that confirmatory card selection (focused on the “q” card representing “benefit obtention”) will be preferred when the outcome benefit is linked to a need. By contrast, in the “without a need” condition, falsifying selection focusing on no benefit obtention (the “not q” card) would be preferred inasmuch as the task goal is to detect cheating and the offer is a trick.

### 2.2. Pre-test

A pre-test was carried out aimed at scoring the judgements about the probability of the occurrence of a benefit as a result of acquiring the corresponding product. The aim of this pre-test was to control the possibility that participants would tend to confirm the more credible offer and falsify the more incredible one (Evans, 2013; Van Duyne, 1976). If the benefit were judged as arising from a product with a high probability, the offer would be credible; if the probability was low, incredible. A short questionnaire was elaborated that contained a question related to each benefit, together with eight, filler questions. The two corresponding questions were: “What is the probability of occurrence of the hair growing back in a person’s bald patches as a result of rubbing stinging nettle hair restorer on them?”, and “What is the probability of someone never having to take the watch to repair as a result of buying a watch of an unknown make?”

Twenty participants filled in the questionnaire, scoring each question on a three-point scale: low, medium and high probability. They scored both outcomes, the one related to need and the one not related, as being of low probability (100% and 80% of the sample, respectively); that is, both offers were considered improbable, and so similarly unbelievable.

### 2.3. Method

#### 2.3.1. Participants

One hundred and fifty-three first year Pedagogy and Psychology students (108 females, 70.6%) at the University of La Laguna participated in exchange for course credits.

#### 2.3.2. Design and procedure

The design had two between-subject factors, need offer relation with two conditions: with and without a need and task goal with two conditions: “detecting the cheat” and “detecting the cheater”. Two dependent variables were used. One of these was the result of adding the selection of cards “p” (“product acquired”) and “not-q” (“no benefit obtention”) together, to the selection of the “not-q” card only. Both selections represent the falsifying selection; the “not-q” card is considered as a “defective” falsifying selection also aimed at avoiding a cheat (see Cosmides, 1989). The other dependent measure was the

result of adding those selections that contained the “q” card (“benefit obtention”). Selections where “q and not-q” cards were chosen together were excluded in this measure. This type of selection represents the confirmatory selection. We expected that the most frequent selection would be that of the “q” card together with the “p” card, as the most representative confirmatory selection. Both dependent measures were expressed as rounded-up percentages.

Participants were given the task during regular class time without a time limit being imposed. Task versions were randomly assigned to different classes. Participants were told to do the task silently and individually without looking at each other's responses. A total of 87 participants were given the “offer with a need” (60 in detecting the cheat and 27 in detecting the cheater task versions) and 66 the “offer without a need” version (33 in detecting the cheat and 33 in the detecting the cheater task versions). As can be seen, one task version had a larger cell size. In order to balance cell size, we randomly selected subsamples of 36 participants 1000 times in this task version, and chose the resulting average frequencies (that appear in Table 1) for confirmatory and falsifying card selections for statistical comparisons.

## 2.4. Results

Table 1 shows the percentages of confirmatory and falsifying selections as a function of experimental conditions (“with and without a need”). Chi-Squared tests showed that percentages in the experimental conditions in both confirmatory and falsifying selections were not significantly different between either of the task goal cheating and cheater detection versions,  $p > 0.05$ . So we collapsed the data of both versions to detect if the offer is a cheat and to detect if the seller is a cheater in subsequent analyses.

We carried out planned comparisons to test our hypothesis. We found that falsifying card selection was significantly greater in “without a need” than in “with a need” condition (44% vs. 24%, respectively),  $\chi^2(1, N = 129) = 5.61, p < 0.05$ . In addition, significant differences ( $p < 0.05$ ) were found in 88% of the comparisons made with the *bootstrap* subsamples previously mentioned. The modal selection in this dependent measure was that of the “p and not-q” cards together (81%); that is, the more representative option of the falsifying selection. Likewise, we found that confirmatory card selection was significantly higher in “with a need” than in “without a need” condition (62% vs. 33%, respectively),  $\chi^2(1, N = 129) = 10.52, p < 0.05$ . Moreover, significant differences ( $p < 0.05$ ) were found on the 99% of the comparisons made with the *bootstrap* subsamples previously mentioned. The modal selection in this dependent measure was that of the “p and q” cards together (53%); that is, the more representative option of the confirmatory selection.

These results support our hypothesis. As predicted, the relation of the offer to a need significantly enhanced confirmatory card selection at the cost of the falsifying selection. By contrast, when the offer is not related to a need, there was a higher percentage of falsifying selection, and falsifying card selection was the preferred choice (see Table 1). Therefore, this supports the role of approach and avoidance motivated reasoning in our task that predict predominance of confirmatory selection in “with a need” condition, whereas falsifying selection will predominate in the “without a need” condition. By contrast, these results cannot be explained from the cheater detection algorithm and confirmation bias approaches that predict either predominance of falsifying or confirmatory selection in both versions of the task: with and without a need.

## 3. The effect of adding a cheating warning

### 3.1. Overview

We hypothesized that adding some cheating warning information to the task instructions about the offer would weaken approach motivation at the same time as enhancing an avoidance-motivated reasoning by focusing attention on “not q” card “no benefit obtention” as a potential punishment.

**Table 1**  
Percentages and frequencies (in parenthesis) of confirmatory and falsifying selections for the experimental conditions in each experiment.

	Experiment 1			Experiment 2			Experiment 3			Total
	With a need	Without a need	Mean	With a need	Without a need	Mean	With a need	Without a need	Mean	
CONFIRM	<b>62%</b> (39) (N = 63)	<b>33%</b> (22) (N = 66)	<b>47%</b> (N = 129)	<b>39%</b> (28) (N = 72)	<b>40%</b> (25) (N = 63)	<b>39%</b> (N = 135)	<b>27%</b> (20) (N = 73)	<b>30%</b> (19) (N = 64)	<b>28%</b> (N = 137)	<b>38%</b> (N = 401)
Cheating detection	56%(20) (N = 36)	30%(10) (N = 33)	<b>43%</b> (N = 69)	42%(15) (N = 36)	40%(12) (N = 30)	<b>41%</b> (N = 66)	31%(11) (N = 36)	30% (10) (N = 33)	<b>30%</b> (N = 69)	
Cheater detection	70%(19) (N = 27)	36%(12) (N = 33)	<b>52%</b> (N = 60)	36%(13) (N = 36)	39%(13) (N = 33)	<b>38%</b> (N = 69)	24%(9) (N = 37)	29%(9) (N = 31)	<b>26%</b> (N = 68)	
FALSIF	<b>24%</b> (15) (N = 63)	<b>44%</b> (29) (N = 66)	<b>34%</b> (N = 129)	<b>33%</b> (24) (N = 72)	<b>49%</b> (31) (N = 63)	<b>41%</b> (N = 135)	<b>45%</b> (33) (N = 73)	<b>59%</b> (38) (N = 64)	<b>52%</b> (N = 137)	<b>42%</b> (N = 401)
Cheating detection	19% (7) (N = 36)	46%(15) (N = 33)	<b>32%</b> (N = 69)	28% (10) (N = 36)	47% (14) (N = 30)	<b>36%</b> (N = 66)	46% (17) (N = 36)	61%(20) (N = 33)	<b>54%</b> (N = 69)	
Cheater detection	30%(8) (N = 27)	42%(14) (N = 33)	<b>37%</b> (N = 60)	39%(14) (N = 36)	52%(17) (N = 33)	<b>45%</b> (N = 69)	43%(16) (N = 37)	58%(18) (N = 31)	<b>48%</b> (N = 71)	

Similar to our research, Fiedler and Hertel (1994) have shown the effect of background cheating information in enhancing falsifying selection of an offer in a conditional rule. For example, the following rule “if a person takes Sanotren, he/she becomes immune to AIDS” was presented with background information casting doubt on the reputability of the company that produces the drug. When suspicious information was combined with falsifying instructions, participants identified cards “p and not-q” about 35% of the time. Likewise, Ayal and Klar (2014) found that contextual cheating cues improved falsifying card selection in a version of WST with a suspicious offer.

In Experiment 1, we found that the presence of a need induces confirmatory selection. In Experiment 2, we examined whether this influence of need is weakened by adding background information indicating the offer is a cheat (see Appendices B and D). We expected a weakening of confirmatory and an enhancement of falsifying card selection in “with a need” condition.

### 3.2. Method

#### 3.2.1. Participants

One hundred and fifty-three first year Pedagogy and Psychology students (105 females, 68.6%) at the University of La Laguna participated in exchange for course credits. None of them had participated in the previous experiment.

#### 3.2.2. Design and procedure

Design and procedure were as in Experiment 1. Ninety participants were given the “offer with a need” (54 in detecting the cheat and 36 in detecting the cheater task goal versions) and 63 the “offer without a need” version (30 in detecting the cheat and 33 in the detecting the cheater task goal versions). As can be seen, one of the task versions had a larger cell size. In order to balance cell sizes we randomly selected subsamples of 36 participants 1000 times in this task version, and chose the resulting average frequencies (in Table 1) for confirmatory and falsifying card selections for statistical contrasts.

### 3.3. Results

Chi-Squared contrasts showed that percentages in the experimental conditions in both confirmatory and falsifying selections were not significantly different between either of the task goal cheating and cheater detection versions,  $p > 0.05$ . So we collapsed the data of both versions of the task goal to detect if the offer is a cheat and to detect if the seller is a cheater, in the subsequent analyses.

We carried out planned contrasts to test our hypothesis. We found that falsifying card selection did not significantly differ between “without a need” and “with a need” condition (49% vs. 33%, respectively),  $p > 0.05$ . The modal selection in this dependent measure was that of the “p and not-q” cards together (90%); that is, the selection more representative of the falsifying selection. Likewise, we found that confirmatory card selection did not differ between “with a need” and “without a need” conditions (39% and 40%, respectively). The modal selection in this dependent measure was that of the “p and q” cards together (56%); that is, the selection more representative of the confirmatory selection.

We carried out several relevant tests between Experiments 1 and 2. Regarding conditions, we found that confirmatory card selection was significantly greater in Experiment 1 in “with a need” condition (62% vs. 39%, respectively),  $\chi^2(1, N = 135) = 7.06, p < 0.05$ . In addition, significant differences ( $p < 0.05$ ) were found on the 85% of the comparisons made with the *bootstrap* subsamples previously mentioned. No other contrasts reached significance.

Two main results have been demonstrated in this experiment. First, in spite of adding a cheating warning to task instructions, falsifying selection has not been enhanced enough (“not-q” card selection is only 9% greater in Experiment 2 than in Experiment 1) in with a need condition, where confirmatory selection continued to be predominant (see Table 1). This suggests that the presence of a need in an offer continued to exert a significant weakening influence on the falsifying selection. Second, adding a cheating warning to task instructions significantly decreased the confirmatory selection in with a need condition as compared to Experiment 1. This suggests that cheating warning has been effective in inhibiting the selection of the card representing the reward: the “q” card of benefit obtention.

This weakening effect of a need on falsifying selection could be due to the offer being conceived as a unique opportunity to obtain a benefit that is presented as necessary for the buyer. In this case, the benefit would continue to be a goal associated with product acquisition, which could inhibit the selection of “not q card” “no benefit obtention” to some extent. In the next experiment, we consider the possibility of removing this effect of a need if participants are advised that benefit could be obtained by acquiring other (efficient) products.

These results could not be explained from the cheater detection algorithm and confirmation bias approaches. Cheater detection algorithm would predict the predominance of falsifying selection in “with and without a need” conditions to be significantly stronger in Experiment 2 than in Experiment 1. Both predictions are at odds with the results. Confirmatory bias, either as a motivational bias or due to cognitive limitations to represent negative instances of the outcome benefit, would predict predominance of confirmatory selection under both task conditions. There would also be no difference between Experiment 2 and Experiment 1, which contrasts with our results.

## 4. The influence of information of alternative products

### 4.1. Overview

In Experiment 3, we examined the influence of information on alternative products in confirmatory/falsifying card selection. Our deceptive offers were presented as an opportunity to obtain an improbable benefit (either recovering hair in the bald patches or having a watch that never has to be repaired). This opportunity would be conceived as a unique opportunity inasmuch that no information about alternatives to the product was provided. As mentioned, people would not spontaneously think about alternatives (products), as this involves an extra cognitive effort (see Evans, 1989). This cognitive focus would reinforce the incentive value of the offer as the way to obtain an improbable benefit, and so favors approach motivation.

We speculate that introducing explicit information about efficient alternatives to the product to obtain a benefit in the task instructions (see Appendices B and D) would weaken this focus. As Nickerson (1998) has claimed, motivation and cognition would exert a mutual influence. In this case, being informed about efficient alternatives would weaken the incentive value of the tricky offer, which would inhibit approach and enhance alternative avoidance motivation, and so the falsifying selection of the “not q” (“no benefit obtention”) card to the degree that now the goal benefit could be obtained from other products. Therefore, we predict that adding information about efficient alternatives to the product in the task instructions will significantly decrease confirmatory selection at the same time as increasing falsifying card selection.

### 4.2. Method

#### 4.2.1. Participants

One hundred and fifty-four first year Pedagogy and Psychology students (111 females, 72.1%) at the University of La Laguna participated in exchange for course credits. None of them had participated in the previous experiments.

#### 4.2.2. Design and procedure

Design and procedure were as in Experiment 1. Ninety participants were given the “Offer with a need” (53 in detecting the cheat and 37 in detecting the cheater task versions) and 64 the “Offer without a need” version (33 in detecting the cheat and 31 in the detecting the cheater task versions). As can be seen, one of the task versions had a larger cell size. In order to balance cell sizes we randomly selected subsamples of 36 participants 1000 times in this task version, and chose the resulting average frequencies (in Table 1) for confirmatory and falsifying card selection for statistical contrasts.

### 4.3. Results

Chi-Squared contrasts showed that percentages in the experimental conditions in both confirmatory and falsifying selections were not significantly different between either of the task goal versions. So we collapsed the data of both versions of the task goal to detect if the offer is a cheat and to detect if the seller is a cheater, in the subsequent analyses.

We carried out planned comparisons in order to test our hypothesis. We found that neither falsifying (45% vs. 59%, respectively) nor confirmatory (27% and 30%, respectively) card selection significantly differed between “with a need” and “without a need” conditions. In addition, the modal selection in the falsifying selection measure was that of the “p and not-q” cards together (90%), the more representative of this type of selection. The modal selection in the dependent measure of confirmatory selection was that of the “p and q” cards together (63%), the more representative of the confirmatory selection.

We carried out planned comparisons between Experiment 3 and Experiments 2 and 1. Overall, these comparisons between Experiment 3 and Experiment 1 revealed that falsifying card selection was significantly greater in Experiment 3 than in Experiment 1 (52% vs. 34%, respectively),  $\chi^2(1, N = 266) = 8.49, p < 0.05$ . In addition, significant differences ( $p < 0.05$ ) were found in 100% of the comparisons made with the *bootstrap* subsamples previously mentioned. Likewise, confirmatory card selection was significantly greater in Experiment 1 than in Experiment 3 (47% vs. 28%),  $\chi^2(1, N = 266) = 10.02, p < 0.05$ . Moreover, significant differences ( $p < 0.05$ ) were found in 100% of the comparisons made with the *bootstrap* subsamples previously mentioned. No other comparison reached significance.

Experiments 3 and 1 contrasts support for the hypothesis, as a falsifying selection was overall significantly greater in Experiment 3. Moreover, confirmatory selection was significantly lower in Experiment 3. This suggests inhibition of approach motivation at the benefit of avoidance motivation and falsifying card selection.

According to these results, we can conclude that adding information on efficient product alternatives enhanced falsifying selection at the cost of confirmation. We propose that this is because this information weakened the focus on the offer as a unique opportunity to obtain a benefit, and so its incentive value. This would inhibit approach motivation and confirmatory selection, while avoidance motivation would be enhanced (the falsifying selection of “not q” “no benefit obtention” card), since the goal benefit could now be obtained from other products.

In contrast to Experiment 1, there were no significant differences in either confirmatory or falsifying selection between “with and without a need” conditions. Information about alternative products seems to exert a decisive influence on sup-

pressing the effect of need in promoting confirmatory selection. Therefore, the influence of need was counteracted when a cheating warning and information about efficient product alternatives were added to the task instructions.

As before, these results cannot be explained from the cheater detection algorithm and confirmation bias approaches. Cheater detection algorithm cannot explain why the falsifying selection was significantly greater in Experiment 3 than in Experiment 1: Why and how adding information on alternative products to a cheating warning would affect the activation of the cheating detection algorithm? In the case of confirmatory bias, predominance of confirmatory selection under both task conditions would be predicted and no differences would be observed between Experiment 3 and Experiment 1, which contrasts with our results.

## 5. Discussion

Our results show that card selection by participants who were presented with a tricky offer was influenced by linking the benefit to a human need (Experiment 1), which significantly enhanced confirmatory “q” card selection. By contrast, adding an explicit warning to the instructions about the offer being a cheat (Experiment 2) weakened confirmatory selection in “with a need” condition. Moreover, we found that adding information on efficient alternatives to the product caused a clear preference for falsifying selection (Experiment 3).

These results support the role of approach/avoidance motivated reasoning in the process of checking for evidence to evaluate cheating buying/selling conditionals, as follows. In Experiment 1, the linking of a benefit to a human need made the benefit more desirable and so of a high subjective incentive value, which would have activated approach motivation and confirmatory card selection in the participants. In Experiment 2, adding the warning that the offer is a cheat should weaken approach and enhance avoidance motivation, and falsifying selection, by focusing attention on no benefit obtention as a potential punishment. However, we found that a cheating warning inhibited confirmatory selection of the “q” “benefit obtention” card without a significant increase in “not q” “not benefit obtention” card in “with a need” condition. This result could be related to the product being conceived as the only way to obtain a necessary goal-benefit. In Experiment 3, adding information on efficient alternatives to the product caused confirmatory card selection to fall to 28% and falsifying selection was predominant in both conditions. This advising information would have weakened the focus on the offer as a unique opportunity to obtain a benefit, and therefore its incentive value. This would inhibit approach motivation and confirmatory selection while avoidance motivation would be enhanced and so falsifying selection of “not q” “no benefit obtention” card, inasmuch that now the goal benefit could be obtained by other products. In addition, Experiment 3 showed that the influence of a need on enhancing confirmatory selection was suppressed when a cheating warning and information about efficient product alternatives were added to the task instructions.

Our results are difficult to explain from the perspective of Social Contract Theory (Cosmides, 1989; Cosmides & Tooby, 2013; Cosmides et al., 2010). Social Contract Theory would predict that the cheater detection algorithm is activated in both “with and without a need” conditions, to the extent that the task goal was to detect cheating. This activation would have caused predominance of falsifying selection, especially in Experiment 2 when a cheating warning was added. Experiment 2 results showed a non-significant tendency to increase falsifying selection in comparison with Experiment 1 (33% vs. 24% and 49% vs. 44% in “with and without a need” conditions, respectively). These figures are far from the figures found by Cosmides (around 70%, Cosmides, 1989; Cosmides & Tooby, 1992; Cosmides et al., 2010); in fact, confirmatory selection continued to be the preferred selection in “with a need” condition. However, Experiment 2 results were similar to those found (35% of falsifying selections) by other studies (Fiedler & Hertel, 1994) with a similar task version (an offer related to a human need) and manipulation: background information casting doubt on the reputation of the company that produces a drug to cure Aids. Likewise, Ayal and Klar (2014) found a percentage of 47.8% of p and not-q cheating selection in a WST with a suspicious medication offer to treat a rare disease. This comparatively low selection of cheating “p and not q” cards in these studies casts doubts on the comparability of cheating detection processes between buying and cheater detection versions of WST when a need is involved. In addition, SCT cannot accommodate the effect of the information of alternative products in enhancing falsifying (avoidance) selection in “with a need” condition (Experiment 3).

This raises the issue of the role of relevance in reasoning (Sperber, 2005; Sperber, Cara, & Girotto, 1995; Wilson & Sperber, 2004). Relevance consists of developing a task interpretation that satisfies the expectation of relevance raised by the task context. In this regard, it is worth noting the claim made by Cosmides et al. (2010) to describe the cognitive nature of the cheater detection algorithm that “...cheater detection is person categorization and not event categorization” (p. 9008). We would like to comment what could be a relevant difference between our WST and the cheater detection WST versions to explain our results. Buying WST in our study focuses attention on the goal of benefit obtention for the buyer, and detecting the cheater would plausibly serve this goal (as contingent with no benefit obtention) as participants were told to “...to discover whether this offer is a cheat and, therefore, find out if it is better for you to accept or reject it” (see Appendix A). In contrast, in cheater detection versions, as plausibly aimed at showing the activation of a person categorization mechanism, focus attention on detecting the violator of a social deal as a cheater. This relates to the question of the role of domain-specific representations such as those proposed by SCT, and of contextual interpretation mechanisms as relevance, and how could be the interaction between them in activating inferential mechanisms to task solving. This is an open question of an interesting debate (Cosmides et al., 2010; Fiddick et al., 2000; Sperber, 2005).

More flexible ways of cognition should then be considered in examination of cheating in buying conduct from the point of view of buyers (see [Ayal & Klar, 2014](#)). In this regard, our results support that decisions in the ambit of buying and selling offers depend on flexible cognitive mechanisms guided by approach and avoidance motivation and goals. We have to consider that acquiring goods in exchanges (and the benefits associated with them) is egotistically necessary for individual survival. So, natural selection would have shaped a flexible way of reasoning based on a cost-benefit goal-related representation, regulated by BIS/BAS approach/avoidance motivational systems in the ambit of buying conduct. In short, when we evaluate buying propositions of potential interest to us as individuals, our first thought is of our own costs and benefits focused on either getting benefit obtention or avoiding no benefit obtention.

Our results are at odds with the motivational point of view of confirmatory bias. Participants did not systematically show a self-serving bias (as they were told to put themselves in the place of a person with a baldness problem) in “with a need” condition by selecting the card that could confirm a positive outcome (“recovering hair”), as in Experiment 3 the falsifying selection was preferred. Moreover, in the “without a need” condition the falsifying selection was preferred throughout the three experiments. Likewise, our results did not show a bias towards positive information due to a failure to use negative information ([Davidsson & Wahlund, 1992](#)), inasmuch that in the whole of the experiments “no benefit obtention” and “benefit obtention” cards were similarly chosen (see [Table 1](#)).

Our results are also contrary to the cognitive point of view of confirmatory bias. On the one hand, the card selection cannot be explained as a result of consistency with expectations, as previous expectations about obtaining a benefit by acquiring the product would be low, as our pre-test supports. Moreover, several studies have demonstrated that unbelievable statements enhance falsifying selections ([Evans, 2013](#); [Pollard & Evans, 1981](#); [Van Duyne, 1976](#)). In accordance with our pre-test, the offer in the “with a need” task version was unbelievable, which should have enhanced falsifying card selection. However, confirmatory card selection was predominant in Experiments 1 and 2 under this condition. On the other hand, we consider that confirmatory self-serving biases would be due to the action of cognitive heuristics to compensate for the limitations of human cognition, either in terms of a positive strategy ([Baron, 2008](#); [Baron et al., 1988](#); [Evans, 2006](#); [Gilovich & Griffin, 2010](#); [Klayman & Ha, 1987](#)), or a positive bias ([Evans, 1989, 2006, 2014](#)). A positive test strategy consists of people's tendency to assume that a hypothesis or statement is true. However, results from our study have shown that participants prefer either confirmation or falsification, depending on whether, or not, a human need was linked to the offer. In the case of the positive bias, our results showed that negative instances (no benefit obtention from acquiring the product) are easily represented when participants are given the conditions for this (Experiment 3).

In short, our results support that evaluation of cheating in buying offers from a buyer's point of view would also be a question of approach/avoidance motivation, which regulates whether confirmation or falsification occur when people search for evidence. This is in contrast to the idea that more rigid mechanisms like cheater detection leads to a falsifying strategy or, alternatively, a bias such as confirmatory bias leads to a confirmatory strategy to regulate buying conduct. Approach and avoidance models of motivation ([Elliot, 2006](#); [Higgins, 2006](#)) are now adopted to study consumer behaviour ([Kenrick, Saad, & Griskevicius, 2013](#)). Our proposal and results could contribute to widen the role of the approach and avoidance theoretical framework to research into this ambit of economic conduct.

It is worth noting that participants in our selection task were only checking the advertised trustworthiness status of the offer, prior to accepting or rejecting the deal (and to buy the product). Thus, there was not a real cost involved in the decision about what card (evidence) to select, and this could have favoured a confirmatory selection in “with a need” condition, inasmuch that checking if the offer is true (is not a cheat) is for free (and the benefit is desirable). The cost of the product constitutes another source of avoidance. A high cost would increase the negative incentive value of the offer, and so would activate the BIS and falsifying selection, whereas a low cost could involve some escape from punishment and would activate the BAS, and confirmatory selection.

In this regard, we have to take into account that our study examines a relevant aspect of buying and selling conduct, as usually buying is preceded by advertisements, which focus on the benefit of the products, whereas cost is in the background and even not mentioned intentionally by sellers. In fact, advertisements exert a convincing decisive influence on the buying act. Additional research is thus necessary to examine the role of the product cost; for example, by an explicit reference to the price of the product that could be manipulated from low to high: a greater subjective value of the cost would enhance avoidance motivation and so falsifying selection.

It is relevant to consider whether cognitive processes involved in card selection are implicit or explicit. Previous research with WST either with a thematic or abstract content has taken card selection as the relevant dependent measure, though the reasoning for this decision is assumed to be implicit to some degree. The behavioural measure of card selection was also the dependent measure of our study (see [Dawson et al., 2002](#), for a study on motivated reasoning with WST). Participants' justification of cards selection is also included in some studies with WST. The theoretical utility of justification is limited, as it may not necessarily reflect the cognitive process of performing card selection (see [Evans, 2014](#)). However, it could constitute an opportunity for participants to make prior cognitive processes explicit insofar as justification would take place after card selection. Thus, it could offer information of theoretical interest. In this context, further research could be useful to examine the justification for responses of card selection found in our study.

A point should be made about the ecological validity of studies, like this one, that examine real life conduct such as buying by using laboratory tasks like the WST. These types of studies have advantages and obvious limitations ([Hogarth, 2005](#); [Ortmann, 2005](#)). As advantages, they allow a stricter control of conditions, and are easier to perform compared to real-life studies. As limitations, the situation that is described in the task, although it attempts to appear real, it is not real nor sim-

ulating a real context, in fact. In the case of WST, advantages seem to be greater than limitations bearing in mind thematic versions of this task have been widely adopted to examine reasoning and decision-taking in social ambits. However, the interest of more naturalistic studies on confirmation/falsification of evidence for cheating in buying contexts has real relevance to our knowledge of this economic ambit of human conduct. Further research is necessary to examine the selection of evidence either falsifying or confirmatory in buying conduct in more real or simulated contexts.

The ease with which deceptive sales offers are accepted, despite these decisions seeming to be impractical is related to approach motivation. But does this conduct show a flaw in human reasoning? When approach motivation predominates, the focus is on the benefit and people would reason to search for evidence of benefit obtention. In this case, a flaw in human reasoning would be shown. We could be accepting a cost of the offer without assuring a benefit. Evidence that someone recovers hair using the product, as an example, should not disregard the fact that the product could be ineffective inasmuch that a person that does not recover hair having used the product: a card (the “not q” card) that has not been checked in the confirmatory selection. However, this decision could be deductively correct if the conditional offer is interpreted in a bi-conditional way (see Johnson-Laird, 1995) as “the hair grows back if and only if someone rubs stinging nettle hair restorer into their bald patches”. This interpretation would be favoured when the offer is presented as a unique opportunity to attain an improbable benefit linked to a need. In this context, we suggest that the cognitive flaw in accepting tricky sales offers could not be due to reasoning but to our tendency to accept unbelievable (improbable) possibilities (miracles) when our well-being is involved. This tendency could be a psychological expression of a blind impulsive approach to opportunities. In any case, it also reveals a way by which trick sellers manage to cheat buyers: linking the offer to improbable benefits associated with a strong human need, which is presented in a weak deceptive context without explicit information on alternatives.

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## Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.joep.2016.08.006>.

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