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## Relevant information, personality traits and anchoring effect

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**Abstract:** Although personality has been one of the most-studied factors in management and decision-making research, this stream of research has generated inconsistent support for the relationship between personality traits and individuals' susceptibility to heuristics, and therefore biased judgment. The aim of this study is to investigate how the provision of correct information and individual difference factors influence susceptibility to anchoring effect. To test this hypothesis, individual levels of the personality traits have been measured. Then, participants were provided with an anchoring task involving the Taj Mahal either providing them correct information before the experiment or not. Providing individuals with the correct information limited susceptibility to the irrelevant anchor; even if only 33% of those exactly recalled it when providing the estimate. High values in agreeableness and openness to experience were found to be related with reduced susceptibility to the anchor.

**Keywords:** anchoring; personality; judgment; decision-making; bias; heuristic.

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### 1 Introduction

The bounded rationality of individuals' decision-making processes is a widely studied topic in management studies. Managers, as human beings, are not perfectly rational, and have emotional and cognitive limitations (Cyert and March, 1963; Simon, 1957). Decision-making studies examine managers' information-processing capabilities and their influence on judgment formation and behavioural processes (i.e., in this journal:

Albar and Jetter, 2013; Jones, 2007; Podvezko, 2007; Sikder, 2008; Sjoberg, 2007; Ustinovichius, 2007). Among those studies, Herbert Simon's work on bounded rationality represents the main background theory. In this stream, scholars have addressed the issue of cognitive biases affecting decision-making processes, in a continuous effort to find an explanation to why human misperceptions can occur. Following up Simon's studies on human cognition, Stanovich and West (2000) proposed dividing cognitive functioning in two systems. System 1 is intuitive, automatic, effortless, implicit and emotional, while System 2 is reflective, slower, conscious, effortful and rational (Kahneman, 2003). On the one hand, the first System is considered to be more rapid and instinctive. An example of this is when we duck because a ball is thrown at us unexpectedly. On the other hand, the reflective system is more deliberate and self-conscious. For example, we use it when planning our next trip. One way to think about all this is that the automatic system is our gut feeling and the reflective system is our conscious thought (Thaler and Sunstein, 2008). Gut feelings can be quite accurate, or 'good enough' (Albar and Jetter, 2013), even in managerial contexts. Moreover, people often make mistakes because they rely too much on the automatic system (Chugh, 2004). Since System 1 is faster than System 2 in making decisions, people have developed thousands of simplifying strategies or rules of thumb, so-called heuristics.

Heuristics are commonly defined as simplifying strategies to cope with complex issues and problems. In their study, Newell and Simon (1972) defined heuristics as those cognitive shortcuts that the human brain tends to use when its decision-making process is limited, in terms of both time and availability of data. People frequently use rules of thumb to make judgments in real life, and although they can be very quick and helpful, their use was found to lead to systematic biases (Tversky and Kahneman, 1974). In fact, heuristics produce accurate or partially accurate judgments and it may be inevitable that people will adopt some of them (Bazerman and Moore, 2009). Heuristics can be applied by almost everyone, as researches have demonstrated that their use is not specific to particular individuals (Bazerman and Moore, 2009; Plous, 1993). For example, managers have been recently found to rely on heuristics in decisions concerning project screening (Albar and Jetter, 2013).

The reliability on heuristics can produce a biased decision-making process and a biased result, which is more likely to occur in System 1-thinking than in System 2 (Bazerman and Moore, 2009). A bias can be defined as the human tendency to make systematic errors in certain circumstances based on cognitive factors rather than evidence (Tversky and Kahneman, 1974). Hammond et al. (2001) proposed one of the most interesting interpretations of cognitive biases in decision making; they called them 'hidden traps', for considering all those situations in which the human brain is abnormally deviating from deciding rationally. A biased managerial decision-making process can affect a wide range of decisions and environments, such as groups (i.e., Sikder, 2008). For example, it could distort beliefs (i.e., Sjoberg, 2007), affect estimates (i.e., Podvezko, 2007) or valuations (i.e., Meszek, 2007), and increase the reliability on subjective approach (i.e., Ustinovichius, 2007).

The aim of this study is to investigate how the provision of correct information and individual difference factors influence the susceptibility to the anchoring effect. The anchoring effect is the phenomenon under which individuals, when making estimates, rely more on subjective irrelevant data and information. This paper, after having introduced the topic of decision-making biases, will provide a theoretical background on the anchoring effect to introduce the research and provide context. Consequently, the

methods and the results of the study will be discussed in terms of future research direction, theoretical and managerial implications.

## **2 Theoretical framework**

This section of the paper presents a brief introduction on the research that has been done with reference to the anchoring effect, which relates to the decision-making process when individuals make estimates for values (i.e., Chapman and Bornstein, 1996; Northcraft and Neale, 1987; Plous, 1989, 1993). The decision-making literature predicts that an individual will make their estimate based upon an initial value – derived from past events, random assignment, or whatever information is available – and typically make insufficient adjustments from that anchor when establishing a final value (Bazerman and Moore, 2009).

Anchoring on unreliable information appears to pose a significant risk to the quality of individual judgment, even when objectively appropriate anchors are available (Whyte and Sebenius, 1997). The initial value(s) may be drawn from memory or experience, or may be supplied by others. When based on irrelevant or no longer pertinent information, faulty decisions are likely to result. When making forecasts, people often use the past as the starting point. While the past may be relevant, the environment may offer other pertinent clues to the future. Illuminating potential anchoring biases may enable decision makers to examine the information they are considering (Plous, 1989; Tversky and Kahneman, 1974).

The anchoring effect appears to be prevalent throughout human decision processes and has been shown to reliably influence judgments in a variety of domains, other than probability estimates (Plous, 1989; Tversky and Kahneman, 1974), including negotiation (i.e., Caputo, 2013; Galinsky and Mussweiler, 2001; Neale and Bazerman, 1991; Ritov, 1996), legal judgments (i.e., Chapman and Bornstein, 1996), and general knowledge (i.e., Epley and Gilovich, 2001; McElroy and Dowd, 2007; Mussweiler and Englich, 2005; Mussweiler and Strack, 1999, 2001; Strack and Mussweiler, 1997). Furthermore, anchoring effects appear viable across most situations for both novices and experts (i.e., Northcraft and Neale, 1987).

There seems to be no difference between the effects produced by relevant anchors and irrelevant anchors. Furnham and Boo (2011), in a recent literature review, stated that irrelevant anchors produce similar effects in judgmental decisions in comparison to those of informational relevance anchors. For example, Tversky and Kahneman (1974) randomly generated the anchor values by spinning a wheel of fortune; while, participants in Englich et al.'s (2006) study randomly acquired the anchors by throwing a set of dice, and Critcher and Gilovich (2008) found that the number on an athlete's jersey could anchor estimations of his performance.

Different factors have been analysed in order to investigate their relation with the anchoring effect, focusing chiefly on the role of mood, knowledge and experience. Significant results of affective factors on anchoring effects have been found (Bodenhausen et al., 2000; Englich and Soder, 2009). In addition, previous researches have provided empirical evidence demonstrating that decisions by expert participants in the judgmental domains also show an anchoring effect (Enough and Mussweiler, 2001; Englich et al., 2005, 2006; Mussweiler et al., 2000; Northcraft and Neale, 1987). These

results imply that expertise does not significantly reduce the assimilative bias in decisions that affect inexperienced laypeople (Furnham and Boo, 2011). Anchoring effect thus appears to be a very robust psychological phenomenon, which does not influence all individuals equally. Identifying those factors that influence how and in what ways a person is susceptible to this heuristic should further the understanding of the process (Furnham and Boo, 2011).

One avenue of approach is to investigate the role of individual difference factors (Furnham and Boo, 2011), which are the different responses generated by an individual toward specific events or circumstances in a way that is different from other people on a regular basis (Brandstätter, 1993). Previous studies pointed out the important role of the personality of the decision maker in risky choice situations (Tversky and Kahneman, 1981), and the influence of intellectual traits on decision-making and consequential choice preference (Stanovich and West, 1998, 2000). In addition, individual differences have been also found in terms of numerical reliance (Bartels, 2006; Peters et al., 2006), optimism (Buehler and Griffin, 2003), preference for actions or inactions (Baron and Ritov, 2004), and ambiguity (Lauriola and Levin, 2001; Nowlis et al., 2002).

The aim of the current study is to investigate how individual difference factors may influence the reliability on an irrelevant anchor, and if individuals rely on irrelevant anchor even when provided with correct information. In fact, Whyte and Sebenius (1997) stated that anchoring on unreliable information appears to pose a significant risk to the quality of individual judgment, even when objectively appropriate anchors are available, assuming a recency effect. Therefore, a recency effect should be found in the study.

Hypothesis 1 The availability of correct information does not influence the susceptibility to the anchoring effect.

Furnham and Boo's (2011) literature review on the anchoring effect claimed how there is limited research on the relationship between personality and the anchoring effect. Thus, due to the lack of sufficient empirical evidence to conclude on the effect of personality on anchoring, a gap in the literature is given and further studies are needed to investigate the relationship between these variables (Furnham and Boo, 2011).

Personality is one of the individual difference variables that affects individuals' performance and more specifically the cognitive processing in judgmental decisions (Furnham and Boo, 2011). Most of the research in the field related to personality has focused on the most widely tested and well-regarded Big-Five personality traits (Eroglu and Croxton, 2010; McElroy and Dowd, 2007). The personality traits that make up the so-called 'Big Five' are not traits themselves but rather dispositional categories under which a variety of specific traits may be subsumed (Barry and Friedman, 1998). According to Barrick and Mount (1991), these five factors include extraversion, agreeableness, conscientiousness, emotional stability/neuroticism, and openness to experience.

*Extraversion* is a personality trait associated with being sociable, assertive, talkative and active. Empirical studies have been undertaken on mood and affect, associating positive mood states and the positive affect with the trait of extraversion. Furthermore, stemming from Bower's (1981, 1991) 'network theory of affect', which suggests that positive (negative) moods produce more positive (negative) judgments, studies on the relationship between mood states and the anchoring effect have demonstrated that negative mood states lead participants to engage in more effortful information processing,

which is more prone to anchoring effect (Bodenhausen et al., 2000). Thus, it is hypothesised that:

Hypothesis 2a A high level of extraversion reduces susceptibility to the anchoring effect.

*Emotional stability* is associated with being calm, even-tempered, and less likely to feel tense or rattled, while *Neuroticism* is associated with being depressed, tense, nervous, angry, unstable, discontented, worried, and uneasy. No empirical evidences have been found in the literature on the relationship between this trait and the anchoring effect (Furnham and Boo, 2011). The trait of neuroticism has been related with mood states and affect, and then with the trait of extraversion (Eroglu and Croxton, 2010). Stemming from Bower's (1981, 1991) 'network theory of affect' and Rusting's (1999) research, a similar effect of extraversion and neuroticism on judgments has been identified. Thus, it is hypothesised that:

Hypothesis 2b A high level of emotional stability reduces susceptibility to the anchoring effect.

The traits of *agreeableness*, which is associated with being courteous, flexible, trusting, cooperative and tolerant; *conscientiousness*, which is associated with being careful, responsible and organised; and, *openness to experience*, which is associated with being imaginative, curious, original and open-minded, can be considered together. In fact, individuals with high conscientiousness and agreeableness (Bodenhausen et al., 2000; Eroglu and Croxton, 2010), as well as with high openness to experience (McElroy and Dowd, 2007) were found to be more susceptible to the anchoring effect. Furnham and Boo (2011) explained these results with the selective accessibility mechanism (Mussweiler and Strack, 1999) and the attitudinal approach (Wegener et al., 2001) to the anchoring effect.

Based on those theories, the following attitudes related to personality traits lead to the activation of confirmatory search and selective accessibility mechanisms of anchoring. Individuals expressing high levels of conscientiousness tend to engage in more thorough thought processes before making their judgments, while those with high agreeableness tend to take the provided anchors more seriously. Finally, high openness to experience influences individuals who are more sensitive to anchor cues (Furnham and Boo, 2011). Thus, it is hypothesised that:

Hypothesis 2c A high level of agreeableness increases susceptibility to the anchoring effect.

Hypothesis 2d A high level of conscientiousness increases susceptibility to the anchoring effect.

Hypothesis 2e A high level of openness to experience increases susceptibility to the anchoring effect.

To test these hypotheses, individual levels of personality traits have been measured. Participants have then been provided with an anchoring task involving the Taj Mahal.

### **3 Method**

#### *3.1 Participants and design*

The questionnaires have been submitted to a sample of 117 managers, professionals and academics recruited through the social network LinkedIn. The design of the study included the observed variables of personality traits, demography (such as gender, age, working experience), and the manipulated variable of anchor. Participants' estimates of the date of completion of the Taj Mahal served as dependent variable.

#### *3.2 Procedure and materials*

All participants were first informed of the nature of the study. After consenting to take part in the study, in a totally anonymous way, participants were presented with demographic questions and the ten-item personality inventory, otherwise known as TIPI (Gosling et al., 2003). The TIPI includes two items for each of the Big-Five personality dimensions. Each item contains a pair of two trait descriptors and participants have to rate on a seven-point Likert scale ranging from 1, 'disagree strongly', up to 7, 'agree strongly', the extent to which the pair of traits applies to them (Gosling et al., 2003). The five-factor model (FFM) is currently the predominant model in trait psychology. The analyses suggested that the ten unipolar items of the TIPI could provide an efficient approximation for longer measures of the FFM personality constructs (Muck et al., 2007). The choice to adopt the TIPI rather than a longer personality measure has been made to reduce transient measurement errors resulting from participant fatigue, frustration and boredom associated with completing several survey instruments in combination with a lengthy experimental session (Volk et al., 2011).

As a measure for the Big-Five dimensions of personality, the TIPI has been validated against standard Big-Five instruments, finding generally positive results in terms of validity (Donnellan et al., 2006; Ehrhart et al., 2009; Gosling et al., 2003; Jonason et al., 2011; Lu and Kao, 2009; Volk et al., 2011). All these extensive validation studies have shown that the TIPI has acceptable psychometric properties even across different cultures and languages (Hofmans et al., 2008; Muck et al., 2007; Romero et al., 2012). The TIPI instrument has been used within different contexts of research, such as business and management (Tabaeian et al., 2012), individual and social preferences (Hesse et al., 2005; Livosky et al., 2012), and clinical psychology (Bunevicius et al., 2008). The Cronbach's alphas for the five TIPI scales in the current study were very similar to the findings by Volk et al. (2011), Donnellan et al. (2006), Ehrhart et al. (2009) and Gosling et al. (2003). Gosling et al. (2003) reported test-retest reliability for the five TIPI scales over a period of six weeks. They were 0.77 for extraversion, 0.71 for agreeableness, 0.76 for conscientiousness, 0.70 for emotional stability and 0.62 for openness, indicating that the scale provides a stable measurement of personality over time. More recently, Romero et al. (2012) confirmed the same results. In sum, the TIPI has been considered a promising instrument for situations where brevity is a priority.

After completing the TIPI scale, participants were presented with an anchoring task involving the Taj Mahal (Bazerman and Moore, 2009). In this task, participants were first asked to write the last three digits of their phone number preceded by the digit 1. Then participants were asked whether the Taj Mahal was completed before or after that year,

which served as the anchor. Finally, participants were asked to estimate the exact year of completion of the Taj Mahal. Half of the participants were presented with a brief story (from the Wikipedia.org page) about the Taj Mahal, in which the exact year of completion was mentioned (which was 1653). All participants were then informed about the nature of our study, thanked, and released from the study.

### 3.3 *An anchoring index*

Almost every study analysing the anchoring effect uses a procedure where the anchor is provided directly by the researcher and is computed in the analysis as low or high anchor in order to polarise results (i.e., Bodenhausen et al., 2000; English and Soder, 2009; Furnham and Boo, 2011; McElroy and Dowd, 2007). In the current study the anchor is not fixed, rather one could say a ‘mobile anchor’ was used. In order to deal with this issue and perform a correlation analysis in addition to a regression analysis, an anchoring index has been developed and calculated as follows.

$$AI = f(x, z)$$

$$x = |DIG - EST|$$

$$z = |EST - CORR|$$

*DIG* is the year composed by the three digits of the phone number of each respondent; *EST* is the estimate provided for the completion of Taj Mahal; and, *CORR* is the correct information provided (the year 1653). The variable *x* and *z* have been standardised to be in the range between 0 and 1. Therefore, the variable *AI* is explicated as follows.

$$AI = \begin{cases} 0, & z < median\{z\} \\ 1-x, & z \geq median\{z\} \end{cases}$$

For the group who was not presented with the brief story of the Taj Mahal, the variable *z* is not applicable. Thus, the anchoring index is calculated as follows.

$$AI = 1 - x$$

The *AI* has a range of continuous values from 0 to 1. When closer to 0 there is no anchoring effect; when closer to 1 there is a strong anchoring effect.

## 4 **Results**

Hypothesis 1 assumes that the availability of correct information does not influence the susceptibility to the anchoring effect. Thus, the recency effect should exist. In order to investigate this relationship, a regression analysis with the anchoring index serving as independent variable has been performed by selecting the cases where the correct information was provided or not. Participants’ estimates of the year of completion of the Taj Mahal served as the dependent variable. In the cases without correct information, the analysis showed significant results ( $F(1, 52) = 17.30, p < .000$ ) between the anchoring index and the estimation. Thus, the anchoring effect existed and affected the estimation judgment. However, in the cases where the correct information has been provided, the

analysis did not reveal the same significant results ( $F(1, 63) = .37, p < .54$ ). Thus, hypothesis 1 is rejected; the hypothesised recency effect cannot be supported.

In order to investigate whether the personality factors influenced participants' susceptibility to the anchor, a regression analysis with a variable expressing whether or not they received correct information and participants' personality trait scores serving as our independent variables have been performed. Participants' anchoring index served as the dependent variable. This analysis showed significant results ( $F(1, 117) = 6.685, p < .000$ ) on the relationship between the independent variables and the dependent variable. R-square is a statistic that will give some information about the goodness of fit of a model. In regression, the R-square coefficient of determination is a statistical measure of how well the regression line approximates the real data points. An R-square of 1.0 indicates that the regression line perfectly fits the data. As can be noted from table 1, only the variable expressing the correct information received had a significant relation in the model.

**Table 1** Output of the regression analysis

<i>Model</i>	<i>R</i>	<i>R square</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>		
1	.517 <sup>a</sup>	0.267	0.227	0.322884583		
<i>ANOVA<sup>a</sup></i>						
<i>Model</i>		<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
1	Regression	4,182	6	0.697	6.685	.000 <sup>b</sup>
	Residual	11,468	110	0.104		
	Total	15,65	116			
<i>Coefficients<sup>a</sup></i>						
<i>Model</i>		<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
		<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
1	(Constant)	1.101	0.251		4.393	0
	INFORMATION RECEIVED	-0.337	0.063	-0.459	-5.307	0
	EXTRAVERSION	0.02	0.022	0.079	0.915	0.362
	AGREEABLENESS	-0.055	0.029	-0.169	-1.888	0.062
	COSCIENTIOUSNESS	0.005	0.027	0.016	0.189	0.851
	EMOTIONAL STABILITY	0.002	0.023	0.008	0.086	0.932
	OPENNESS TO EXPERIENCE	-0.05	0.03	-0.143	-1.665	0.099

Notes: <sup>a</sup>Dependent variable: anchoring index

<sup>b</sup>Predictors: (CONSTANT), OPENNESS TO EXPERIENCE, COSCIENTIOUSNESS, INFORMATION RECEIVED, AGREEABLENESS, EXTRAVERSION, EMOTIONAL STABILITY.

In addition to the regression analysis, a correlation analysis has been performed with the calculated anchoring index as dependent variable and personality traits scores as independent variables. This analysis partially confirmed the regression results and two significant correlations have been found. The anchoring index has been found to be



negatively correlated with agreeableness ( $r(1, 117) = -.207, p = .025$ ) and openness to experience ( $r(1, 117) = -.187, p = .044$ ). This confirms the partially significant results of the coefficients in the regression analysis associated with the above mentioned personality traits. Thus, hypothesis 2c and 2e are rejected, while the analysis did not show any significant result about hypothesis 2a, 2b and 2d.

## 5 Discussion

The present work poses some important elements of originality in comparison with previous works concerning the anchoring effect. First, the sampling method and subject population in this paper are new in the field. The vast majority of studies on the anchoring effect used undergraduate students, while in the present study a population of seasoned managers and professionals has been analysed. Moreover, the sampling method was targeted in order to select individuals with educational background and experience the closest possible to a population of managers. On this account, the social network LinkedIn has been used to collect participants in the study. Second, no other studies have been found to adopt a 'mobile' anchor in the estimation task. Without counting the few studies analysing real data to prove the anchoring effect (i.e., Bokhari and Geltner, 2011), all the other studies provided participants with low versus high anchors in order to polarise results (i.e., Bodenhausen et al., 2000; Englich and Soder, 2009; Furnham and Boo, 2011; McElroy and Dowd, 2007; Nguyen and Schüßler, 2012). Even if this method is very useful to prove the existence of the anchoring effect, the same cannot be said in terms of realness. Third, in the present study the correct information has been put in competition with the anchor number, no other studies have been found analysing this relationship.

That being said, partial support for the hypothesised relationships has been found. First, the expected result (hypothesis 1) about a recency effect that favoured the anchor relative to the correct information has not been confirmed by the analysis, in contrast with Whyte and Sebenius' (1997) results. On the contrary, providing individuals with the correct information limited the individuals' reliability on the irrelevant anchor. This finding does not have a strong support; in fact just 33% ( $N = 21$ ) of the participants receiving the correct information exactly recalled it when estimating the year. This leaves space open for future research concerning managers' attention to the correct information provided to them.

Second, the limited research on the mitigating relationship between personality factors and susceptibility to the anchoring effect found how individuals with high conscientiousness and agreeableness, and low extraversion should be more susceptible to the anchoring effect (Bodenhausen et al., 2000; Eroglu and Croxton, 2010; McElroy and Dowd, 2007). Previous findings on conscientiousness and extraversion are not supported by the current study. In addition, findings of the present work contradict previous research on agreeableness and openness to experience (Bodenhausen et al., 2000; Eroglu and Croxton, 2010; McElroy and Dowd, 2007). In fact, in the present study, high agreeableness has been found to limit the susceptibility to the anchoring effect, and the same can be said about openness to experience.

Other than the presented results from a statistical analysis, some results from differences in the mean of anchoring index across different individuals may be worth noting even if not statistically significant. A gender effect seems to exist; female subjects

seem to be 'less affected' by anchoring bias than male individuals. The same can be said for educated people; individuals with higher degrees seem to be 'less affected' than others. An exception has been found with reference to PhDs, which resulted to have higher mean of anchoring index than people with master degrees. Future research may find interest in examining such findings with broader studies.

Several limitations are present within the current studies. The first relates to the selected measure of personality traits, which has been chosen because of its conciseness and brevity; however, its short length comes at the expense of reliability, a psychometric limitation that is indigenous to all short instruments. Furthermore, such a short scale is able to offer only a broad assessment of the Big Five personality constructs; as noted by its authors, the TIPI is also unable to provide scores for facet-level constructs, which are often better predictors of specific criteria (Gosling et al., 2003; McElroy and Dowd, 2007). Future research on this topic may benefit from using multi-item measures of the Big Five. The second limitation is shared with previous academic research and relates to the use of small size populations. This has been balanced with the use of a population more representative for managers than the usual student class. In fact, the average age of participants was about 43 years old and average working experience was about 19 years.

## **6 Conclusions**

Although personality has been one of the most-studied topics in management and decision-making research, this stream of research has generated inconsistent support for the relationship between personality factors and the susceptibility to heuristics, and therefore biased judgment.

This paper tested whether the five personality factors, namely extraversion, agreeableness, conscientiousness, emotional stability and openness to experience, as depicted by McCrae and Costa (1997, 1999) may influence individual sensitivity to anchor cues and in turn, individual judgments. In a task involving estimates about the year of completion of the Taj Mahal, the hypothesis that individual differences in personality would influence the reliability on a previously presented anchor have been examined. In order to operate with mobile anchors, differently from previous research that provided fixed anchors to participants, an anchoring index has been originally developed.

From a managerial viewpoint, the results of the present work suggest how it is convenient to provide correct information to decision-makers when the risk of susceptibility to the anchoring effects exists. Moreover, agreeableness and openness to experience have been found to reduce susceptibility to the anchoring effect, suggesting that managers with those predominant personality factors should rely less on irrelevant information when making decisions.

From this study, some interesting implications for future research directions on this topic also emerge. Some of them are related to the methods of this analysis. The fact that the current findings have not completely supported previous research and found non-analysed before relationships with reference to providing participants with correct information and personality traits opens some interesting venues for future research. These findings also pose interesting questions on how individual differences in personality traits may influence judgments for other heuristics and biases as well. This should be especially true for decision tasks affected by the reliance on external

information. One venue of research may involve the framing effect (Kahneman and Tversky, 1979). Previous research has chiefly examined relationships between personality traits and risk preference (Harms et al., 2012; Kourtidis et al., 2011; Zhao et al., 2010). Future research may want to explore whether this effect is due to reliance on external information (e.g., the frame) or whether it represents a general tendency among individuals with different personality traits.

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