



THE ROLE OF PRIMING IN ALLEVIATING BIAS WITHIN AUDITOR JUDGEMENT

Master Thesis in Accounting, Auditing and Control

Dr. Lorenzo Dal Maso
Thesis Supervisor

Ram Bambani
Student Number: 371650

Dr. Ying Gan
Second Reader



ABSTRACT

Professional judgment is an important factor for making informed decisions, especially in business fields such as Audit. Although not directly observable, cognitive tendencies have been acknowledged to be capable in undermining audit quality, consequently representing a problem. Information order effects are one such tendency that can influence the individuals' response based on the order in which new information is presented. On the one hand, research proposes that personality traits are a key component to reducing the influence of order effects. More specifically, theory suggests that having a high professional skepticism could potentially mitigate falling prey to cognitive fallacies. On the other hand, streams of literature in psychology propose that self-awareness is the main way of reducing the influence of biases on judgements. Given the mentioned above, this paper investigated the role of priming, a psychological technique that subconsciously alters behavior, in alleviating order effects within auditors by increasing self-awareness. In addition, the research aimed to provide more empirical evidence regarding the implementation of professional skepticism. Through the use of two case studies in a setting that involves complexity, uncertainty and high risk, it was determined that, *ceteris paribus*, auditors have a tendency to overweight information items in the end of an information sequence. These effects were dominant even by considering the different levels of professional skepticism, thus proposing that bias is a primitive and a hired-wired phenomenon. The priming of subjects, however, indicated a change in the beliefs of primed subjects to an extent where information order effects were inconsequential. This outlined the importance self-awareness as a factor for reaching an unbiased judgement, thus raising the necessity of changing regulations and standards with unconventional means to combat bias.

KEYWORDS: *PRIMING, PROFESSIONAL SKEPTICISM, BELIEF REVISION, GOING CONCERN, JUDGMENT, INFORMATION ORDER EFFECTS*

TABLE OF CONTENTS

1	Introduction.....	2
2	Theoretical framework.....	7
2.1	Cognition and Information Processing.....	7
2.2	Auditor Judgement and the Determinants of Judgement.....	10
2.3	Adjustment of Beliefs and Order Effects.....	13
2.4	Professional Skepticism.....	19
2.5	Priming and Debiasing.....	24
3	Data & Methodology.....	27
3.1	Sample.....	27
3.2	Case Studies.....	28
3.3	Execution and Measurement.....	30
4	Empirical Analysis.....	35
4.1	Participants and Demographic Data.....	35
4.2	Case 1.....	37
4.2.1	Descriptive Statistics.....	37
4.2.2	Results.....	44
4.3	Case 2.....	48
4.3.1	Descriptive Statistics.....	48
4.3.2	Results.....	53
4.4	Supplemental Analysis.....	57
5	Conclusion.....	67
5.1	Discussion.....	67
5.2	Limitations.....	69
5.3	Suggestions for future research.....	70
	Bibliography.....	72
	Normative Regulations and Rules.....	78
	Annex A – Derivation of the SbS process Belief-Adjustment Model.....	79
	Annex B – Premium Steel AG.....	81
	Annex C – GamePlay B.V.....	98

1 INTRODUCTION

To have an independent professional opinion is a key component for making informed decisions. Auditors are one example of professionals that are required to express such opinions on a daily basis. The driving factor behind these difficult cognitive processes, which underlie in the auditor decision making process, is also known as judgement.

Judgement has not only been internationally recognized as a term in accounting standards and regulations, but it has also become an object of a research endeavor attempting to understand the foundation of auditor decision making. That being said, the sequential nature of evaluating information is an important part of the judgment process. To reach a judgment, auditors typically form some beliefs upon reviewing initial evidence. By confronting new evidence items, auditors successively adjust their beliefs. Recent developments by Kahneman and Tversky (2013), however, have shown that people suffer from cognitive biases, which lead to irrational behavior as opposed to a normative viewpoint. With respect to financial markets, these discoveries have pushed aside standard assumptions only to be replaced with models that involve tendencies in the behavior of financial actors, such as investors, banks, or even auditors. The so-called “judgment triggers” are judgmental traps which affect the coding of information as a result of psychological biases (tendencies) (Mintz & Morris, 2016). Information order effects are an example of a bias that has the potential to skew the individuals’ response based on the order in which new information is presented. Although order effects are not a phenomenon which is directly related to audit, research has recognized that the order structuring of information can elicit beliefs that are not substantively justified, thus potentially undermining audit quality (Asare, 1992; Hogarth & Einhorn, 1992; Yankova, 2014; Ashton & Kennedy, 2002). Furthermore, the significance of order effects could be tied to the fact that clients usually determine the sequence and order in which data is provided to auditors. This can unduly impact the view point of auditors. Overall, prior research has provided insight into the determinants of information order bias, however, little attention has been paid to the possibilities of mitigating such cognitive tendencies.

On the hand, research suggests that personal dispositions (i.e. traits) play an important role in overcoming biases. Professional skepticism (PS), for instance, can be conceptualized as a personality trait which has been deemed as fundamental in auditing. Auditors with a high degree

of PS are generally considered to have a questioning mind and be less susceptible to fallacies. Nevertheless, more than half of the Security Exchange Commission (SEC) enforcement actions against auditors over the past decade refer to failures of PS (Beasley & Carcello, 1999). This points towards the fact that the effective incorporation of PS into audit practice is relatively difficult. AICPA¹, for instance, has recognized that behavioral biases have the potential to compromise PS and thus to prevent auditors from maintaining an objective and critical view on the information at hand (AICPA, 2010). In support to the aforementioned, the PCAOB² has discussed the potential inhibitory effects that an audit environment (e.g. strenuous workloads) can have on setting the appropriate application of PS (PCAOB, 2012). On the other hand, Kahneman (2013) argues that the most effective strategy for overcoming cognitive traps can be achieved through the sharpening of one's self-awareness. A stream of literature has investigated the implementation of priming under the form a cognitive enhancer leading to the finding that even the subtlest changes in the environment can subconsciously alter the behavior and beliefs of auditors (Hammersley, Bamber, & Carpenter, 2010; Parlee, Rose, & Thibodeau, 2014; Backof, Thayer, & Carpenter, 2014).

Given the aforementioned, it would of interest to investigate whether the increase of self-awareness of auditors can reduce the influence of information order effects. This would be of added value to regulators and audit practitioners due to several reasons. First, this would raise the necessity of special trainings that promote self-awareness, such that auditors learn to identify circumstances in which cognitive traps are likely to occur. Secondly, much flexibility has been given to the order in which information is presented, which could have adverse effects on the decision making. Hence, the results of this paper aim to provide empirical evidence of whether this is the case. In addition, the results will show if guidance structures serving as reminders are needed, which will thus control for cognitive tendencies. With regard to auditing standards, the lack of clear and unambiguous description of what professional skepticism is has casted a shadow over its proper application. As a result, this paper will provide more insight with regard to the impact of personality traits on beliefs. Given the aforementioned, this study provides and extends the support of how biases can affect the belief-adjustment process of individuals. Furthermore, it

¹ American Institute of Certified Public Accountants

² Protecting Investors through Audit Oversight

provides important insights as to how self-awareness and environmental enhancers can be used to mitigate such issues.

Considering the adverse effects of information order bias and the necessity of finding a way to reduce its impact on auditor judgment, the following research question is formulated:

Can the implementation of an environmentally enhancing stimuli mitigate or reduce the impact of information order effects on auditor beliefs?

The question was broken down into three stages whereby each one was related with a specific hypothesis. The research was done via the conduct of a controlled experiment which involved the employment of two (2) case studies over two (2) separate points in time, where participants had to sequentially assess the likelihood of an entity's going concern.

In order to measure information order effects, cues of information items were provided to participants in the context of sequential, mixed evidence, consisting of short series. Based on the theoretical foundations developed by Hogarth and Einhorn (1992), it was hypothesized that differences in the opinions will exist between auditors who first evaluate negative evidence followed by mitigating factors and auditors who first evaluate mitigating factors followed by contrary information. To measure this effect, forty (40) subjects were randomly assigned either to a positive (“--++”) or a negative treatment condition (“++--”), all of whom were given a case study and were further asked to provide their initial opinion (belief) regarding the going concern of an entity. Thereafter, the positive group had to evaluate two pieces of negative evidence followed by two pieces of positive evidence, whereas the negative group had to evaluate the same information but in the reverse order. If participants in the negative group experienced greater downward belief revisions, calculated as the difference between the likelihood assessment from the last information item and the initial belief, compared to the positive group, this indicated the existence of order effects.

With regard to personality traits, though the use of a scale developed by Hurtt (2010), trait professional skepticism was measured. Based on a median split, subjects were thus reclassified as either having “low” or “high” trait PS. This resulted in the split of four treatment conditions, which allowed to measure if the belief adjustment process tends to differ between auditors with different

levels of skepticism given the impact of information order. The results indicated that the belief formation of auditors is heavily influenced by the order in which information and additional evidence are processed. Information order effects were also not diminished even by taking into account the different levels of the participants' trait professional skepticism. This implied led to the conclusion that subconscious bias could potentially have a more dominant effect over personal disposition traits.

The last part of the experiment involved the random allocation of twenty (20) participants, out of the original forty (40), in a group that was exposed to a priming stimulus, whereas the remainder served as a control reference. This was done in order to cognitively enhance the awareness of participants with the final aim of reducing the impact of information order effects. After exposing half of the subjects to a priming stimuli, a second case, similar to the first one, was given to both the control group and the primed group. Through the use of a unique 4-digid code, subjects were identified and thus allocated to the correct information order condition (i.e. negative “++--” or positive “--++”) as per initial allocation in the first case. Using the results from the first and the second case studies, this gave the possibility to measure if primed participants experienced a change in their beliefs relative to the participants from the control group. The results indicated that environmentally enhancing stimuli significantly moderated the believe revision of primed auditors relative to non-primed auditors in a way which alleviated the former from information order effects.

Although the results supported the main predictions of the present study, several limitations should be considered. First of all, the sample size of the study was relatively small and the sample selection was drawn on a self-selection basis, which thus hinders the representativeness of the results. Secondly, participants were placed in a more simplified setting, whereby each individual was confronted with two cases. However, unlike in a real-life audit setting, the available information regarding the company, its financial stability, and other factors was limited to the information provided in the case description. Consequently, the participants were only able to form judgements based on the information in the cases. Lastly, the priming stimulus was specifically tailored to counter the effects of one specific cognitive trap, however, the question of its effectiveness against other biases remains openly debated.

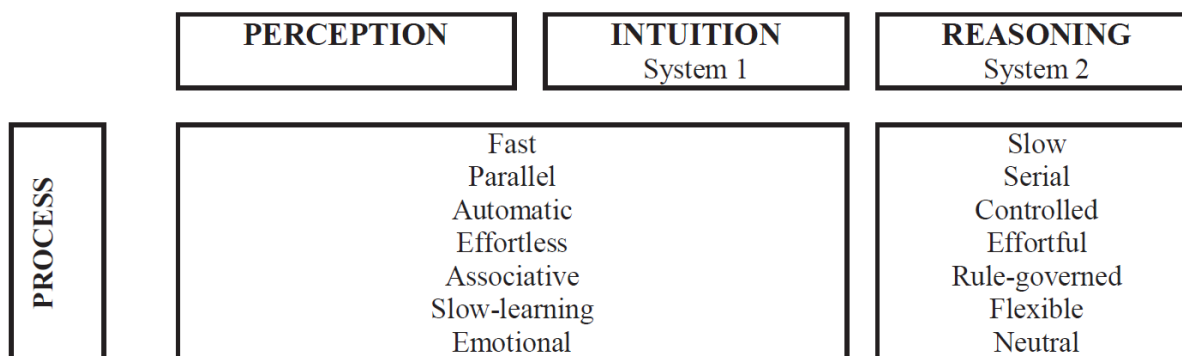
The remainder of the thesis is organized as follows: Chapter 2 provides a theoretical background of the underlying mechanics behind cognition, information processing, and the determinants of judgement. It further discusses the process of adjusting beliefs and the impact of order effects. The chapter concludes by introducing the reader with the concepts of professional skepticism and priming, and their role in influencing auditor judgement and behavior. Chapter 3 describes the research design and the methodology which was used to attain and analyze the empirical data. Thereafter, Chapter 4 presents the main findings which are further supported with supplemental tests to increase the reliability of the results. Lastly, Chapter 5 concludes the thesis with a discussion about the implications of the reported findings and the avenues for future research work which they open. Annex A provides additional information on the formal derivation of the belief –adjustment model which is discussed in Chapter 2. The experimental materials that were used to attain the results of the participants are presented in Annex B and Annex C

2 THEORETICAL FRAMEWORK

2.1 COGNITION AND INFORMATION PROCESSING

The human mind is known to consist of multiple parts that create an interconnected system (i.e. modularity), which reacts to and processes information (Baars & Cage, 2013). One part of the mind that has been gaining popularity ever since the 60s is the human cognition (Baars & Cage, 2013). It is defined as “the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.” (Oxford University Press, 2016). The description of cognition thus applies to mental processes such as problem solving, association, memory, attention and perception, to name a few, which help the mind reach a decision. Empirical research of these mental phenomena have been used in neuropsychology and cognitive science to bridge the gap between two processes known as information-processing and brain implementation (Baars & Cage, 2013). This usually involves the creation of theoretical models, which are then used to describe certain actions or behaviors. Following the paperwork of Stanovich (1999), and Kahneman and Frederick (2005), the “dual-process” view, displayed below in Figure 1, is one such model which separates the cognitive system into two constituent blocks: intuition and reasoning, also labeled as System 1 and System 2 processing, respectively.

Figure 1: Cognitive Systems (Source: Kahneman (2003b, p. 1451))

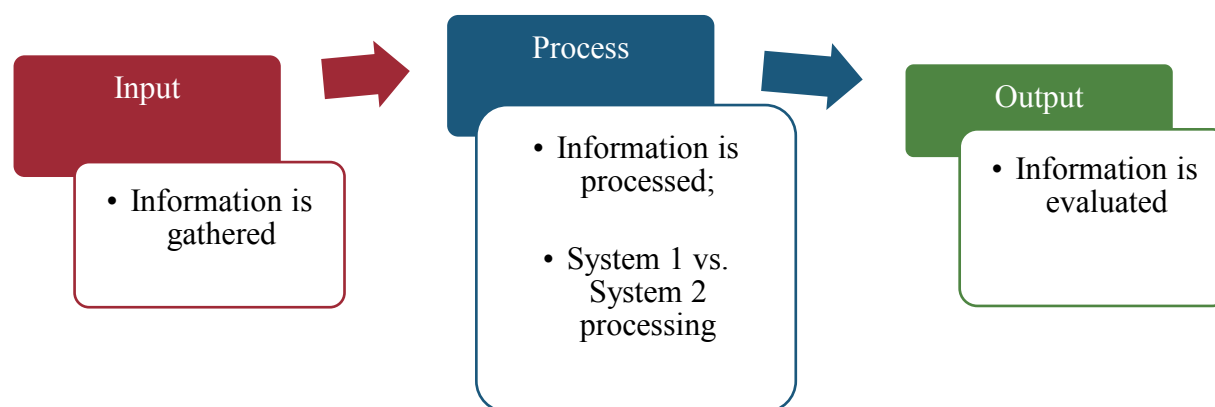


System 1 processing requires little mental effort as it is easily accessible, it involves emotionally charged and spontaneous processing, and is difficult to be controlled as it is often habit-based (Kahneman, 2013). On the other hand, System 2 processing involves effortful, analytical and slow processing in a rather controlled manner (Kahneman, 2013). It is hypothesized that the rules of logic govern the operations of System 2 and it can be seen as more flexible relative

to the operations of System 1 (Kahneman, 2013). Comparing the processing of both systems on an evolutionary basis, System 1 can be regarded as the more primitive processing apparatus that resembles the way in which animal cognition operates (Stanovich, 1999). System 2 processing, however, represents higher mental function, a unique characteristic attributed to *Homo sapiens*, due to a more developed prefrontal cortex. To sum up, System 1 processing requires no mental effort, and it does not relate to short-term (working memory) capacity, whereas System 2 processing is cognitively complex (and demanding), and is highly dependent on general intelligence, and is limited by short-term memory capacity (Stanovich, 1999).

The aforementioned system types play an important role in information processing – this is the cognitive operation which is responsible for how information is gathered, processed, evaluated, and used to draw inferences (Sternberg & Sternberg, 2012). If we assume the human cognition to be identical to a more sophisticated computing machine, essentially the information processing begins with an input (information), which passes through a processing mechanism (System 1 vs. System 2 processing) and ends with an output (decision) (Libby & Lewis, 1977). Despite the complexity of this mechanism, information, at almost every stage, can be coded differently due to the interference of various factors. As shown below in Figure 2, during the input-phase information is gathered, weighted and integrated based on the characteristics of the information set or the specific task (Libby & Lewis, 1977). Furthermore, certain viewpoints can change and adjust depending on whether new information is presented.

Figure 2: Input-Output model (Source: Yankova (2014, p. 15))



The process-stage deals with how information is processed based on the interplay of the two system types. As previously mentioned, System 1 takes a more rule-of-thumb (heuristics) approach and can thus be conscious or unconscious, which is the opposite of System 2 which requires a high degree of attention. This implies that System 1 processing is relatively more susceptible to suggestion and biases, whereas System 2 has a monitoring (i.e. corrective) function. However, there are instances where intuitive input generated from System 1 is endorsed by System 2, hence resulting in a biased decision. Stanovich (1999) argues that a bias free decision is only possible if System 2 manages to suppress biased stimuli from System 1. The effectiveness of this mechanism is thus dependent on process-related factors, which can affect the use of the particular type of processing system. This utilization of the processing system is theorized to be the result of a mental cost-benefit analysis, i.e. whether the use of high cognitive effort is well compensated with a (chosen processing) strategy yielding a “correct” outcome (Payne, 1982). This, therefore, suggests that if ambiguity or task complexity increases, *ceteris paribus*, individuals are more likely to revert to Type 1 processing, as the associated mental costs would outweigh the expected benefits.

The last (output) phase of information processing is reached after information has been analyzed and a conclusion is reached. At this point, it is unclear whether the processing outcome has been skewed due to influence of other factors present in the previous phases. Due to this, output related factors are usually employed to evaluate the overall quality of the mental process (Libby & Lewis, 1977). For instance, this would refer to the absence of biases, the speed and accuracy of reaching the final judgement and the consistency. As this research is interested in how these mental processes and factors are responsible for the judgment formation of auditors, it should be made explicit that the quality of auditor opinion herein is estimated in terms of the degree of cognitive biases.

To sum up, the first two stages of information processing should be seen as a multidimensional plane (instead of a one-dimensional line) where information is reshaped and interpreted depending on the combined effect of various factors. Furthermore, the interplay between the two types of system processing allows a certain degree of cognition adaptability through which individuals can adjust their initial beliefs after new information is uncovered. Lastly, the cognitive processing can be influenced by the attributes of the information processor,

which is linked to personal endogenous factors, such as skepticism. These factors and the exact cognitive mechanism through which this belief adjustment is possible are discussed in the next sections.

2.2 AUDITOR JUDGEMENT AND THE DETERMINANTS OF JUDGEMENT

Auditing is a process in which auditors examine the financial information present an opinion or express a judgement concerning whether there is any material misstatement (Mintz & Morris, 2016). Consequently, auditors have several responsibilities, which amongst others include following procedures to obtain evidence and consideration of internal controls; making risk assessments for any material misstatement that could be due to fraud; and reviewing audit evidence which should be sufficient and appropriate to create a basis for expressing an auditor opinion. The latter is of extreme importance, since it gives the most weight to the overall process. In other words, the auditor judgment is a decisive factor, which affects multiple parties, such as managers, investors, suppliers, to name a few, including the organization being audited. However, as discussed in the previous section, the judgement of a person can be influenced by various factors (Mintz & Morris, 2016). Prior to explaining the impact of such factors, professional judgment is first defined and an explanation is provided as to why it is of public interest.

According to the KPMG Professional Judgement Framework (2011), judgment is defined as the “process of reaching a decision or drawing a conclusion where there are a number of possible alternative solutions”. This definition is further supported with the one provided by Bonner (1999, p. 385) where judgment is conceptualized as the formation of “...an idea, opinion, or estimate about an object, an event, a state, or another type of phenomenon.” Judgment occurs in settings with uncertainty, risk, and, sometimes, in conflicts of interests. In some audit settings, certain accounting standards can be open to interpretation, consequently, professionals have to rely on their judgment in order to draw inferences. Other settings include factors such as unregulated authority that can impair judgment and auditor independence. For instance, Van Rinsum, Maas, and Stolker (2014) show that auditors tend to accept aggressive accounting when hired by management relative to the case when hired by an auditing committee. Due to this reason, professional judgment in auditing is of extreme importance as professionals must be able to apply an appropriate level of objectivity, experience, and knowledge to form an opinion on an accounting matter, which is based on relevant facts and circumstances. A common fallacy is to assume that

judgment is equivalent to decision. Although similar, the latter follows after a judgment is formed and involves the making of a choice by taking into account personal preferences. Thus, the key difference is that judgment represents the individual's beliefs, whereas decision further takes into account preferences (Thorne, 1998). Consequently, if there is an inconsistency between thoughts, beliefs, and preferences (i.e. cognitive dissonance), individuals would behave differently by adjusting their beliefs and principles to reach a certain goal (Mintz & Morris, 2016). This can be seen as an intentional inconsistency with an individual's underlying judgment, which in accounting settings could lead to flawed audits. A good example would be an instance in which a material misstatement is identified and yet an unqualified opinion is issued. This provides another point why professional judgment is of high importance to auditors and the public interest.

With reference to the aforementioned and the previous section, judgments should be seen as the cognitive output of decision making. Essentially, judgments can be represented as the final product of a long chain of information processing. This, however, can lead to certain complications since many factors influence the initial information (the input) until it is completely processed (as a comprehensive output). Consequently, judgements can be flawed due to unintentional inconsistencies resulting from adverse factors that can influence the cognitive sub-consciousness. This suggests that even though auditors might make diligent and reasonable decisions, audit deficiencies could arise from unconsciously biased decisions. To support this, Bazerman, Loewenstein and Moore (2002) argue that such issues cannot be resolved by solely imposing conditions of strong normative environment or high litigation. Consequently, to gain a better understanding of how cognitive factors can affect the decision making process, factors determining auditor judgment are analyzed and divided into three main categories: Environmental Factors, Personal Factors, and Task Factors (Bonner, 2008).

Environmental factors are contextual to the audit environment that come under the form of incentives, standards and regulations, audit technology, accountability, teamwork, feedback or pressure. Specifically, these factors are imposed exogenously to the auditing environment and as a result alter the auditors' cognitive efforts and motivation, thus affecting the auditor judgment Libby and Luft (1993). On the other hand, personal factors are endogenous tendencies that capture personality traits that influence professional and personal behavior (Engler, 2014).

Task Factors can be seen as the general structural characteristics of a task that influence the information processing of a person (Einhorn & Hograth, 1981). The general idea is that tasks can vary in terms of placing different demands on a person's exertion of effort, skills, and cognitive resources, which in turn affects the information processing. The main topic of interest, which was analyzed in this paper, relates to the order of evidence and its impact on auditor judgment. Essentially, order effects refer to the phenomenon that information can be presented in various formats and ordered in multiple ways. According to normative theories, such as the Bayes' rule, the judgments of rational auditors should only be influenced on the basis of their relevance (i.e. diagnosticity) and not by the presentation format or the order of evidence (Melnick & Everitt, 2008). Information order effects, however, suggest the opposite (Kahneman, 2013). Specifically, subjects, which are given an information set in the order (X-Y), are found on average to provide significantly different decisions relative to subjects that have been exposed to the opposite order, i.e. (Y-X). For instance, psychology research has established that people can be affected by order and framing effects when sequential processing of evidence is present (Einhorn & Hograth, 1981). Prior audit research has further confirmed that task variables (by controlling for the temporal order and for the mode of processing evidence) have an impact on audit judgment and can thus lead to non-normative responses (Ashton & Ashton, 1988; Butt & Campbell, 1989; Tubbs, Messier, & Knechel, 1990). To support this, Asare (1992) extended these findings by showing that order effects do not only influence the auditor's judgement, but also translate into audit report choices. In other words, Asare (1992) shows that auditors who evaluate contrary information, followed by mitigating factors, issue more unqualified opinions relative to those who evaluate the same evidence in a reverse order. The next section provides a more detailed theoretical explanation of the aforementioned phenomena, upon which the research approach and the methodology of this paper are constructed.

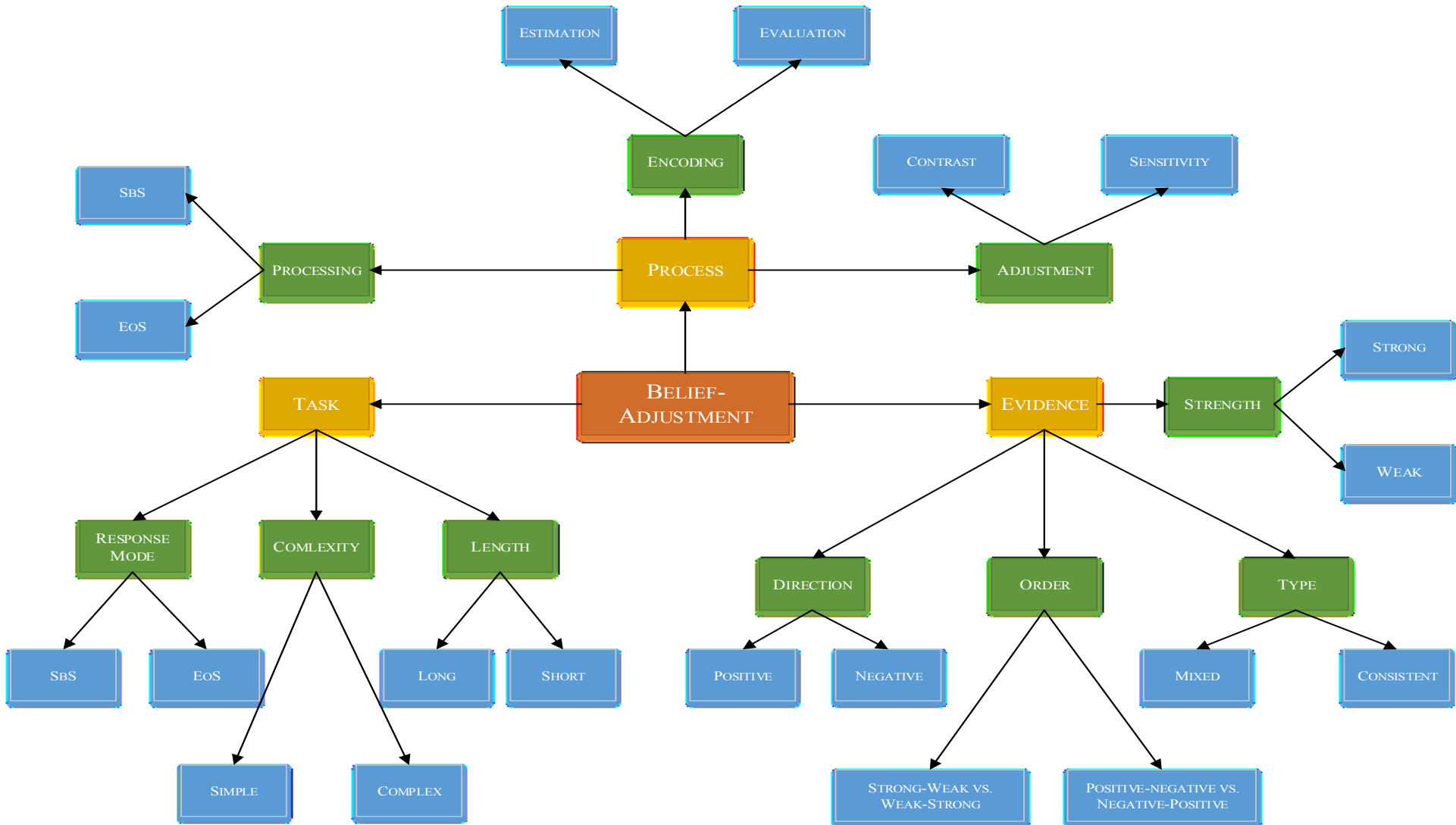
In conclusion, the evidence by psychology and auditing research elaborated on above provides enough support to state that cognitive factors significantly and systematically influence auditors' judgments in a rather adverse way. The existence of these phenomena clearly outlines that there is no interpersonal consensus, which provides no support for normative theories. Consequently, auditor judgment can be considered a multidimensional cognitive process, instead of a simple one-dimensional input-output system. Given the aforementioned, the next section focuses on the fundamentals of belief revision and the biases that can disrupt these processes.

2.3 ADJUSTMENT OF BELIEFS AND ORDER EFFECTS

One underlying assumption, which needs to be considered during the course of an audit, is “*the going concern of a firm*”, i.e. whether an entity will continue operating in the near future (Venuti, 2004). A company which is going concern faces a low likelihood of liquidating its assets or being forced out of business. According to ISA 570 (2016), if the initial risk assessment of the company indicates that the probability of the entity’s ability to continue as a going concern is low, mitigating factors need to be considered. These are counter-balancing factors which tend to mitigate the significance of items which affect the going concern assumption. For instance, if the entity under consideration has lost a principal supplier, the availability of an alternative source of supply can be considered as a mitigating factor. Since the nature of mitigating factors is not easily quantifiable, expressing an opinion regarding the concern of an entity can be challenging. Therefore, auditors need to form an opinion based on their belief. Bell, Peecher and Solomon (2005) define belief as “states of mind about facts that can be uncertain and vary in regard to justifiability...” However, beliefs are an abstract construct, which are not fully entertained in consciousness (Hume, 1999). This implies that beliefs are shaped by complex cognitive processes, which are linked to System 1 and System 2 processing (Gilbert, 1991). Consequently, peoples’ beliefs are susceptible to bias.

According to Anderson (1981), the tendency of beliefs to adjust as new evidence appears is a reflection of the adaptability of humans to changing informational conditions. As such, the process of belief revision is of sequential nature. Building upon this, Hogarth and Einhorn (1992) synthesized a model of belief revision. The model of belief revision can be seen as a sequential anchoring-and-adjustment process in which a prior belief (i.e. an anchor) is adjusted in light of new evidence. The model considers three properties that are relevant to belief revision – task characteristics, evidence characteristics and cognitive mechanisms. For simplicity, these properties are presented on the next page in Figure 3. A formal derivation of the belief-adjustment model is also presented in Annex A.

Figure 3. Properties of Belief Revision (Source: Yankova (2014, p. 61))

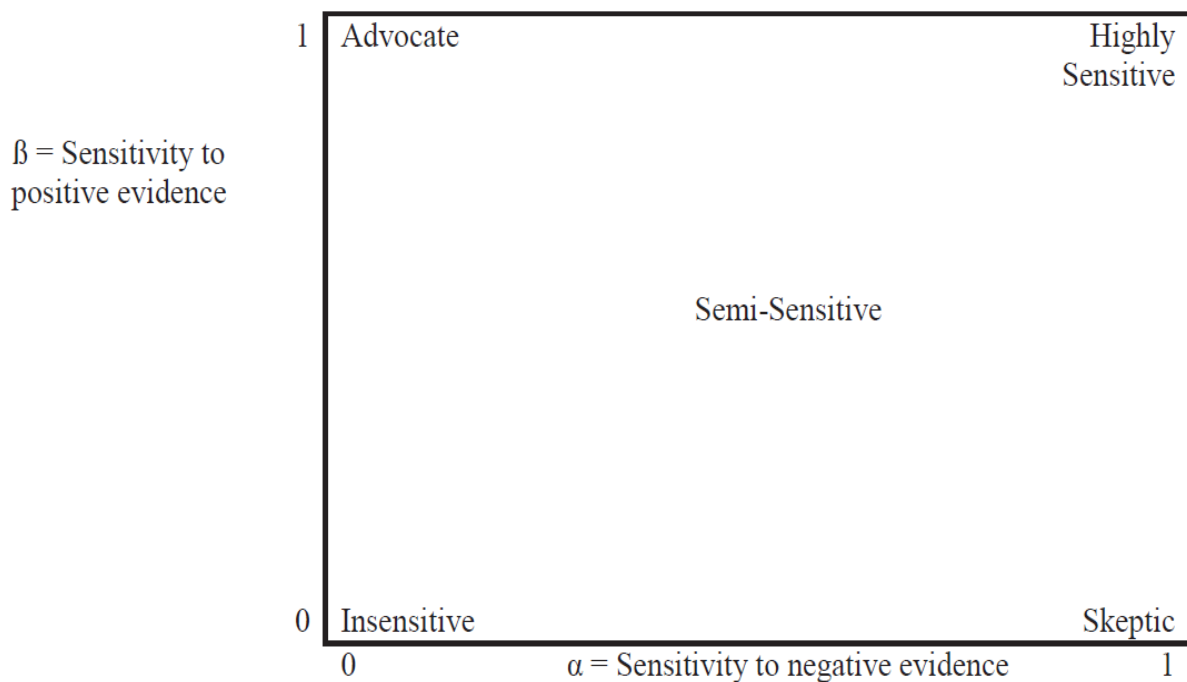


Task characteristics consider the manner in which information is evaluated so that people arrive at updated beliefs. As such, there are three identified task features that influence this process – complexity, length, and response mode (Hogarth & Einhorn, 1992). If subjects are unfamiliar with the task or the information load is large, then a task is perceived as complex. Similarly, if subjects are exposed to a large number of information items, the task is considered as lengthy. Usually a task involving a series of 17 information cues or above can be considered as lengthy (Hogarth & Einhorn, 1992). Lastly, the response mode considers how judgement is elicited dependent on how the information within the task is presented. It can be either in a step-by-step (SbS) manner or in an end-of-sequence (EoS) manner. In the latter case, beliefs are evoked after the whole evidence is aggregately processed, whereas SbS revises judgments after each piece of evidence is separately analyzed.

Evidence characteristics relate to the properties of the evidence that is processed by subjects. These properties involve the strength, direction, type, and presentation order of evidence (Hogarth & Einhorn, 1992). The evidence can be either strong or weak depending of its relevance to the task. On the other hand, the evidence can be either negative or positive with respect to the hypothesis under consideration. In other words, a positive evidence leads to an increase in beliefs in a given hypothesis, whereas the reverse holds for negative evidence. The type of evidence can be either consistent (i.e. a set consisting of entirely positive or negative items) or mixed, which involves both positive and negative items. Lastly, the presentation order can be split into two pairs: strong-weak versus weak-strong, and positive-negative versus negative-positive. The latter type of order is used in the case of mixed evidence, where a group of subjects is exposed to positive evidence followed by negative evidence, next to another group, which is first exposed to negative evidence followed by positive evidence.

The last relevant property of the model considers three cognitive mechanisms – encoding, processing, and adjustment, which are central components to the adjustment of beliefs (Hogarth & Einhorn, 1992). Encoding is the starting point during which information is assessed against a reference point prior to belief revision. There are two types of modes, evaluation and estimation, through which information can be encoded. The evaluation mode assesses evidence in an additive manner, as information is seen as bipolar (positive-negative) with respect to a given hypothesis. On the other hand, the estimation mode evaluates evidence in an averaging manner, thus viewing information as unipolar. Based on prior literature, and a descriptive example by Yankova (2014) the evaluation mode is considered to be the superior of the two (Asare & Messier, 1991; Bamber, Ramsay, & Tubbs, 1997). The second cognitive

mechanism, processing, is the internal (mental) process of belief revision. It considers how evidence is processed, which could be either in a sequential manner (SbS) or simultaneously (EoS). SbS processing is considered to be less (cognitively) demanding as information is gradually integrated and beliefs are adjusted after each piece of information. On the other hand, EoS processing stores large amounts of information, which are first aggregated and assessed before being integrated into beliefs. Lastly, the last mechanism looks at how beliefs are adjusted with respect to new information. Hogarth and Einhorn (1992) distinguish between two important effects that are of interest. The contrast effect assumes that the same piece of negative evidence affects strong initial beliefs to a greater extent relative to weak initial beliefs. On the other hand, the same piece of positive evidence affects weak initial beliefs more than strong ones. In other words, belief adjustments are proportional for negative evidence, but are inversely proportional for positive evidence with respect to the present anchor. Consequently, the degree of initial belief is predictive of the magnitude of belief revision. The second important effect is the individual sensitivity towards negative (α) and positive evidence (β). Due to the existence of contextual and personal factors, individuals are assumed to be sensitive to both types of evidence. This implies that high sensitivity towards positive evidence does not crowd out sensitivity towards negative evidence nor is complemented by it. Looking at Figure 4A, individuals can be insensitive, skeptics, advocates, highly sensitive, or semi-sensitive. Empirically, numerous studies have found that auditors are more sensitive to negative evidence relative to positive evidence (Ashton & Ashton, 1988; Favere-Marchesi, 2006). These results hint towards the conservative standards adopted by professional environments, due to the existence of high litigation and reputation costs.

Figure 4A. Sensitivity towards Evidence (Source: Hogarth & Einhorn (1992, p. 41))

The aforementioned theory implies that beliefs are susceptible to order effects. Kahneman and Frederick (2005) define order effects as weighting biases, which occur as a result of over/under-weighting of information items. Hence, there are three outcomes that can occur: primacy effects, recency effects, and no order effects. Under primacy effects, individuals put more importance on information presented early in a chain of evidence. It is hypothesized that items presented early in a sequence are rehearsed more and thus have a higher likelihood to remain longer in the memory (Plotnik & Kouyoumdjian, 2013). On the other hand, recency effects advocate individuals to overweight the importance of information items presented later in the series. Assuming that individuals are sensitive to information ($0 < \alpha, \beta \leq 1$), under mixed evidence and SbS processing mode, recency effects are expected to occur (Hogarth & Einhorn, 1992). Furthermore, the belief-adjustment model predicts that the magnitude of recency effects is expected to increase with the strength of and the sensitivity towards new evidence. Yankova (2014) provides an extensive overview regarding the predictions of the model, which are summarized in Figure 4B.

Figure 4B. Attitudes towards Evidence (Source: Hogarth & Einhorn (1992, p. 17))

Type of Evidence Response Mode	Mixed		Consistent	
	End-of-Sequence	Step-by-Step	End-of-Sequence	Step-by-Step
Short Series				
Simple	Primacy	Recency	Primacy	No effect
Complex	Recency	Recency	No effect	No effect
Long Series	Force toward primacy	Force toward primacy	Primacy	Primacy

In general, if the series is perceived as lengthy, primacy effects are predicted to occur, irrespective of the other components. It is hypothesized that mental fatigue influences new information in a way that individuals do not completely process new evidence. If the series consists solely of consistent evidence, and if the task is perceived as simple, primacy effects are expected to occur. Lastly, if the series consists of mixed evidence, the task is perceived as simple and the response mode is EoS, primacy effects are hypothesized to occur. In the other cases of mixed evidence only recency effects are predicted.

Overall, this study is interested in the context of sequential (SbS) responses to information, mixed evidence, and short series. The belief-adjustment model predicts that people in such a setting have a tendency to experience recency bias. Consequently, if auditors evaluate the going concern probability of an entity and are provided with cues of additional evidence, it is expected that they will put more emphasis on the information received later in the sequence. This implies that differences in the opinions will exist between auditors who first evaluate negative evidence followed by mitigating factors and auditors who first evaluate mitigating factors followed by contrary information. Consequently, the following hypothesis is formed:

H₁: Auditors evaluating mitigating factors followed by contrary information will exhibit greater downward belief revision than those who receive the same information in the reverse order.

To support the hypothesis, numerous studies have confirmed the existence of recency effects in an auditing environment. For instance, Ashton and Ashton (1988) demonstrate that in the case of mixed evidence, judgments of auditors are significantly affected by recency effects. Furthermore, Ashton and Ashton (1988) conclude that SbS processing exacerbates belief revision relative to the case of EoS processing. More support is offered by Theis,

Yankova, and Eulerich (2012) and Baird and Zelin (2000), who demonstrate the existence of order effects in the case of simple and complex tasks, EoS responses, and short information series. As the Belief-Adjustment model of Hogarth and Einhorn (1992) is based on human psychology, other fields of research offer further support to the aforementioned prediction. For instance, recency effects have been reported in military judgments (Adelman, Tolcott, & Bresnick, 1993), medical judgement (Chapman, Bergus, & Elstein, 1996), loan rating decisions (Guiral-Contreras, Gonzalo-Angulo, & Rodgers, 2007), and legal judgment (Costabile & Klein, 2005), to name a few. Given the extensive literature review about the existence of bias in auditing, the next two -subsections consider ways of dealing with such issues. The first subsection presents the idea that having strong innate characteristics and a questioning mind can mitigate recency. The second sub-section defends the argument that subconscious bias can be reduced through the implementation of a subconscious schema also known as priming.

2.4 PROFESSIONAL SKEPTICISM

A central component of the auditor's mindset involves a high degree of self-awareness which allows for the proper application of professional skepticism (PS) and accounting standards (Glover & Prawitt, 2013). PS of auditors, is defined as an attitude (i.e. a state of consciousness) that involves the critical assessment of audit evidence and having a questioning mind (AICPA, 2002; PCAOB, 2012). Although the concept of PS has undergone a lot of debate and conceptual development over the years, it is still considered a relatively vague concept (Yankova, 2014). Consequently, there is limited empirical evidence which can provide clarity on the topic.

Nelson (2009) distinguishes between two adopted views on PS, the "neutral view" and the "presumptive doubt" view, which are considered of being the most important. Under the neutral view, auditors critically assess information, managerial explanations and claims, without making any assumptions regarding biases, or the level of management's honesty or dishonesty. According to this view, independence and objectivity are a *priori* for the functionality of PS, since only an autonomous and impartial auditor can prioritize the public interest before satisfying the client's interest or one's own self-interest (Yankova, 2014).

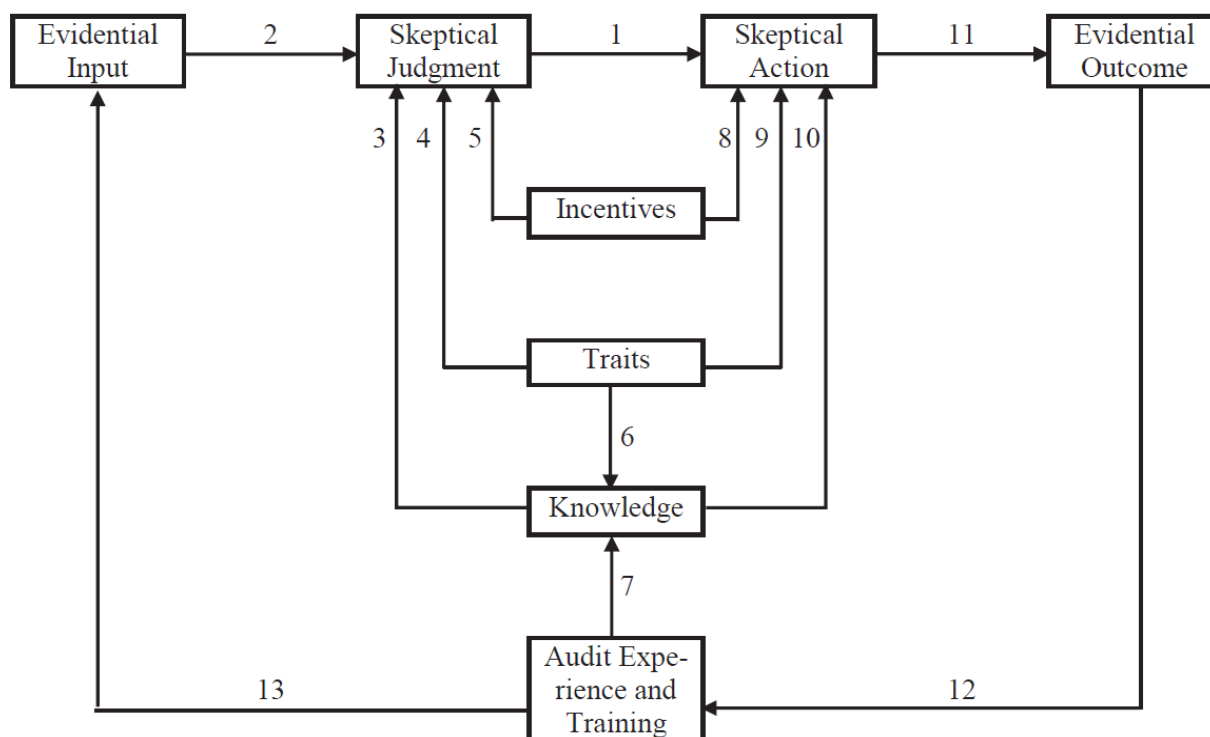
Although accounting standards codified in AS 1015.09³ and ISA 200.15 (2009) adopt the neutral view of PS, somewhat more emphasis is placed on the second view of PS.

The presumptive doubt perspective considers practices which are often adopted in forensic auditing, where a more conservative approach is taken. As such, unless sufficient persuasive evidence exists, managerial assumptions, statements, and other financial data are considered as doubtful. Even though the difference between both views might seem insignificant at first, empirical evidence suggests otherwise. For instance, Bazerman, Lowenstein, and Morgan (1997) report that followers of the neutral view are more susceptible to bias in favor of the client. Furthermore, Quadackers, Groot and Wright (2014) conclude that the presumptive doubt view is more predictive of auditor skeptical judgments and decisions, especially in higher-risk settings. On the other hand, auditors that express a preference towards the presumptive view may exhibit relatively high PS, which in turn can design overly inefficient and expensive audits (Shaub & Lawrence, 2002; Bell, Peecher, & Solomon, 2005; Nelson, 2009). Moreover, Cohen, Dalton and Harp (2014) find that the neutral view is positively associated with job attitudes such as person-job fit and professional identification, which is opposite to the findings with regard to the presumptive doubt view. In conclusion, the two views should not be considered as superior to one another since each of them has different implications, suggesting that none can be deemed as optimal for all audit scenarios (Glover & Prawitt, 2013).

Despite the limitation of empirical evidence surrounding the measurement and the mechanics of professional skepticism, two renounced frameworks are known to exist that provide a theoretical foundation. The first one is conceptualized by Nelson (2009), which is based on the idea that knowledge, traits, and incentives dynamically interact to produce judgments in auditors that reflect PS. The framework of Nelson (2009) is best described by Figure 5A.

³ AS1015 is equivalent to SAS 1 (AU 230), however, pursuant to SEC Release No. 34-75935, File No. [PCAOB-2015-01](#) (September 17, 2015) the PCAOB auditing standards were reorganized, which became effective as of December 31, 2016.

Figure 5A. Nelson’s Model of PS (Source: Nelson (2009, p. 5))

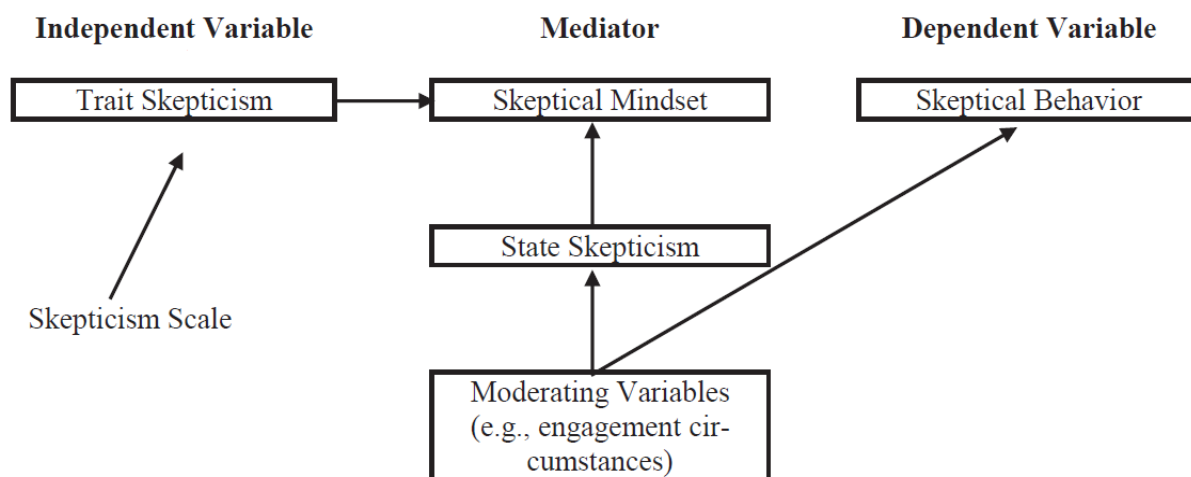


A central input to skeptical judgement is audit evidence (link 2), which when processed translates into a skeptical action (link 1), however, this relation is not generalizable. This is due to the presence of traits incentives (link 5 and link 8), traits (link 4 and link 9), and knowledge (link 3 and link 10) which collectively interact and thus directly affect the relationship between skeptical judgement and skeptical action. In general traits are considered as stable, long-lasting attributes of an auditor such as ethical predispositions, skills, and dispositional skepticism which are exogenously determined. Furthermore, it should be noted that knowledge is partly determined by traits (link 6) and by experience/training (link 7), which further (indirectly) skews the relationship between skeptical judgment and skeptical action. Lastly, skeptical action determines the extent to which more evidence is attained (link 11). This then becomes part of the auditor’s experience (link 12), thus transforming into future evidential input used in future decisions (link 13), whereby the process repeats itself.

The second important framework is conceptualized by Hurtt (2010), which describes PS as a multi-dimensional individual characteristic. This model views PS as a behavioral disposition that consists of traits and states. The former represents the rational and consistently stable attributes of an individual, whereas the latter is considered as a temporary condition, which is influenced by situational factors. The interaction of both state and trait skepticism

determines the auditors' skeptical mindset, thus transcending unto a skeptical behavior. This relationship is displayed in Figure 5B.

Figure 5B. Hurtt's Model of PS (Source: Hurtt (2010, p. 150))



Both frameworks posit that a complex interplay of consistent traits (such as dispositional skepticism) and the equilibrium of situational factors of the audit environment (such as incentives or client-specific factors) influence the extent to which auditors' judgments and actions reflect professional skepticism. Nelson (2009), however, argues that cognitive traps such as anchoring tendencies, and recency effects play a role in information processing, thus adversely affecting the process of decision making. Consequently, this leads to judgments of impaired PS and quality. According to Bazerman and Moore (2013), such biases occur at a subconscious level by being resistant to skepticism-enhancing activities and thus represent a significant issue. Furthermore, the PCAOB (2012) and Nelson (2009) underline the importance of information order effects to PS since clients are the ones that determine the order in which financial information is provided. This implies that clients can present evidence in a manner which creates significant contrast effects, thus inducing biases in auditors in favor of the former. The aforementioned is supported in a study by Hurtt, Brown-Liburd, Earley, and Krishnamoorthy (2013), which also discusses that biases are detrimental to auditor decision making and PS. According to Abou-Seada and Abdel-Kader (2003), auditors that are more skeptical will have the tendency to form opinions and beliefs that differ from others who are less skeptical. This implies that trait skepticism is an important component in terms of belief revision. However, it is empirically and theoretically unclear whether any interaction between PS and information order effects exists. As such, two scenarios suggest opposing ideas.

The first scenario supports the notion that skepticism cannot overcome information order effects and as a consequence is dominated by recency effects. Nelson (2009) argues that certain environmental conditions can potentially exasperate cognitive biases, thus adversely affecting PS. Furthermore, Rose and Rose (2003) posit that high cognitive effort is not always beneficial, since more elaboration leads to more complex thinking and as a result complexity can bring about recency effects. These results imply that biases are not linearly nor positively related to cognitive efforts, as predicted by Kennedy (1993). A similar finding has emerged in Hurley's (2016) research who argues that higher level of PS can impair effectiveness of audits, due to depletion. Moreover, Ashton and Kennedy (2002) hypothesize that by collecting evidence auditors suspend beliefs until there is a solid basis to reach a judgment. This inevitably leads to the overweighting of information presented at the end of the evidence sequence, thus inducing order effects in auditors' judgement. Lastly, in an empirical analysis by Yankova (2014), it was found that recency effects dominate trait professional skepticism.

The second scenario supports the notion that professional skepticism can mitigate information order effects through the interplay of three cognitive mechanisms. The first mechanism relies on the auditors' attitude towards evidence. Through applying the belief adjustment model, Pei, Reckers, and Wyndelts (1990) predict that when individual sensitivity (to informational evidence) is highly asymmetrical, order effects are mitigated. The second mechanism presumes that auditors with high trait PS will not "jump" to conclusions, but will instead evaluate the evidence in a simultaneous manner, thus reducing the impact of recency effects (Hilton, Fein, & Miller, 1993; Schul, Burnstein, & Bardi, 1996). This opposes the aforementioned by Ashton and Kennedy (2002), however, no empirical evidence is available in support of this mechanism.

The last mechanism relates to the findings of Kennedy (1993), and thus presumes that recency is an effort-related bias. This posits that auditors with high trait PS, exert more effort and are thus less susceptible to order effects. This is further supported by Hilton, Fein, and Miller (1993) who argue that innate skepticism (with respect to the credibility of information) can promote attention and higher exertion of effort in information processing, resulting in less biased judgments. Therefore, this shows that the belief adjustment process tends to differ between auditors with different levels of skepticism. This leads to the following statement:

H₂: Auditors with low innate professional skepticism will experience significantly different belief revisions than those with high innate professional skepticism, ceteris paribus.

2.5 PRIMING AND DEBIASING

Auditing research has explored numerous ways of how to reduce recency effects in belief revision. A study by Kennedy (1993) led the conclusion that order effects are effort-related biases which can be diminished by stimulating the cognitive effort of individuals. According to Payne (1982) people will exert mental effort only if they find doing something worthwhile. Consequently, Kennedy (1993) utilized accountability as a mechanism which induces effort and thus successfully mitigated recency effects in the research sample. Other methodologies which have been applied to mitigate recency effects include attention-enhancing techniques (Cushing & Ahlwat, 1996) or self-reviews (Ashton & Kennedy, 2002). Social research provides another point of view on how judgments can be altered. Baron and Branscombe (2011) discuss that cognitive frameworks (i.e. schemas) influence the thoughts of individuals at any point in time. Consequently, the better-developed schemas are, the more influential they are with respect to decision-making, and the easier it is to activate them. Sparrow and Wegner (2006) argue that with a psychological technique known as priming such schemas can be activated.

Tulving and Schacter (1990, p. 301) define priming as a: “[...] nonconscious form of human memory, which is concerned with perceptual identification of words and objects.” In other words, priming can be considered as an unconscious remembering process, which occurs when certain stimuli or events increase the availability of specific information categories (Higgins & King, 1981; Higgins, Rholes, & Jones, 1977). For instance, after watching a horror movie people have a tendency to be more sensitive to the cracking sound of a door or a wind blow. Priming has only recently been recognized as separate from other forms of memory or memory systems, which led to its importance as an aspect of social thought. There are several types of priming, amongst which the most important are positive and negative priming (Mayr & Buchner, 2007; Reisberg, 2009), perceptual and conceptual priming, affective priming (Murphy & Zajonc, 1993; Vaidya, Monti, Gabrieli, Tinklenburg, & Yesevage, 1999) and associative and semantic priming (Bentin, McCarthy, & Woods, 1985; McNamara, 1994). In general, priming is a process that engages people in a task or exposes them to certain stimuli. Thus, when an individual is primed, his performance on a subsequent task can be led towards a certain direction (Tulving, Schacter, & Stark, 1982).

Due to its strong tendencies to lead decisions into a certain direction, priming has become an interesting and important phenomena for research studies. However, the application of priming in financial markets and accounting can be considered as rather unexplored, as the literature and research on this topic is rather limited. Kliger & Gilad (2012), for instance, investigate the effect of color exposure in financial decision making. They concluded that subjects who were exposed to red color (which emphasizes value losses of an underlying asset) assigned higher valuations and probabilities to events involving losses, than to events involving the gains. These results were relative to the valuations provided by subjects who were exposed to green color. This can be rationalized through the application of Construal Level Theory, where Trope, Liberman, and Wakslak (2007; 2010) empirically validate that thought processes determine which part of an information set is retained and is given the most consideration. For instance, shifting the focus from specific details to abstract thinking enhances the global features of an information set relating to a particular event (Freitas, Gollwitzer, & Trope, 2004). Considering the aforementioned, one could argue that such interventions might have a significant impact on the behavior and critical judgment of auditors. To support this, Backof et. al (2014) applied Construal Level Theory by priming auditors to consider how complex management estimates were obtained by making them engage into low-level, concrete thinking. They thus concluded that primed auditors become more sensitive to contradictory evidence, which is further enhanced by reviewing graphical evidence. This implies that a simple prime and the presentation format of audit evidence can affect auditor judgment. Furthermore, Parlee et. al (2014) conducted an experiment, which showed that priming through the use of metaphors promoted professional skepticism and thus has a significant impact on the skeptical judgments of auditors. Another notable research is the one by Hammersley et. al (2010), which makes use of Support Theory to establish a relation between documentation specificity of fraud risk and auditor's subsequent performance. Furthermore, the experiment uses conceptual priming as a stimulus to compare the fraud risk assessments made by auditors between manipulated groups and controlled groups. Their findings yield mixed results, whereby priming is determined to have both a positive and a negative effect dependent on whether auditors receive a general memo or a specific memo, respectively.

The aforementioned studies by Backof et al. (2014), Hammersley et al. (2010), and Parlee et al. (2014) create a theoretical foundation to argue that priming can subconsciously alter both the judgement and the behavior of individuals towards a desired direction. This suggests that priming at the most basic level can infiltrate information processing and act as a biasing and a debasing technique. Therefore, this leads to the following formulation:

H₃: Auditors who evaluate mitigating factors followed by contrary information will exhibit different belief revisions post to receiving a priming stimulus.

3 DATA & METHODOLOGY

As previously discussed, this research is interested in the effects of priming on debiasing (or reducing) order effects in auditors within a going-concern assessment environment. Furthermore, an attitude of professional skepticism was operationalized to investigate whether subconscious bias can be mitigated based on the variation of innate traits. To do so, a controlled laboratory experiment was conducted, in which subjects were tasked to complete a two-part evaluation task (as explained in the sub-section below).

3.1 SAMPLE

The chosen method of sampling represents a combination between opportunity sampling and volunteer sampling (Babbie, 2013). Although random sampling is considered as a relatively good method for obtaining an unbiased representative sample, it was inapplicable for the present study. This is because this research was mainly interested in a target population that consists of experienced audit professionals. In addition, due to the nature of the industry, partners and senior executives from various audit offices were first approached for a permission regarding the conduct of this research. Thereafter, audit professionals were contacted via email. Only individuals who had chosen to be involved in the study were selected. Overall, the sample consisted of individuals who are currently employed as auditors in two BIG 4 firms (e.g. Deloitte and EY).

The necessary empirical data was collected through two (2) cases studies, i.e. Case 1 and Case 2, in two (2) consecutive periods which involved the assessment of the going concern of an entity. To ensure a higher participation rate, both a pen-and-paper and an online survey were made available as an option to the professionals. Since participation was on a voluntary principle, auditors were asked to choose their preferred method for completing the experiment. Subjects that chose the first option were asked to register themselves by inputting a four-digit code, after which they were randomly assigned to a treatment condition. Under the second option, a randomizer (i.e. EY Random⁴) was used to allocate the pen-and-paper surveys in the different conditions based on the total email confirmations of the participants who registered for the face-to-face experiment. During the actual meeting, participants were asked to write down a four-digit number in the upper-right corner on the first page of the case study. Once the complete data from Case 1 was processed, EY Random was used again to assign participants

⁴ A software developed by EY to generate random numbers for sample selection purposes.

either to the control group or to the primed group. The four-digit code made it possible to identify participants and thus to allocate them in the correct treatment condition in Case 2 as per initial allocation. It should be noted that auditors in the primed group only had the opportunity for a pen-and-paper survey since their physical participation was mandatory. The survey was carried out in two countries (i.e. Bulgaria and the Netherlands), due to this reason both cases were standardized to English. This was done in order to increase control and to avoid translation mistakes. Furthermore, as a global corporate policy, the work language of the BIG 4 companies is English, which implies that the employees are expected to maintain a high enough proficiency in English in order to be able to take part in the experiment.

3.2 CASE STUDIES

As discussed in the previous subsection, the employed method of data collection was done through the use of two (2) surveys under the form of case studies. These were used in order to attain information regarding the trait professional skepticism of participants and the influence of order effects in two time periods, i.e. before and after the subjects were primed. Each case was divided into two parts, whereby the first part presented a general description of the entity.

The first case, or Case 1, considered a hypothetical company Premium Steel AG which is designed and tested by Yankova (2014). It depicted a scenario in which the entity is a manufacturer of high quality steel products in Germany, however, due to the economic crisis and other factors it had suffered performance wise. The second case, i.e. Case 2, considered the hypothetical Dutch company – GamePlay B.V. Case 2 can be seen as adaptation of Case 1 as it combines developed tasks and additional evidence characteristics, which have been tested in a research by Kida (1984). Briefly, GamePlay depicted a scenario in which the entity is a successful game platform provider with a recent history of an IPO⁵. Following the description of the entity, participants were placed in the roles of auditors for a specific fiscal year and were asked to provide a going-concern assessment. Additionally, it was clarified that internal controls were deemed as effective, the entity was a client for a third consecutive year, and that a risk-based approach had been applied. Next to this, consolidated financial statements were provided which were comprised of a balance sheet, an income statement, a cash flow statement and additional financial information. The financial data included historical information for three consecutive years including the present financial year under audit.

⁵ Initial Public Offering

Based on the provided information, participants were asked on an 11-point Likert scale (ranging from 0% to 100%) to evaluate the likelihood that the entity will continue its existence within the following twelve (12) months. This likelihood judgment scale was employed for eliciting the auditors' initial beliefs (i.e. S_0). Thereafter, four additional cues of information were provided in a sequential order, whereby participants were requested to provide their revised assessment after evaluating each cue. Thus, the four reassessed beliefs are henceforth specified as S_1 , S_2 , S_3 , and S_4 . Depending on the treatment condition in which participants were placed (i.e. positive "--++" or negative "--+-"), the presented evidence consisted either of two blocks of positive information (i.e. mitigating factors) and two blocks of negative information (i.e. contrary evidence) or vice versa, respectively. Once again, an 11-point of Likert scale was used to estimate the probability that the entity will continue operating within a future period of twelve (12) months. It should be noted that participants were specifically instructed to answer all questions in a sequential manner in order to invoke SbS mode processing.

The second part of the cases contained additional questions which included demographic data, manipulations checks, Hurtt's scale for PS, and debriefing questions. At the beginning of the second part of Case 1, participants were provided with a 30-item questionnaire which represented Hurtt's scale. The scale measured the overall professional skepticism of auditors based on six dimensions (e.g. questioning mind, suspension of judgement, search for knowledge, interpersonal understanding, autonomy, and self-esteem), as per a methodology developed by Hurtt (2010). The scale was administered only in Case 1 after the first part of the experiment, since according to Peecher and Solomon (2001) innate PS is assumed to be a non-manipulative stable trait. Furthermore, no information was provided to participants regarding the nature of the scale to reduce the likelihood of non-genuine responses. Similarly, at the beginning of the second part of Case 2, demographic questions about the age, experience, and other individual characteristics of participants were asked. Manipulation test procedures were administered subsequent to the Hurtt scale in Case 1 and to the demographic questions in Case 2. The purpose of these checks was to confirm whether the participants perceived the cues of additional evidence in consistency with the predicted direction (i.e. positive and negative). In addition, these procedures measured how similar the information cues were to participants in terms of importance. The perceived strength and direction of the additional evidence were operationalized on a two-base rating scale. The importance of an individual information cue was measured on a 7-point Likert scale ranging from 1 ("Not important") to 7 ("Very important"). On the other hand, the direction was measured by allowing participants to classify

the cue as either neutral, negative, or positive information. It should be further noted that the manipulation checks were not directly administered after the evaluation part of the case, in order to obtain a more objective input from the participants (Yankova, 2014). In addition to the manipulation checks, the survey ended with several skepticism- and effort-related questions. In combination with the demographic section, the input from these questions was used to generate control variables, which were used to mitigate homogeneity. These included self-reported scores of concentration, intensity of thought, attention, and level of difficulty. For further information, templates of Case 1 and Case 2 are provided in Annex B and Annex C, respectively. Each template represents the “--++” condition from the final experimental materials.

3.3 EXECUTION AND MEASUREMENT

The experimental design followed a difference-in-difference-in-differences (DDD) approach, and it made use of two periods (i.e. Case 1 and Case 2), two manipulated variables (i.e. priming and information order effects) and one measured independent variable (PS). The key assumption of this statistical method, also known as “Parallel Paths”, posits that the average change in the comparison group represents the counterfactual change in the treatment group if there were no treatment. In other words, if two similar cases (i.e. Case 1 and Case 2) are employed, over an interval of time (t), and if a group of auditors is primed and compared to another one which is not, any significant change in the believe revision between the two groups would be due to the effects of priming, assuming all things equal. To do so, the research made use of the methodology of Yankova (2014) and the design of Experiment 4 by Hogarth and Einhorn (1992). According to Kahle, Pinsker and Pennington (2005), the latter has found numerous applications in auditing research relating to belief adjustment. Furthermore, the experiment was broken down into three stages, where each consecutive stage tested the significance of each hypothesis from the theoretical framework.

The first stage of the experiment focused on finding whether order effects affect decision making (i.e. H_1). This was measured by comparing whether a significant difference in the belief revision of professionals exists due to the different order of presented information. To establish the correct environment, the independent variable (i.e. information order) was manipulated at two levels. From the final sample of forty (40) participants, seventeen (17) subjects were exposed to two pieces of negative information, which were then followed by two pieces of positive information. This treatment group is henceforth referred to as the “*positive group*” or

the “--++” group. The remaining twenty-three (23) participants were exposed to the same evidence as the positive group, but in the reverse order, i.e. the positive cue clusters of evidence were presented prior to the negative evidence. This treatment group is henceforth referred to as the “*negative group*” or the “++--” group. It should be noted that the presentation order in both groups was held constant within the positive and the negative cue clusters of additional information. The dependent variable (i.e. belief revision) was measured as the difference between the last likelihood assessment (S_4) and the initial belief (S_0) of each participant, namely:

$$\text{Belief Revision} = S_4 - S_0.$$

If the importance of each additional evidence is perceived as similar by a person, then the normative theorem predicts that a person’s last revised belief should be equivalent to her/his initial belief (i.e. $S_4 - S_0 = 0$). This implies that the order of information should not lead to the overweighing of importance of information items presented later in the series. However, as previously discussed in Section 2.3, the belief-adjustment model predicts that if the information series consists of mixed evidence, and the response mode is SbS, recency order effects are predicted to occur. More specifically, recency is observed if the responses of the negative group indicate significantly greater downward belief revisions compared to the positive group. In other words, recency emerges if:

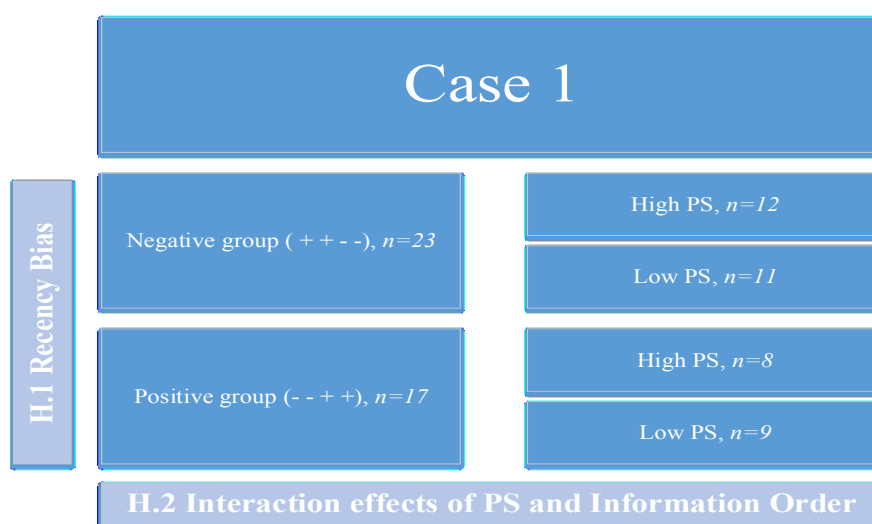
$$S_4 - S_0 \text{ (negative group)} < S_4 - S_0 \text{ (positive group)}.$$

In order to statistically measure this effect, univariate analysis of variance (ANOVA) was used as a technique to determine whether there is a significant difference between the various treatment groups.

For testing the second hypothesis, additional questions were administered which consisted of two parts. The maximum score that a subject could obtain on a 30-item questionnaire was one hundred and eighty (180), which is equivalent to the highest level of PS. The participants were split into two categories of PS (low versus high), based on a median split. Hypothesis 2 (i.e. H_2) was tested in a univariate ANOVA through the estimation of interaction effects between information order and the different levels of trait professional skepticism. Based on the theoretical framework, people with high PS are expected to evaluate the evidence simultaneously and not deviate from the expected norms. Furthermore, auditors with high PS are expected to exert more effort and thus be with promoted attention, resulting in less biased

judgments. Therefore, the belief adjustment process is predicted to significantly differ between auditors with high levels of skepticism compared to auditors with low levels of professional skepticism. Given the aforementioned, the first two hypothesis procedures can be summarized in Figure 6A as follows:

Figure 6A. Hypothesis testing and experimental design of H₁ and H₂

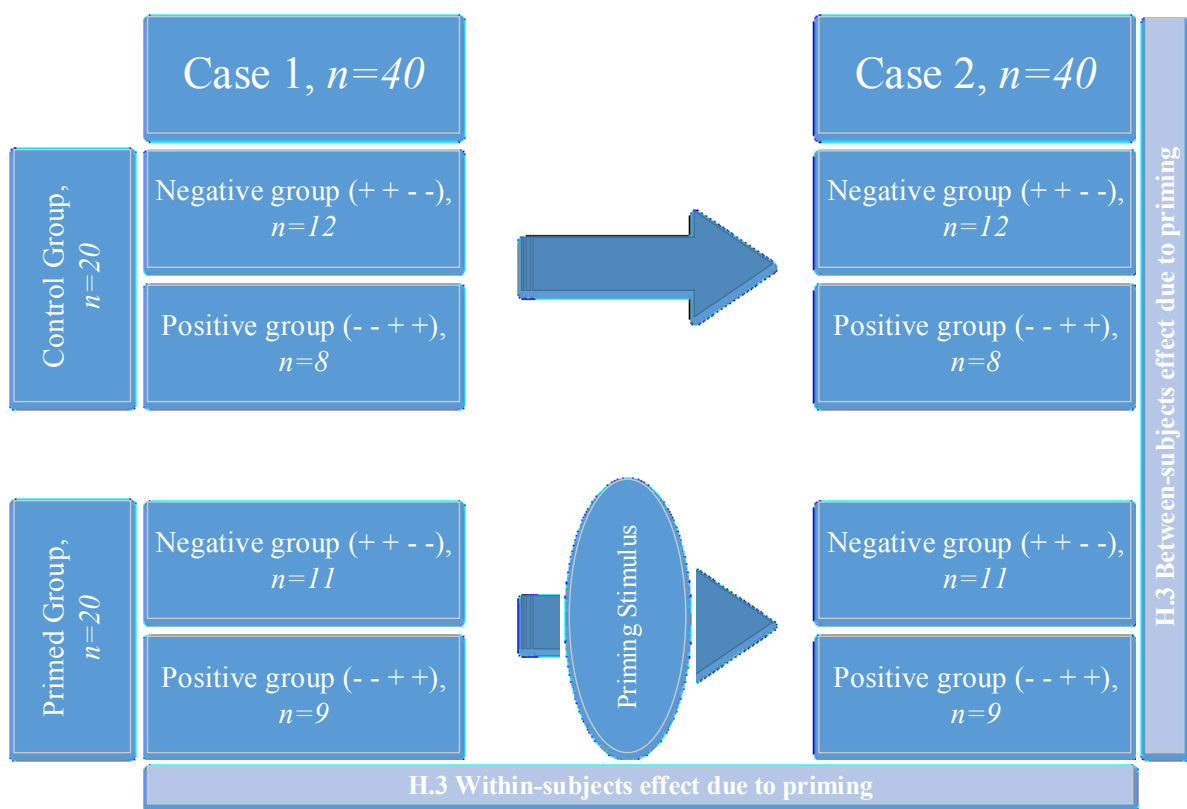


For testing the third hypothesis, an adapted approach of Hammersly et al. (2010) was followed. Participants were invited to participate in a second case study (i.e. Case 2), which took place approximately one week after the successful completion of the first case. Half of the participants that participated in Case 1 were then randomly assigned to a group which would be subject to an environmentally enhancing stimuli, whereas the remainder were placed in a control group. During the session meeting, just before Case 2 was given to the subjects from the primed group, a 15-minute presentation was held which featured an instruction video regarding the functionality of the human brain and its susceptibility to biases. In addition, several brain teasers and interactive games that are linked to order effects (i.e. recency and primacy) were used to demonstrate the implications of biases. After having been exposed to the stimuli, primed individuals were given Case 2 and were thus asked to perform a similar task to the first one. Post to processing the data from Case 2, repeated-measures ANOVA was used to account for any significant within-subjects and between-subjects effects amongst the various treatment groups.

According to Leff, Gordon and Ferguson (1974), exposing individuals to new environments, which can only be subliminally encountered in real life scenarios, increases their

awareness and perception. Consequently, it can be hypothesized that this could potentially result in a priming effect. It should be noted that priming effects function regardless of the subjects' ability to recognize the stimulus they were exposed to. This implies that the exposure may be subconscious, in a procedure known as automatic priming (e.g., flashing words or pictures very briefly such that the participants are not aware of them), or conscious, with subjects' full awareness (e.g., letting the subjects read a story or a word list). Consequently, it is expected that primed individuals would be more self-aware and their susceptibility to cognitive tendencies will be significantly reduced in Case 2 in contrast to Case 1. On the other hand, participants in the control group are expected to maintain a relatively similar level of belief revision in Case 2 similar as in Case 1. Given the aforementioned, the third hypothesis procedure can be summarized in Figure 6B as follows:

Figure 6B. Hypothesis testing and experimental design of H₃



To further reinforce the results from the aforementioned procedures and to control for heterogeneity, an additional set of parametric tests was conducted. An ordinary least square (OLS) regression was used to explore the significance of two model specifications which included demographic, effort-, and certainty-related control variables. OLS is preferred over other methods such as analysis of covariance (ANCOVA), since the latter rests on a set of very

stringent assumptions, hence, it can be fairly sensitive to minor violations in smaller samples as in cases like the present one. The first model specification (Model 1) tested the impact of information order and PS on auditors' final beliefs (S_4). Belief revisions were not operationalized as a dependent variable in Model 1, since the supplemental did not only aim to reconfirm the main findings of H_1 and H_2 but to provide information regarding the individual impact of additional information items on final beliefs. It was also of interest to see what the relation between subjects' initial beliefs (S_0) and final beliefs is. Additionally, including S_0 as a control variable provides information whether initial beliefs are independent from the information order, which is implicitly expected as per the belief-adjustment model. The second model specification (Model 2) tested if any changes in the belief revision of participants occurred as a result of priming, thus providing support for H_3 . More details regarding the technical structure and implementation of the supplemental analysis is provided in Section 4.4.

4 EMPIRICAL ANALYSIS

4.1 PARTICIPANTS AND DEMOGRAPHIC DATA

On average, it took participants 30.03 minutes (SD: 18.64) and 27.2 minute (SD: 16.41) to complete Case 1 and Case 2, respectively. It should be noted that participation was entirely voluntary suggesting that the majority of the sample represents a diligent and motivated part of the overall population. Due to the nature of this study, the involvement of more experienced auditors was generally required. Overall, 42 subjects participated in the study, however, 2 were excluded from further analysis since they failed the manipulation checks or their responses were incomplete. For further information, please refer to the next subsection. The final sample, upon which the main analysis was based on, consisted of 40 participants. In relation to this sample, an overview of demographic data is presented below in Table 1.

Table 1. Demographic data characteristics

Variable	N	Frequency	Mean (SD)	Range
Nationality				
Dutch	10	25%		
Bulgarian	30	75%		
Age	40		27.23 (4.16)	22 – 38
Gender				
Male	23	57.5%		
Female	17	42.5%		
PS score	40		143.05 (10.97)	123 – 165
General Experience	40		4.3 (3.51)	0 – 13
Steel Industry Exp.	40		1.98 (1.35)	1 – 6
Game Industry Exp.	40		2.75 (1.79)	1 – 6
Task Experience	40		3.35 (1.51)	1 – 6
Auditor Certification				
No	28	70%		
Yes	12	30%		
Position				
Assistant/ Staff	18	45%		
Senior	16	40%		
Manager	4	10%		
Senior Manager	2	5%		

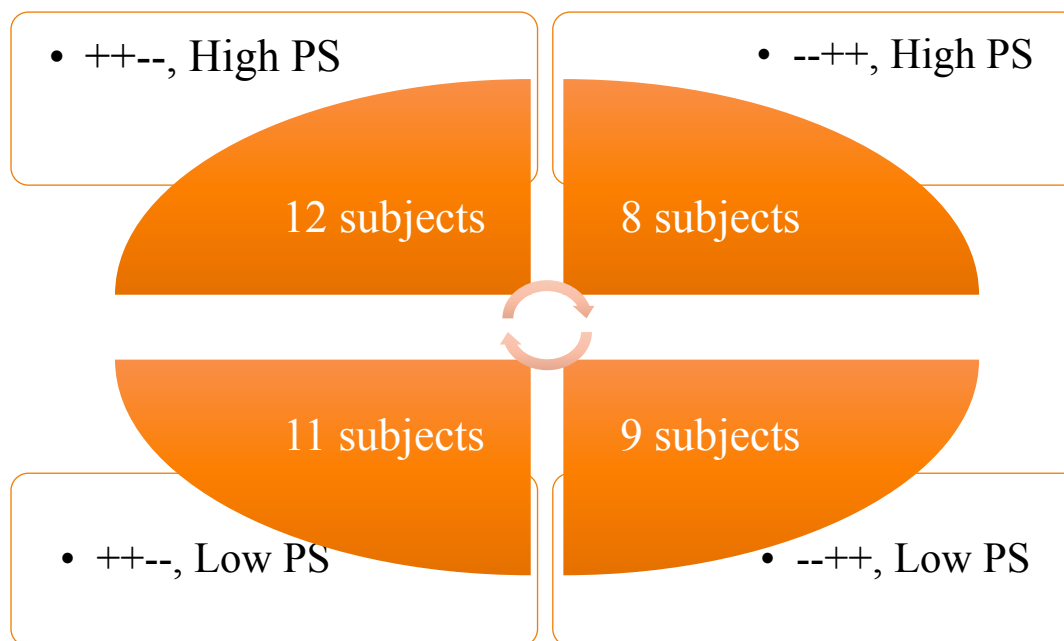
As the study was carried out in two countries, participants were asked to identify their nationality. Table 1 reveals that 75% of the sample have a Bulgarian nationality, whereas the remainder are with a Dutch nationality. It is further displayed that 57.5% of the participants were male, thus showing the male dominance characteristic for the auditing profession. On average, participants had 4.30 years of general audit experience, implying that most of the participants have a profound understanding of general procedures related to the audit of entities. Furthermore, subjects' self-assessed experience with the audit of firms in the gaming industry

(mean: 2.75) is relatively higher compared to firms in the steel industry (mean: 1.98), yet both are below the average scale measurement unit. A similar finding can be attributed to the subjects' experience with going concern cases (mean: 3.35 on a scale from 1 to 7). Only 30% of the participants possessed professional certificates related to their line of work whereby one (1) was a professionally certified auditor (in Dutch: "Registeraccountant" or abbreviated RA) two (2) were CPAs, one (1) was a CFE, and eight (8) participants had an ACCA certification. It should be noted that the research case involved only the assessment of the going concern ability of an entity, and not the provision of related report choice. Furthermore, the case study was conducted during the auditing season which reduced the likelihood of auditors participating in this study. Consequently, it was considered appropriate to include staff members and seniors that are not yet professionally certified who usually carry out tasks related to the gathering and documentation of evidence on which auditor judgments are thereafter based upon. Overall, it can be concluded that a fair proportion of the participants possessed the experience and qualification needed to complete the experimental cases.

Table 1 further displays that the mean professional skepticism score of the participants was 143.05 (SD: 10.97) ranging from 123 to 165 which implies that the coverage rate of the theoretical range (30 – 150) is approximately 30%. This is in line with prior studies that have documented similar coverage rates (ca. 40%). The Hurtt scale has already been validated in several research papers. Due to this only a reliability analysis is performed instead of performing an overall factor analysis. Hurtt's scale was measured to have a score of 0.771, which suggests the former to have a good internal consistency. The median of the PS score was estimated to be 143.50. As previously discussed, the dichotomization of trait PS was conducted based on a median split. Consequently, 20 participants were considered to have "High" professional skepticism (i.e., $PS \geq 143.50$), the remaining participants that scored below this threshold were classified as "Low" in PS. In addition, the randomization procedures described in the methodology section resulted in a relatively even distribution of participants across the information order condition. In other words, 17 subjects were assigned to the positive "--++" treatment condition and the remainder to the negative "++--" condition.

This, overall, resulted in the stratification of participants into four experimental groups, which are described in Figure 7 as follows:

Figure 7. Group stratification of participants in the different treatments conditions



It should be highlighted that the randomized post-hoc block between-subjects design does not always produce a relatively equal stratification. In this case, it can be seen that the size ratio of the largest group (12 subjects) and the smallest group (8 subjects) is exactly at the benchmark value of 1.5, which does not provide indications for biased stratification. Taking the aforementioned into consideration, the main results of the first case are presented and analyzed in the subsequent sub-section.

4.2 CASE 1

4.2.1 Descriptive Statistics

First, manipulation checks were performed to test whether participants apprehended the positive and negative cues of additional evidence. Furthermore, the importance of information was analyzed. As discussed in the methodology section, the perceived direction of the additional evidence was measured by allowing participants to classify the cue as either neutral, negative, or positive information. If a signal is perceived in the opposite direction instead of in its predicted direction, then the participant is excluded from the sample. Initially, forty two (42) subjects participated in the study, however two (2) responded in a manner inconsistent with the intended manipulation procedure and were thus excluded from the final sample. Additional

checks were performed to verify if there is any missing data, however, no such indications were found. Therefore, the empirical analysis discussed below relates to a final sample of forty (40) subjects. For further information regarding the individual perception of cues, please refer to Table 2 where the aforementioned information is summarized.

Table 2. Manipulation check results from Case 1

Item	Sign	Misrated	Neutral	Mean	SD
Rejection of state funding	-	2	5	5.65	1.14
Bankruptcy of a major supplier	-	1	3	5.83	1.11
Renegotiation with Banks regarding Credit Lines	+	0	6	5.18	1.02
Cash capital increase of EUR 200 million	+	0	4	5.40	1.39

The two cues that were misclassified relate to the rejection of state funding and the bankruptcy of a major supplier. The latter can be the result of a potential error by the participant since the loss of a major supplier is an important factor which significantly affects the going concern assumption. The cue relating to the renegotiation with Banks regarding credit lines was the most frequently perceived as neutral. This might result from the insecurity experienced by the subject regarding the outcome of such negotiations. It should be noted that the mean importance assessment of the cue does not imply that information has been systematically under/overweighed. Furthermore, it can be seen that the additional information cues were perceived to be as reasonably similar in terms of importance.

The aforementioned suggests that the experimental manipulation was successful in predicting the overall importance and direction of the cues that were utilized in the case study. Therefore, any potential differences can largely be attributed to the different order in which the additional evidence was presented to the subjects. Although preliminary demographic data was presented in the previous sub-section, certain characteristics need to be further considered in order to explore whether subject randomization resulted in two balanced treatment conditions. These results are presented below in Table 3, where the following variables are included: nationality (*NAT*), gender (*GEN*), age (*AGE*), auditor certification (*CERT*), professional skepticism (*PS*), years of general experience (*YGE*), industry-specific experience (*IE*), task-specific experience (*TE*), and position in the firm hierarchy (*POS*).

Table 3. Demographic characteristics by treatment groups

Variable	Treatment Group		Mean Difference	p-value (two-tailed)
	Negative group (++--), n=23	Positive group (--++), n=17		
NAT	,83	,65	,18	,224
AGE	28,52	25,47	3,05	,012*
GEN	,39	,47	-,08	,627
PS	143,96	141,82	2,14	,550
YGE	5,48	2,71	2,77	,007**
IE	2,17	1,71	,46	,284
TE	3,00	3,29	-,29	,569
CERT	,35	,24	,11	,456
POS	1,83	1,65	,18	,512

NAT is the proportion of Bulgarian individuals. GEN is the proportion of female subjects. CERT_BIN is the proportion of subjects that are legally certified auditors (WPs). POS is the subjects' position in the firm hierarchy, where 1= assistant/other; 2 =senior; 3 = manager; 4 = senior manager; 5 = partner.

* Significance level at 0.05
 ** Significance level at 0.01

From Table 3 it becomes visible that participants from group “++--” were significantly older and generally more experienced in comparison to participants from group “--++”. Although this does not have immediate effects, a disproportionate assignment of subjects in terms of demographic characteristics could have an impact on the final results, nevertheless Keppel (1973) argues that perfect stratifications where treatment groups only differ in respect to the experimental stimulus are difficult to be achieved, especially since experiments do not involve a satisfactory/sufficiently large number of subjects. To further extend the above analysis, a correlation matrix was obtained in order to better visualize the interrelations between the aforementioned demographic variables. Since the normality of the different variables tends to differ, both Pearson and Spearman rank correlation coefficients are presented in Table 4.

Table 4. Correlation matrix for demographic variables

	NAT	AGE	GEN	PS	YGE	IE	TE	CERT_BIN	POS
NAT	1.000	-0.098	0.029	0.325*	-0.028	0.125	-0.214	-	-0.212
AGE	-0.025	1.000	-0.106	-0.026	0.799**	0.204	0.467**	0.421**	0.756**
GEN	0.029	-0.072	1.000	0.250	0.106	0.122	0.118	-0.121	-0.005
PS	0.317*	-0.040	0.257	1.000	0.103	0.207	0.017	-0.035	0.073
YGE	0.000	0.910**	0.057	0.053	1.000	0.211	0.449**	0.337*	0.696**
IE	0.033	0.179	0.092	0.203	0.218	1.000	0.443**	0.154	0.025
TE	-0.212	0.391*	0.125	0.020	0.435**	0.492**	1.000	0.437**	0.387*
CERT_BIN	-	0.296	-0.121	-0.063	0.290	0.135	0.435**	1.000	0.504**
POS	-0.174	0.655**	0.015	0.152	0.661**	0.017	0.351*	0.461**	1.000

Pearson correlation coefficients are presented in the lower left corner, whereas Spearman rank correlation coefficients are presented in the upper left.

* Significance level at 0.05
 ** Significance level at 0.01

The correlation matrix shows several interesting patterns. As a first, the significant correlation between nationality and trait professional skepticism implies that culture is linked with trait professional skepticism, however, this is yet to be empirically established. According to Hofstede's cultural dimensions, Bulgaria scores relatively low on the indulgence dimension compared to the Netherlands. In general, societies with a low score in this dimension have a tendency to cynicism and pessimism which are to a certain extent linked with having a skeptical more conservative mindset. All other demographic variables such as age, experience (e.g. industry, task specific, and general), position, and auditor certification appear to be significantly and positively correlated with each other. Nevertheless, it should be noted that such a pattern is generally predictable and trivial. On average, elder people tend to be more experienced, more certified and occupying higher positions within the corporate hierarchy relative to their younger counterparts. Gender is not significantly correlated with any other variable.

In order to avoid the identified between-group significant differences and to mitigate omitted variable bias, the participants' experience is accounted for as a control variable. However, to avoid potential multicollinearity issues, only general experience is included in the supplemental analysis since it shares a relatively strong correlation with a set of demographic variables, as previously discussed. Nevertheless, it should be noted that information order effects are hypothesized to operate at a subconscious level, thus implying that experience and/or knowledge should not distort this phenomenon. Due to this, it cannot be openly argued whether experience can mitigate the participant's belief revisions.

Given the aforementioned, it should be noted that the existence of recency effects on an aggregate level does not always suggest that subjects are biased on an individual level. Due to this, an analysis was made in order to determine whether all participants experienced information order effects and whether those are recency or primacy. For further information, please refer to Table 5.

Table 5. Information order effects on an individual-subject level

Observed Effect	n	N	Percent	Yankova (2014)	Hogarth and Einhorn (1992)
Recency effect	23	40	57.5%	50.90%	60.87%
Primacy effect	9	40	22.5%	23.95%	34.78%
No order effects	8	40	20%	25.15%	4.35%

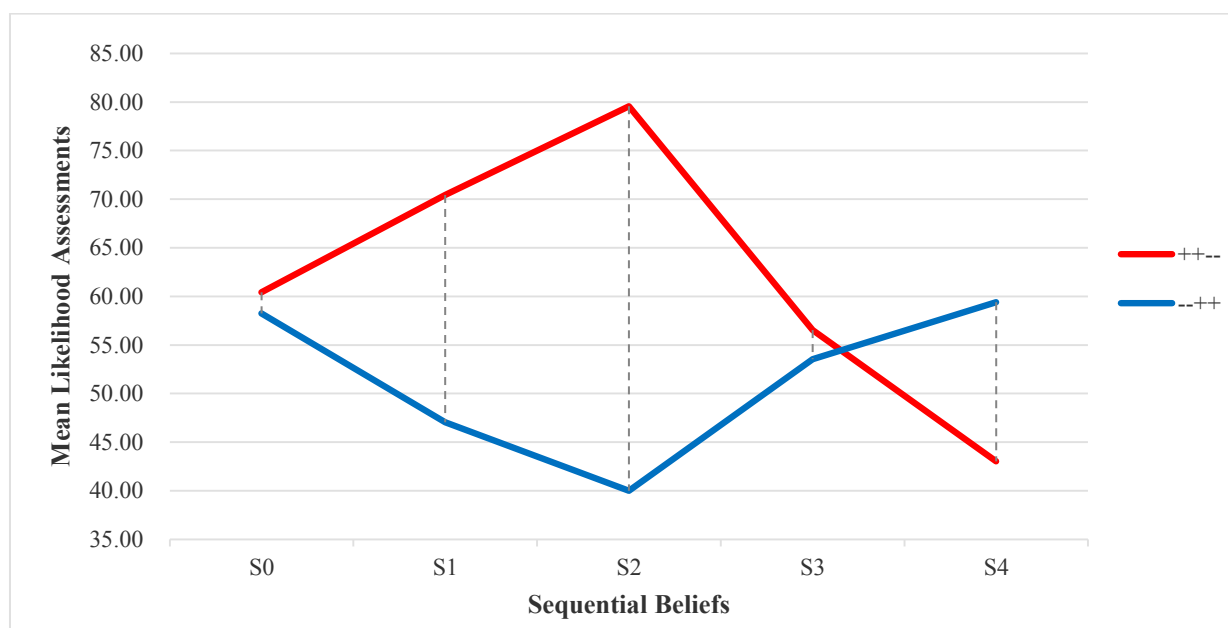
As discussed in the theoretical framework, primacy occurs when initial information is overweighed in comparison with subsequently presented evidence. In this case, 22.5% of the sample (i.e. 9 people) experienced primacy bias. Specifically, four (4) participants in the positive condition had a negative belief revision ($S_4 - S_0 < 0$), whereas five (5) participants in the negative condition had a positive belief revision ($S_4 - S_0 > 0$). When the presented information is overweighed later in the sequence, this indicates the presence of recency effects. As expected, the majority of participants (57.5% or 23 subjects) experienced recency bias. This implies that participants in the negative condition had a negative belief revision, whereas, those placed in the positive condition had a positive belief revision. Lastly, if the participant's last belief is equivalent to his/her initial belief (i.e. $S_4 - S_0 = 0$), then this implies that no order effects have occurred. In this case, eight (8) participants were within the normatively appropriate threshold. To support the findings presented in Table 5, the research papers of Yankova (2014) and Hogarth and Einhorn (1992) were used as an objective point of reference. As displayed, both studies found that more than half of the participants responded in consistency with recency, whereas those that exhibited primacy effects varied from 23% to 35%. Subjects that did not experience order effects were typically below 25% out of the test sample in both studies. Although at first Hogarth and Einhorn's empirics might seem to differ it should be taken into account that this study involved experienced, professional participants, whereas the former did not. Due to this, a greater proportion of the subjects in the present and in Yankova's research provided normatively accurate responses, thus supporting the existence of auditor's judgment quality.

Before discussing the main results of Hypothesis 1, the last preliminary analytical procedure is performed which relates to the sequence of the participants' mean belief revision with respect to the specific condition in which they were assigned. This information is summarized in Panel A of Table 6.

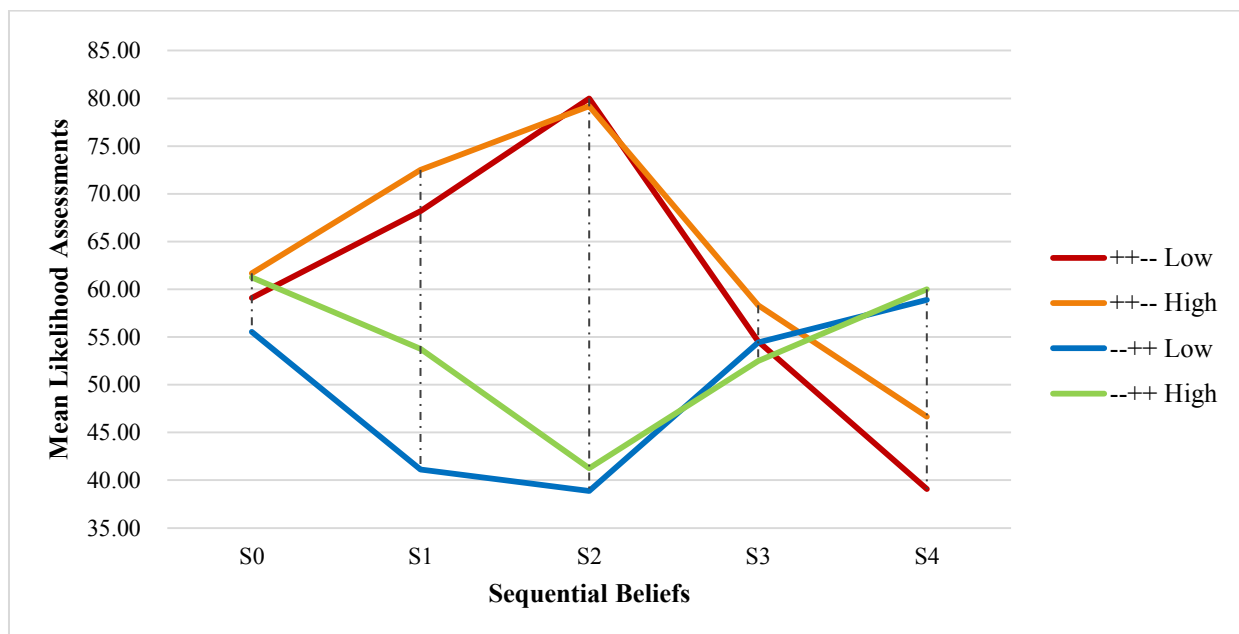
Table 6. Belief-Revision data across Treatment Conditions with professional skepticism

<i>Panel A</i>								
Order		N	S ₀	S ₁	S ₂	S ₃	S ₄	S ₄ – S ₀
++--		23	60,43	70,43	79,57	56,52	43,04	- 17,39
		<i>SD</i>	19,88	15,22	12,24	16,13	17,43	22,00
--++		17	58,24	47,06	40,00	53,53	59,41	1,18
		<i>SD</i>	18,11	20,85	16,58	20,60	19,83	12,19
<i>Panel B</i>								
Order	PS	N	S ₀	S ₁	S ₂	S ₃	S ₄	S ₄ – S ₀
++--	Low	11	59,09	68,18	80,00	54,55	39,09	- 20,00
		<i>SD</i>	18,68	14,01	10,95	18,64	19,21	23,24
++--	High	12	61,67	72,50	79,17	58,33	46,67	- 15,00
		<i>SD</i>	21,67	16,58	13,79	14,03	15,57	21,53
--++	Low	9	55,56	41,11	38,89	54,44	58,89	3,33
		<i>SD</i>	16,67	14,53	15,37	20,68	20,88	10,00
--++	High	8	61,25	53,75	41,25	52,50	60,00	- 1,25
		<i>SD</i>	20,31	25,60	18,85	21,88	20,00	14,58

Overall, it can be seen that the respondents follow the predictions of Hograth and Einhorn's belief-adjustment model. For instance, participants in the “++--” condition revised their beliefs two times positively followed by two downward belief revisions, thus resulting in a final going-concern likelihood assessment below the average initial belief. On the other hand, participants in the “--++” condition followed the reverse pattern, i.e. beliefs were first adjusted downwards followed by two belief revisions upwards. Participants, on average, displayed favorable initial beliefs regarding the future existence of Premium Steel AG as the likelihood assessment was above the theoretical midpoint of 50%. It can also be noted that the difference in initial beliefs between the two groups is not statistically significant ($t(38) = 0.359$, p (two-tailed) = 0.722). The result differs considerably if the same comparison is repeated, but with the final beliefs of the participants. On average, subjects from the “++--” condition had a lower final likelihood assessment which significantly differed by 16.4% relative to the one from the other condition ($t(38) = -2.769$, p (two-tailed) = 0.009). This suggests that even though participants from the two groups had fairly similar initial ascertainments and received the very same information items, they arrived at significantly different end points. The aforementioned is graphically presented on Figure 8A where it can be seen that the participant's belief revisions yield the hypothesized “fishtail” pattern, thus providing support for the first hypothesis.

Figure 8A. Belief-Revision Curves across Treatment Conditions in Case 1

The analysis above can be further extended by taking into account the stratification of the subjects' mean beliefs adjustments by including professional skepticism. The resulting segregation is shown in Panel B of Table 6, where several findings become notable. In support to the above analysis, participants from the “++--” condition exhibited more extreme downward beliefs adjustment than the ones experiencing an upward belief adjustment in the “--++” condition. Irrespective of their level of trait skepticism, respondents started with similar initial likelihood assessments, however, concluded the case with relatively different final assessments. In the --++ condition, for instance, participants, both with low and high levels of PS, had no significant differences in their final belief (S₄) mean likelihood assessments, i.e. 58.89 and 60.00, respectively. On the other hand, by considering the ++-- condition, participants with high trait skepticism exhibited lesser downward belief adjustments than those with low trait skepticism. Although this effect is hypothesized to occur, it is statistically insignificant ($t(21) = -7.576, p(\text{two-tailed}) = 0.309$). To provide more clarity, the mean sequential beliefs among the four treatment conditions are displayed in Figure 8B.

Figure 8B. Belief-Revision Curves with Skepticism

Despite the inclusion of trait skepticism, the “fishtail” effect remains an active phenomenon, moreover, Figure 8B displays a greater downward drift exhibited by the respondents from the +++- low PS group compared to the respondents from the +++- high PS group. Building upon these descriptive preliminaries, the following sub-section will discuss the methods used to obtain the statistical inference in detail and will thereafter present the main findings.

4.2.2 Results

As explained in the methodology section, ANOVA (analysis of variance) was employed to test the hypotheses discussed in the theoretical framework. Prior to interpreting the results, several assessment techniques are used to analyze whether the three major assumptions of ANOVA are satisfied – normal distribution of residuals, homogeneity of variance, and independence of observations. It should be noted that the last assumption has already been satisfied through the design of the experiment and the use of randomization. The first two requirements verify the validity of inferences drawn using the F-statistic. The last one, on the other hand, assures that the dependent measures of each respondent are perfectly uncorrelated with each other (Hair, Black, & Babin, 2010).

Several formal and informal statistical tests were used to determine whether the residuals are normally distributed. Firstly, the boxplot, the case processing diagnostics, the normal Q-Q plot, and the histogram provide an indication that the distribution of residuals is approximately normal.

Table 8. Main Assumptions of ANOVA

<i>Panel A – Descriptive Normality Tests</i>				
	Statistic	Std. Error	Z-score	
<i>Mean</i>	0.000	2.863		
<i>Median</i>	0.625			
<i>Std. Deviation</i>	18.108			
<i>Minimum</i>	- 40			
<i>Maximum</i>	40			
<i>IQR</i>	21.25			
<i>Skewness</i>	- 0.249	0.374	- 0.6658	
<i>Kurtosis</i>	- 0.037	0.733	- 0.5047	
<i>Panel B – Inferential Normality tests</i>				
	Statistic	df	Sig.	
<i>Kolmogorov-Smirnov</i>	0.090	40	0.200	
<i>Shapiro-Wilk</i>	0.981	40	0.715	
<i>Panel C – Equality of Error Variances</i>				
	F-statistic	df1	df2	Sig.
<i>Levene’s Test</i>	2.170	3	36	0.108

Panel A of Table 8 further shows that the distribution is with a skewness of -0.249 (SE: 0.374) and with a kurtosis of -0.037 (SE: 0.733), implying that the standardized scores of these descriptives are below the critical z-value of ± 1.96 . This further reinforces the fact that errors of the dependent variable are normally distributed. Lastly, inferential tests of Shaphiro-Wilk and Kolmogorov-Smirnov were performed to provide completeness to the above argumentation. The results from the tests, displayed in Panel B of Table 8 indicate that the null hypothesis for normality is not rejected at a 0.05 significance level for both Shaphiro-Wilk (SW (40) = 0.981, p-value (two-tailed) = 0.715) and Kolmogorov-Smirnov (KS (40) = 0.090, p-value (two-tailed) = 0.200). Given the aforementioned, it can be concluded that the residuals are normally distributed. The last assumption of ANOVA is verified by applying Levene’s Test of equality of error variances. The statistical technique tests the hypothesis that the error variance of the dependent variable is equal across groups. Panel C of Table 8 shows that the null hypothesis is not rejected at a 0.05 significance level, thus implying that the variance across the different groups is homogeneous (F (3, 36) = 2.170, p-value (two-tailed) = 0.108). Considering the aforementioned, it can be concluded that the assumptions of ANOVA are satisfied, and thus the results can be reliably interpreted.

The main results of ANOVA regarding the mean belief revisions of respondents from case 1 are presented in Table 9.

Table 9. Results from ANOVA analysis and Group Means for Belief-Revision

<i>Panel A: ANOVA</i>					
Source	Df	Mean Square	F	Sig.	η^2
<i>Model</i>	3	1200.833	3.381	0.029	0.220
<i>Information Order</i>	1	3351.192	9.433	0.004	0.208
<i>Professional Skepticism</i>	1	0.423	0.001	0.973	0.000
<i>Order x PS</i>	1	223.808	0.630	0.433	0.017
<i>Error</i>	36	355.208			

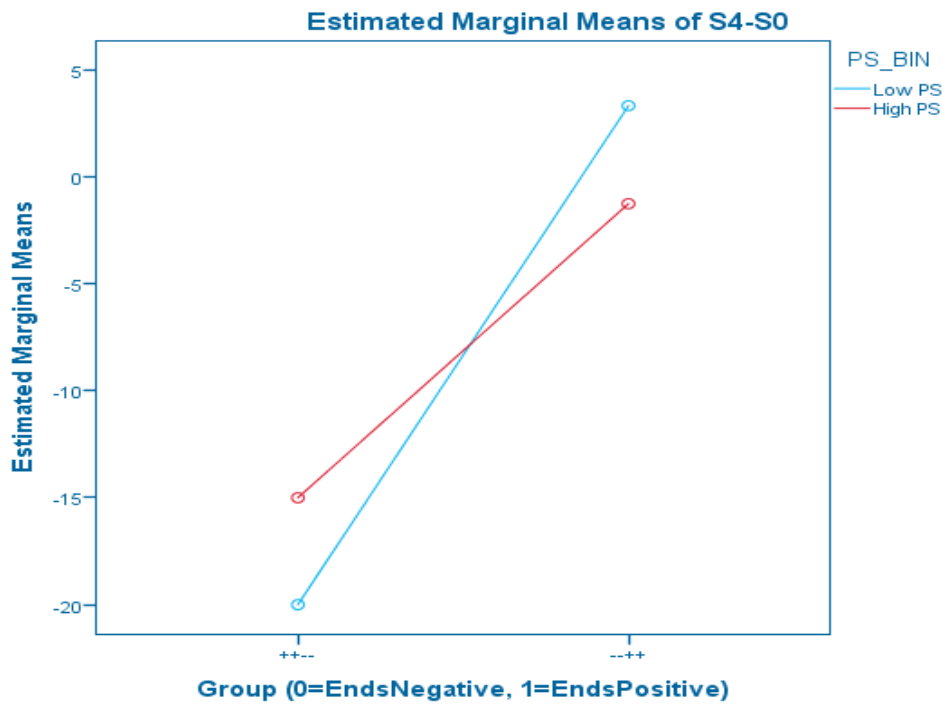
<i>Panel B: Overview of Group Means for Belief Revision</i>			
Group	--++	++--	Total
<i>Low PS</i>	3.33	- 20.00	- 9.50
<i>High PS</i>	- 1.25	- 15.00	- 9.50
Total	1.18	- 17.39	- 9.50

In agreement with the expectations from the descriptive statistics, Panel B of Table 9 shows the respondents from group “++--” experienced greater downward belief revision (-17.39) than respondents in the “--++” group (1.18), thus implying the emergence of recency bias. Furthermore, the ANOVA results displayed under Panel A of Table 9 confirm that the information order effect on auditors’ belief adjustment are statistically significant ($F(1, 36) = 9.433, p$ (two-tailed) = 0.004). It should also be noted that the effect size of information order accounts for 20.8% of the variance in the subjects’ total belief revisions. According Cohen et. al (2014), this effect size can be classified as a large effect.

Further to order effects, the results in panel A of Table 9 provide information about the effect of professional skepticism on the belief revision of auditors. Overall, it can be ascertained that subjects with low levels of trait skepticism (-9.50) compared to subjects with high levels of trait professional skepticism (-9.50) have no significant differences in their mean belief revisions ($F(1, 36) = 0.001, p$ (two-tailed) = 0.973). To provide completeness of the analysis, the interaction between information order effects and professional skepticism were also analyzed. Panel B displayed in Table 9 shows a rather interesting relation. It can be seen that the rank relationships are inconsistent among the different treatments. Participants with low PS assigned to the “++--” exhibited more downward belief revisions compared to those with high PS. The same can be observed with the participants assigned to the “--++” group, i.e. respondents with low PS experienced more upward belief revisions than those with high PS. This indicates that the interaction between professional skepticism and information order effects can be classified as disordinal, however, it does not appear to be significant at a level of

5% ($F(1, 36) = 0.630, p(\text{two-tailed}) = 0.433$). This relationship can be visualized below in Figure 9.

Figure 9. Relationship and interaction plots from ANOVA results



Based on the aforementioned findings, it can be concluded that auditors evaluating mitigating factors followed by contrary information will exhibit greater downward belief revision than those who receive the same information in the reverse order. Consequently, this provides empirical support for **H₁**. On the other hand, considering between-group differences, in terms of professional skepticism, does not seem to diminish information order effects. Thus, this implies that subconscious bias could potentially have a more dominant effect over personal disposition traits. Therefore, this does not provide empirical support for **H₂**.

The next section will make use of the DDD approach and will thus present the observed effects posterior to the priming stimulus.

4.3 CASE 2

4.3.1 Descriptive Statistics

Similar to Case 1, manipulation checks were first performed to test whether respondents answered in a consistent manner with the intended manipulation. In comparison to the previous scenario, all subjects apprehended the additional evidence in the apprehended direction, furthermore no missing data was found, thus resulting in a final sample of 40 participants. Table 10 summarizes the relevant information related to the manipulation checks.

Table 10. Manipulation check results from Case 2

Item	Sign	Misrated	Neutral	Mean	SD
Material liability is likely to occur at the beginning of 2013.	-	0	0	5.35	1.27
Operation metrics related to users are expected to decline	-	0	7	5.05	1.54
GamePlay B.V. has negotiated to be the first exclusive provider of social games on a new Facebook platform.	+	0	2	5.28	1.45
GamePlay announced a tender offer of EUR 500 million to acquire WangGames	+	0	8	4.85	1.14

All participants acknowledged that the material liability cue is negative for the future existence of the company. It seems that participants were unsure whether the cue relating to the reduction in operation metrics such as DAU, MAU, or MUU could have a negative impact. From a business and marketing perspective, it can be argued that less users is related with less interactivity thus leading to less growth. On the other hand, only active users making online purchases should be considered as an important factor contributing to the financial profitability of the company. The cue relating to the tender offer of EUR 500 million to acquire WangGames was the most frequently perceived as neutral. This might result from the insecurity experienced by the subjects regarding the outcome of such negotiations. Once again, it can be seen that the additional information cues were perceived to be as reasonably similar in terms of importance. Furthermore, the perceived importance of the additional evidence from Case 2 is comparable to the one from Case 1. The experimental manipulation was also successful in predicting the overall importance and direction of the cues that were utilized in Case 2.

Half of the participants were assigned to an experimental group (i.e. the Primed Group), whereas the remainder were used as a control group. Case 2, therefore, is used as a comparable scenario to Case 1 in order to verify if any differences have occurred between the two groups after exposing one of them to a priming stimulus. As in Section 4.2.1, the demographic characteristics of the participants were analyzed in order to explore whether a balanced subject

randomization occurred between the experimental and control groups. From Table 11 it becomes clear that participants from the control group have significantly more representatives from Bulgaria than from the Netherlands. In order to avoid the identified between-group differences and to mitigate omitted variable bias, the participants' nationality is accounted for as a control variable. Additional control procedures, supplemental tests and variance analysis are discussed in Section 4.4.

Table 11. Demographic characteristics by treatment groups

Variable	Treatment Group		Mean Difference	p-value (two-tailed)
	Control group, n=20	Primed group, n=20		
NAT	1.00	0.50	0.50	>0.001**
AGE	27.70	26.75	0.95	0.477
GEN	0.45	0.40	0.05	0.757
PS	145.50	140.60	4.90	0.161
YGE	4.35	4.25	0.10	0.930
IE	2.05	1.90	0.15	0.730
TE	2.80	3.45	- 0.65	0.199
CERT	0.25	0.35	- 0.10	0.503
POS	1.65	1.85	- 0.20	0.459

NAT is the proportion of Bulgarian individuals. GEN is the proportion of female subjects. CERT, BIN is the proportion of subjects that are legally certified auditors (WPs). POS is the subjects' position in the firm hierarchy, where 1= assistant/other; 2 =senior; 3 = manager; 4 = senior manager; 5 = partner.

* Significance level at 0.05
 ** Significance level at 0.01

Similar to Case 1, an analysis was made in order to determine whether all participants experienced information order effects. The information is summarized in Table 12. Overall, 42.5% of the sample experienced recency bias, which differs from Yankova's benchmark and the results discussed in Case 1. On the other hand, more respondents in Case 2 experienced no order effects, which provides an indication that the priming stimulus could have affected the belief revision of the auditors. This supports the hypothesis that a subconscious tool could increase auditor awareness and thus reduce biases. Nevertheless, this needs to be formally confirmed with statistical analysis.

Table 12. Information order effects on an individual-subject level

Observed Effect	n	N	Case 2	Case 1	Yankova (2014)
Recency effect	17	40	42.5%	57.5%	50.90%
Primacy effect	9	40	22.5%	22.5%	23.95%
No order effects	14	40	35%	20%	25.15%

In the previous sub-section, preliminary analytical procedures were used to obtain information regarding the sequence of the participants' mean belief revision. This process was repeated in this section due to two reasons. First, this will provide indications as to whether primacy effects (i.e. “the fishtail” phenomenon) have been reduced after the priming of subjects. Secondly, this will show if primed participants behaved differently in terms of adjusting their beliefs with respect to non-primed auditors. Panel A of Table 13 shows the mean likelihood assessments of participants with respect to the order of information. Overall, the patterns are similar to the ones prior to the priming of subjects. It can be seen that participants in the negative condition revised their beliefs two times positively followed by two downward belief revisions, whereas, participants in the positive condition first adjusted their beliefs downwards followed by two belief revisions upwards. This is further displayed in Figure 10. It can be noticed, however, that the illustrated “fishtail” in Case 2 is relatively smaller compared to the one from Case 1. In fact, even though subjects from the “++--” condition had a lower final likelihood assessment of 7.19% than participants from the “--++” condition, it was statistically insignificant ($t(38) = -2.024, p(\text{two-tailed}) = 0.192$). This implies that priming might have altered the impact of information order effects on participants to a level that is not significant.

Figure 10. Belief-Revision Curves across Treatment Conditions in Case 2

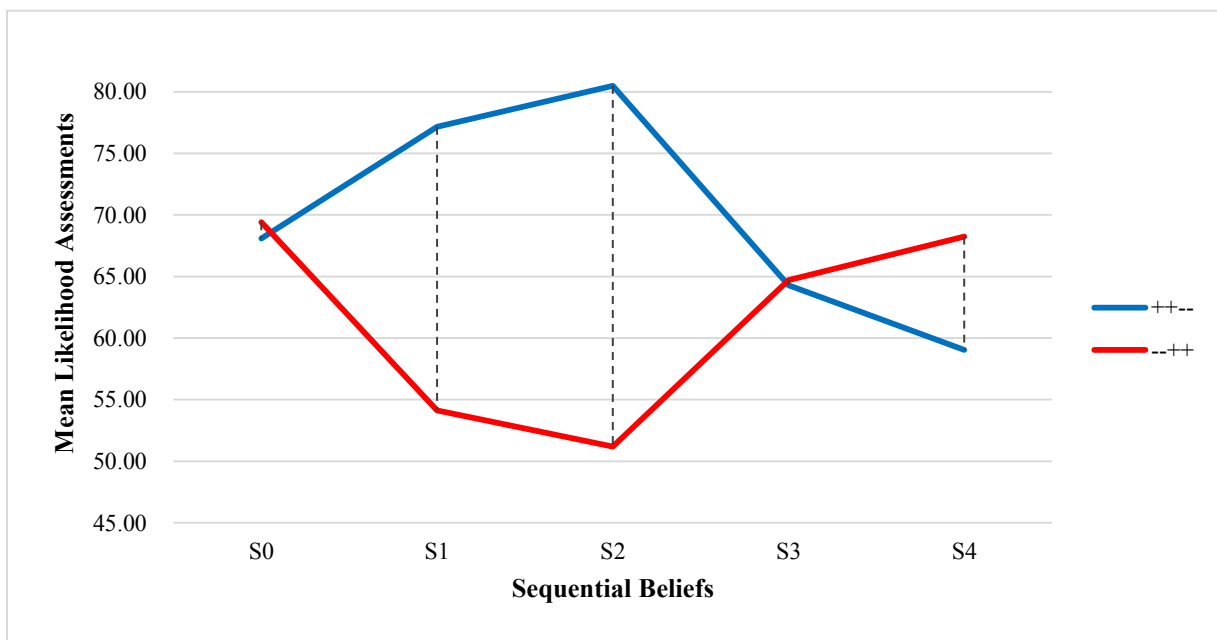


Table 13. Belief-Revision data across Treatment Conditions with Priming

<i>Panel A – Belief-Revision Curves across Treatment Conditions</i>								
Order	N	S ₀	S ₁	S ₂	S ₃	S ₄	S ₄ – S ₀	
++--	23	68.10	77.14	80.48	64.29	59.05	- 9.05	
	SD	15.69	13.09	10.71	15.02	19.72	13.75	
--++	17	69.41	54.12	51.18	64.71	68.24	- 1.18	
	SD	11.44	9.39	9.28	13.75	13.80	17.28	
<i>Panel B – Mean Likelihood Assessments by Experimental Group before priming</i>								
Order	Group	N	S ₀	S ₁	S ₂	S ₃	S ₄	S ₄ – S ₀
++--	Control	12	60.00	71.67	77.50	61.67	49.17	-10.83
	SD		20.00	13.37	10.55	15.28	17.30	20.21
++--	Experiment	11	60.91	69.09	81.82	50.91	36.36	-24.55
	SD		20.71	17.58	14.01	15.78	15.67	22.52
--++	Control	8	57.50	45.00	45.00	57.50	60.00	2.50
	SD		16.69	17.73	18.52	19.09	19.27	8.86
--++	Experiment	9	58.89	48.89	35.56	50.00	58.89	0.00
	SD		20.28	24.21	14.24	22.36	21.47	15.00
<i>Panel C – Mean Likelihood Assessments by Experimental Group after priming</i>								
Order	Group	N	S ₀	S ₁	S ₂	S ₃	S ₄	S ₄ – S ₀
++--	Control	12	62.50	75.00	77.50	58.33	50.00	- 12.50
	SD		13.57	13.14	9.65	13.37	20.45	16.03
++--	Experiment	11	76.00	81.00	85.00	72.00	69.00	- 7.00
	SD		15.06	12.87	10.80	13.17	11.97	11.60
--++	Control	8	72.50	58.75	55.00	70.00	66.25	- 6.25
	SD		12.82	9.91	10.69	7.56	14.08	20.66
--++	Experiment	9	66.67	50.00	47.78	60.00	70.00	3.33
	SD		10.00	7.07	6.67	16.58	14.14	13.23

To further gain insight, Panel B and Panel C of Table 13 show the mean belief-revision sequence of participants by experimental group prior to the priming and after the priming of subjects, respectively. For simplicity, the data is also displayed in Figure 11A and Figure 11B. As previously mentioned, all subjects during Case 1 behaved within the expected boundaries, i.e. participants from the negative group exhibited more downward belief adjustment relative to the ones from the positive group. Despite the similar initial beliefs, respondents from the “++--” primed group had more downward final beliefs relative to participants from the “++--” control group with approximately 12.8%. Posterior to the priming process, the opposite pattern was observed. Participants from the negative primed group not only had similar final beliefs to their counterparts, but also had a higher final likelihood assessment which significantly differed by 20% relative to the participants from the negative control group ($t(21) = -2.080, p$ (two-

tailed) = 0.010). This supports the hypothesis that the lack of information order effects is due to a change in the behavior of primed auditors.

Figure 11A. Belief-Revision by Experimental Group before priming

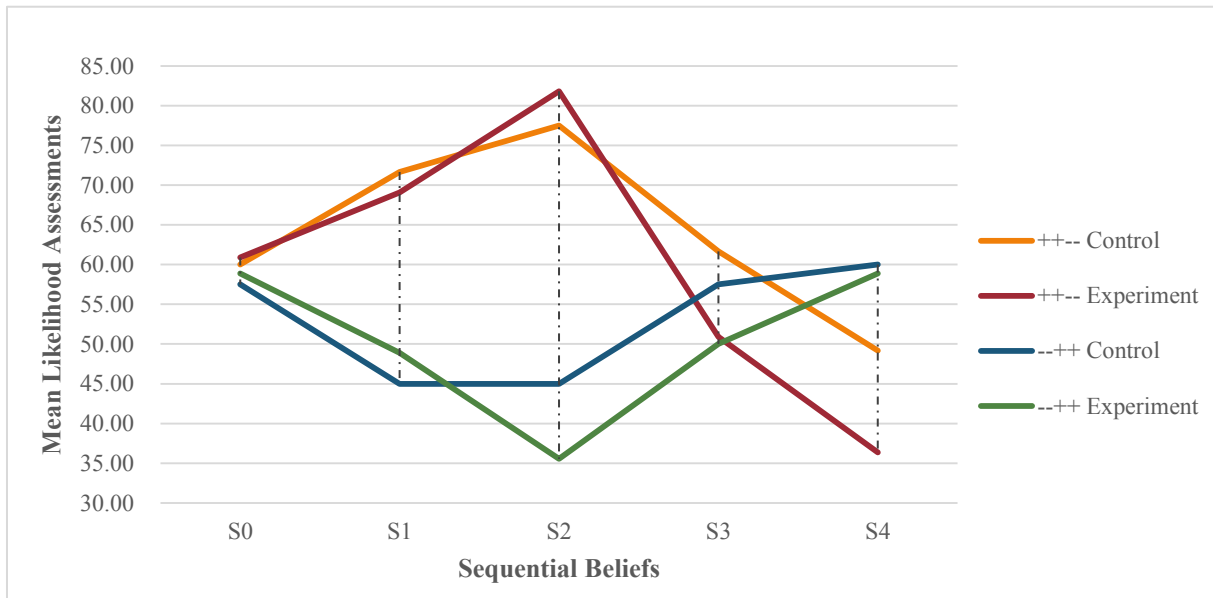
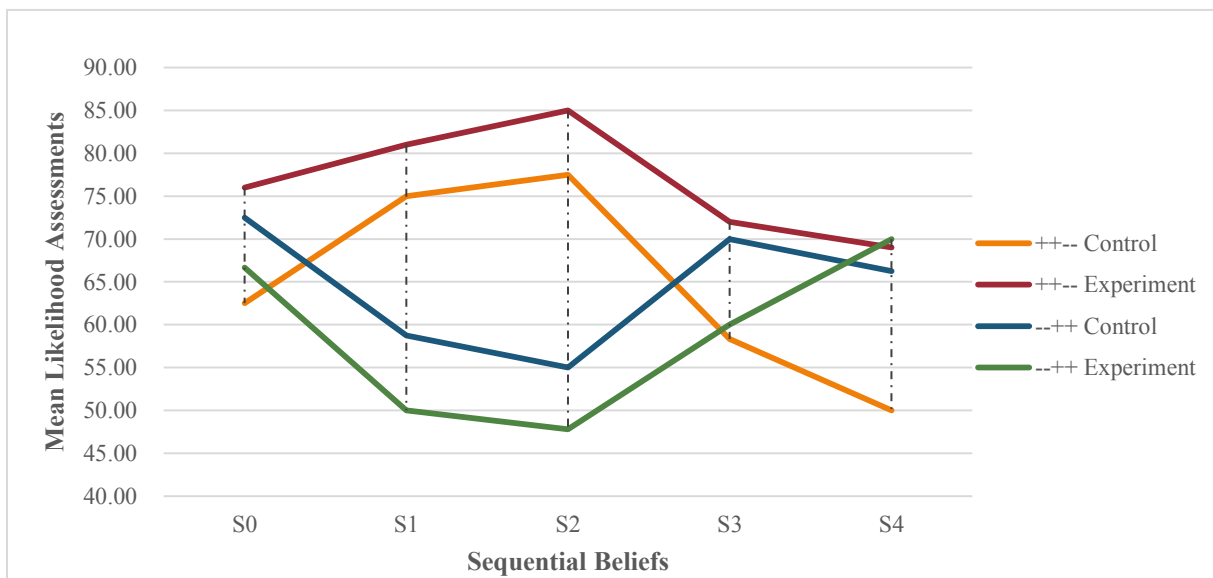


Figure 11B. Belief-Revision by Experimental Group after priming



Considering the aforementioned findings, the next sub-section will repeat the statistical techniques used in the results section of Case 1 by further including repeated-measures ANOVA and difference-in-differences method to obtain a valid statistical inference. Thereafter, the main findings are to be presented.

4.3.2 Results

Prior to investigating the effects of the priming stimulus, the estimated likelihood assessments of the primed group and the control group were compared. This was done in order to verify that there are no significant differences between the two types of respondents. Panel A of Table 14 displays that during Case 1 there were no significant differences between the two groups in terms of belief revision. Furthermore, as previously established information order effects are significant with a relatively strong effect ($\eta^2 = 0.227$). This implies that participants from both groups experienced recency effects with a level of significance below 1% significant ($F(1, 36) = 10.565, p(\text{two-tailed}) = 0.003$).

The second hypothesis predicts that priming is expected to mitigate recency effects in individuals by altering their belief adjustment process on a subconscious level. Panel B of Table 14 shows that information order effects post to Case 2 were not significant, implying that auditors in the negative group, on average, did not exhibit greater downward belief revisions than auditors in the positive group. ($F(1, 36) = 2.635, p(\text{two-tailed}) = 0.113$). Nevertheless, it should be noted that subjects in the priming group did not have significantly different belief adjustments in comparison to subjects in the control group. This suggests that several outcomes could have occurred. The presented content in Case 1 and Case 2 was not identical, which could have affected the dependent variable in a certain way. Another explanation is that primacy effects emerged and as a result, the effect of recency effects was crowded out. Lastly, it could be the fact that the insignificant priming effect is due to a potential type II error. To gain further insight and explain the aforementioned results, repeated-measures ANOVA was conducted to see if any within-subjects effects occurred as a result of the priming stimulus. Panel C of Table 14 shows that there is a significant interaction between the responses of primed subjects and the different cases. This suggests that on average the belief revision of participants in the primed group changed considerably in comparison to the subjects from the control group between Case 1 and Case 2.

Table 14. Results from ANOVA analysis and Group Means for Belief-Revision

<i>Panel A: Case 1 – Primed Group vs Control Group</i>						
Source	df	Mean Square	F	Sig.	η^2	
Model	3	4475.606	4.508	0.009	0.273	
Information Order	1	3496.503	10.565	0.003	0.227	
Priming effect	1	640.503	1.935	0.173	0.051	
Order x Priming	1	306.350	0.926	0.342	0.025	
Error	36	330.955				
<i>Panel B: Case 2 – Primed Group vs Control Group</i>						
Source	df	Mean Square	F	Sig.	η^2	
Model	3	430.985	1.832	0.159	0.132	
Information Order	1	619.724	2.635	0.113	0.068	
Priming effect	1	602.185	2.560	0.118	0.066	
Order x Priming	1	28.955	0.123	0.728	0.003	
Error	36	243.782				
<i>Panel C: Repeated-Measures ANOVA</i>						
Source	df	Mean Square	F	Sig.	η^2	
Case 1 vs. Case 2	1	150.086	0.830	0.368	0.023	
C ₁ vsC ₂ x Information Order	1	586.086	3.242	0.080	0.083	
C ₁ vsC ₂ x Priming	1	1242.393	6.872	0.013	0.160	
C ₁ vsC ₂ x Order x Priming	1	73.470	0.406	0.528	0.011	
Error (Within-Subjects)	36	180.803				
Information order	1	3530.142	9.161	0.005	0.203	
Priming	1	0.295	0.001	0.978	0.000	
Order x Priming	1	261.834	0.679	0.415	0.019	
Error (Between-Subjects)	36	385.348				
<i>Panel D: Overview of Group Means for Belief Revision</i>						
	Case 1			Case 2		
	++--	--++	Total	++--	--++	Total
Control Group	- 10.83	2.50	- 5.50	- 12.50	- 6.25	- 10.00
Primed Group	- 24.55	0.00	- 13.50	- 6.36	3.33	- 2.00
Total	- 17.39	1.18	- 9.50	- 9.57	- 1.18	- 6.00

Additionally, the interaction between information order and the different cases was found to be significant at a level of 10%. To gain further insight, Panel D of Table 14, and Figure 12A and Figure 12B illustrate this effect, namely that in Case 1 primed participants in the negative group exhibited significant downward belief revisions compared to primed participants in the positive group with a mean difference of 24.55% ($t(18) = 2.769, p$ (two-tailed) = 0.012). Post to completing Case 2, participants in the primed negative group exhibited downward belief revisions relative to those in the primed positive group with a mean difference of 9.70% ($t(18) = 1.777, p$ (two-tailed) = 0.093). The results imply that during Case 1 participants experienced recency effects that were reduced post to subjects receiving an external

priming stimulus. Overall, this relationship is explained by observing the following change in the belief adjustment of primed participants, expressed via the following difference:

$$\overline{D_p} = (\overline{P_1} - \overline{N_1}) - (\overline{P_2} - \overline{N_2})^6 = (0 - (-24.55)) - (3.33 - (-6.36)) = 14.86\%^7$$

Auditors in the control group partially exhibited the same behavior as participants in the primed group, however, the overall within-subjects effect was relatively different. During Case 1 control participants in the ++-- group exhibited significant downward belief revisions compared to control participants in the --++ group with a mean difference of 13.33% ($t(18) = 2.101, p$ (two-tailed) = 0.098). Post to completing Case 2, participants in the control negative group exhibited downward belief revisions relative to those in the control positive group with a mean difference of 6.25%, but not significant at level of 0.05. ($t(18) = 0.762, p$ (two-tailed) = 0.456). This relationship is explained by observing the following change in the belief adjustment of participants in the control group, expressed via the following difference:

$$\overline{D_c} = (\overline{P_1} - \overline{N_1}) - (\overline{P_2} - \overline{N_2})^8 = (2.50 - (-10.83)) - ((-6.25) - (-12.50)) = 7.08\%^9$$

Based on the aforementioned, it can be concluded that recency order effects were altered by being reduced to an insignificant level. Furthermore, the changes associated with the priming of subjects showed support in terms of **H₃**, i.e. auditors who evaluate mitigating factors followed by contrary information exhibit different belief revisions post to receiving a priming stimuli in comparison to auditors that receive no stimuli. All performed tests satisfy the standard assumptions of ANOVA and are displayed in Table 15, whereby each panel refers to the aforementioned tests in a consecutive order. In order to reinforce the robustness of the findings, additional parametric tests were conducted, which are discussed subsequently.

⁶ D_p estimates the difference for primed participants between the two information order conditions. P stands for positive or --++ and N stands for negative or ++--, whereas the different subscripts indicate the case number.

⁷ This difference is statistically significant at a level of 10%, but not statistically significant at a level of 5% ($t(18) = 1.879, p$ (two-tailed) = 0.077).

⁸ The expression refers to an equivalent differencing as discussed in note 3, but with respect to participants in the control group.

⁹ This difference is not significant at level of 10% ($t(18) = 0.763, p$ (two-tailed) = 0.456).

Figure 12A: Estimated Marginal means of Control group

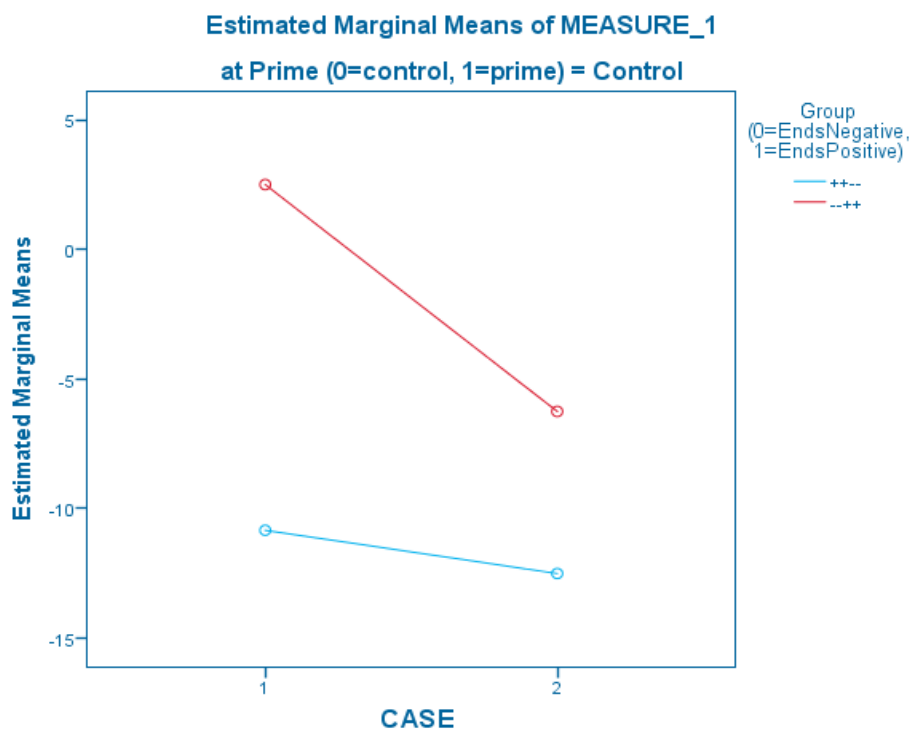


Figure 12B: Estimated Marginal means of Primed group

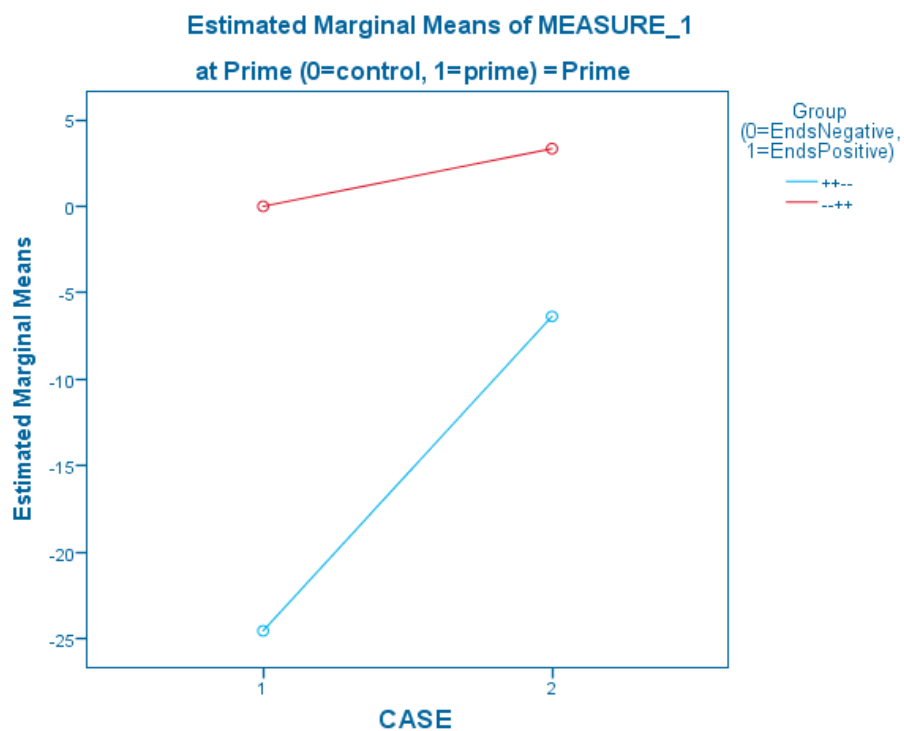


Table 15. Dependent variable diagnostics

<i>Panel A: Case 1 – Primed Group vs Control Group</i>				
Test	Statistic	df ₁	df ₂	Sig.
Kolmogorov-Smirnov	0.093	40	n.a.	0.200
Shapiro-Wilk	0.974	40	n.a.	0.491
Levene’s Test of Equality of Means	1.591	3	36	0.208
<i>Panel B: Case 2 – Primed Group vs Control Group</i>				
Test	Statistic	df ₁	df ₂	Sig.
Kolmogorov-Smirnov	0.139	40	n.a.	0.048
Shapiro-Wilk	0.972	40	n.a.	0.419
Levene’s Test of Equality of Means	1.940	3	36	0.141
<i>Panel C: Repeated-Measures ANOVA</i>				
Test	Statistic	df ₁	df ₂	Sig.
Mauchly’s Test of Sphericity	0.000	0	n.a.	.
Box’s Test of Equality of Covariance Matrices	1.209	9	9740.856	0.284

4.4 SUPPLEMENTAL ANALYSIS

This subsection discusses supplemental tests which were conducted to reduce the probability of heterogeneity. A linear regression was used to model the results discussed in the previous subsections. To provide a more robust analysis, several evidence-, effort-related and demographic variables were considered to control for potential relationships with the participants’ going concern assessments.

The first model specification (Model 1) can be summarized as follows:

$$\begin{aligned}
 FINBELS = & \beta_0 + \beta_1 INFORD + \beta_2 PS + \beta_3 INFORD * PS + \beta_4 INBELS + \beta_5 IAE_1 + \beta_6 IAE_2 \\
 & + \beta_7 IAE_3 + \beta_8 IAE_4 + \beta_9 SUFINF + \beta_{10} CERTAIN + \beta_{11} COMP + \beta_{12} CARE \\
 & + \beta_{13} INTENS + \beta_{14} CONC + \beta_{15} DIFF + \beta_{16} YGE + \beta_{17} PART + \beta_{18} NAT \\
 & + \varepsilon
 \end{aligned}$$

The first model specification considered the collected data prior to the priming stimulus, which thus consisted of forty (40) observations. The participants’ final beliefs (*FINBELS*) (i.e. S₄) were employed as a dependent variable, whereas the initial beliefs (*INBELS*) (i.e. S₀) of auditors were included as a control variable. In addition, the model further utilized professional skepticism (*PS*), information order (*INFORD*), and the interaction of the two (*INFORD*PS*) as independent variables. In accordance with our main conjecture, the coefficients of interest are

β_1 and β_3 , whereby the former is expected to be positive, corroborating the idea that participants in the positive group will have upward belief revisions in contrast to participants in the negative group. On the other hand, β_3 is expected to be negative, which relates to the idea that auditors with high PS in the positive group are expected to have lower belief revisions in contrast to auditors with low PS in the same group. The reverse scenario should therefore imply that auditors with high PS are expected to have upward belief revisions in contrast to auditors with low PS in the same group. *INFORD* is a dummy variable coded with 1 if the participant is in the positive condition, and 0 otherwise. In contrast to the prior subsection, a continuous measure of PS was used instead of a dichotomous one. Furthermore, in order to improve the interpretability of the results and avoid potential multicollinearity issues, mean centering techniques were used on PS.

The second regression model considered the collected data from both case studies, where the employed dependent variable is the change in the auditors' total belief revisions from Case 1 to Case 2 (*dBELREV*), which can be formally expressed as:

$$dBELREV = \Delta BELREV = (S_4 - S_0)_{CASE\ 2} - (S_4 - S_0)_{CASE\ 1}$$

Accordingly, the second model specification (Model 2¹⁰) can be defined as:

$$\begin{aligned} dBELREV = & \beta_0 + \beta_1 INFORD + \beta_2 PRIME + \beta_3 INFORD * PRIME + \beta_4 IAE_1 \\ & + \beta_5 IAE_2 + \beta_6 IAE_3 + \beta_7 IAE_4 + \beta_8 SUFINF + \beta_9 CERTAIN + \beta_{10} COMP \\ & + \beta_{11} CARE + \beta_{12} INTENS + \beta_{13} CONC + \beta_{14} DIFF + \beta_{15} YGE + \beta_{16} PART \\ & + \beta_{17} NAT + \varepsilon \end{aligned}$$

In order for the second model to adequately account for DDD effects, information order (*INFORD*), and the priming condition (*PRIME*) were included as independent variables. Furthermore, the model included the interaction of information order and priming effects (*PRIME*INFORD*), which accounted for the changes in the belief revision of auditors of both the positive and negative treatment groups across the priming and control groups. Therefore, the coefficients of interest are β_1 and β_3 . The first coefficient expected to be with a positive sign, thus implying that primed participants will have a positive change in their belief revision. On the other hand, β_3 is expected to be with a negative sign which relates to the idea that primed participants in the negative group will experience a positive change in their belief

¹⁰ The control variables of Model 2 are operationalized as the average of both case studies.

revision in contrast to non-primed participants in the same information order group, whereas primed participants in the positive group will experience a negative change in their belief revision relative to non-primed positive order participants. *PRIME* is a dummy variable coded with 1 if the participant is primed, and 0 otherwise.

As previously discussed, Kennedy (1993) argues that recency should be seen as an effort-related bias, which can be mitigated by imposing requirements on self-accountability and other effort-enhancing mechanisms. As a result, control measures, such as self-reported thought intensity (*INTENS*), concentration (*CONC*), being careful (*CARE*), and perceived difficulty (*DIFF*) were included to account for any potential relationships between auditors' judgement and effort-related factors. In addition, this provides insight as to what extent non-induced/non-manipulated effort could provide a meaningful contribution in explaining the belief revision of participants. Information (un)certainty and (in)sufficiency are generally recognized as factors that could potentially affect the auditors' decision making. Consequently, certainty in own assessments (*CERTAIN*), and whether the provided information was sufficient (*SUFINF*) and comprehensive (*COMP*) were also included as control variables. To account for demographic differences, years of general experience (*YGE*), nationality (*NAT*), whether participants previously attended studies with PS (*PART*), as well as, the individual assessments of the importance of additional evidence (*IAE*) were further included as measures to control for heterogeneity. *IAE*₁ and *IAE*₂ represent the cue clusters of negative additional evidence, whereas *IAE*₃ and *IAE*₄ represent the cue clusters of positive additional evidence, all of which are chronologically presented as per Case 1 and Case 2 in Annex B and Annex C, respectively. Lastly, it should be noted that the two model specifications utilized an identical set of control variables to control for heterogeneity. However, since the second model specification considers the change of belief revisions, the values of the control variables represent the average from both case studies.

Prior to analyzing the supplementary results that were obtained from the above mentioned models, the correlations of the utilized variables are first discussed. Table 16 and Table 17 display the correlation matrix of Model 1 and Model 2, respectively.

Table 16. Correlation matrix of Model 1

	<i>FINBELS</i>	<i>INFORD</i>	<i>PS</i>	<i>INFORD*PS</i>	<i>INBELS</i>	<i>IAE₁</i>	<i>IAE₂</i>	<i>IAE₃</i>	<i>IAE₄</i>	<i>SUFINF</i>	<i>CERTAIN</i>	<i>COMP</i>	<i>CARE</i>	<i>INTENS</i>	<i>CONC</i>	<i>DIFF</i>	<i>YGE</i>	<i>PART</i>	<i>NAT</i>
<i>FINBELS</i>	1.000	0,408**	-0.036	-0.023	0,414**	-0.283	-0.146	0,313*	0,127	-0.178	-0.107	0,102	-0.004	-0.019	0,110	-0.085	-0.211	-0.288	-0.030
<i>INFORD</i>	0.410**	1.000	-0.112	-0.056	-0.093	0,059	-0.059	0,152	-0.064	-0.135	-0.225	-0.032	-0.110	-0.154	-0.116	0,101	-0.392*	0,036	-0.204
<i>PS</i>	-0.027	-0.097	1.000	0,685**	-0.023	0,127	0,194	-0.202	0,285	0,071	0,277	0,198	0,466**	0,471**	0,442**	-0.238	0,103	0,000	0,325*
<i>INFORD*PS</i>	-0.086	-0.075	0,747**	1.000	0,078	0,117	0,174	-0.180	0,273	0,075	0,234	-0.004	0,224	0,290	0,239	-0.152	0,123	0,145	0,050
<i>INBELS</i>	0.447**	-0.058	-0.002	0.038	1.000	0,123	0,363*	0,196	0,182	0,237	0,125	0,163	0,167	0,003	0,077	-0.018	0,013	-0.038	-0.277
<i>IAE₁</i>	-0.246	0.087	0.177	0.200	0.075	1.000	0,212	0,111	0,143	0,364*	0,237	0,202	0,095	-0.010	0,097	-0.026	0,225	0,214	-0.117
<i>IAE₂</i>	-0.151	-0.047	0.151	0.124	0.363*	0.153	1.000	-0.153	0,375*	0,395*	0,222	0,115	0,146	0,052	-0.078	0.003	0,075	0,193	-0.005
<i>IAE₃</i>	0.315*	0.157	-0.241	-0.231	0.263	0.160	-0.134	1.000	0,221	0,182	-0.174	-0.098	0,090	-0.050	0,027	0,161	-0.076	0,081	-0.208
<i>IAE₄</i>	0.203	-0.066	0.319*	0.339*	0.290	0.090	0.313*	0.290	1.000	0,467**	0,083	0,063	0,146	0,128	0,090	0,060	0,081	0,057	0,281
<i>SUFINF</i>	-0.153	-0.112	0.120	0.113	0.253	0.366*	0.374*	0.196	0.513**	1.000	0,440**	0,135	0,224	0,049	0,132	0,012	0,211	0,128	-0.069
<i>CERTAIN</i>	-0.101	-0.232	0.282	0.247	0.095	0.267	0.221	-0.208	0.101	0.455**	1.000	0,187	0,212	0,336*	0,312	-0.531**	0,471**	0,002	-0.169
<i>COMP</i>	0.105	-0.033	0.197	0.021	0.163	0.363*	0.093	-0.089	-0.025	0.145	0.250	1.000	0,420**	0,135	0,271	-0.193	-0.005	0,023	0,088
<i>CARE</i>	0.035	-0.089	0.426**	0.228	0.147	0.027	0.098	0.105	0.126	0.189	0.201	0.379*	1.000	0,675**	0,653**	-0.056	-0.097	-0.002	0,315*
<i>INTENS</i>	0.057	-0.159	0.429**	0.308	0.057	-0.060	0.021	-0.028	0.155	0.045	0.340*	0.132	0.683**	1.000	0,770**	-0.315*	0,176	-0.023	0,224
<i>CONC</i>	0.161	-0.067	0.369*	0.221	0.064	0.106	-0.127	0.059	0.077	0.118	0.290	0.331*	0.672**	0.776**	1.000	-0.266	0,275	-0.162	0,080
<i>DIFF</i>	-0.061	0.140	-0.202	-0.135	0.055	-0.076	0.063	0.223	0.063	0.056	-0.540**	-0.157	-0.095	-0.349*	-0.275	1.000	-0.192	0,185	0,092
<i>YGE</i>	-0.190	-0.395*	0.053	0.062	0.018	0.199	0.007	-0.061	0.116	0.239	0.389*	0.111	-0.101	0.058	0.161	-0.080	1.000	-0.033	-0.028
<i>PART</i>	-0.280	0.036	0.010	0.019	-0.030	0.191	0.191	0.063	-0.007	0.101	-0.007	-0.034	0.025	-0.011	-0.133	0.208	-0.078	1.000	-0.290
<i>NAT</i>	-0.029	-0.204	0.317*	0.187	-0.293	-0.128	-0.040	-0.187	0.252	-0.070	-0.168	0.022	0.329*	0.195	0.092	0.040	0.000	-0.290	1.000

Pearson correlation coefficients are presented in the lower left corner, whereas Spearman rank correlation coefficients are presented in the upper left.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 17. Correlation matrix of Model 2

	<i>dBELREV</i>	<i>INFORD</i>	<i>PRIME</i>	<i>INFORD*PRIME</i>	<i>IAE₁</i>	<i>IAE₂</i>	<i>IAE₃</i>	<i>IAE₄</i>	<i>SUFINF</i>	<i>CERTAIN</i>	<i>COMPR</i>	<i>CARE</i>	<i>INTENS</i>	<i>CONC</i>	<i>DIFF</i>	<i>YGE</i>	<i>PART</i>	<i>NAT</i>
<i>dBELREV</i>	1.000	-0.255	0.401*	-0.018	0.023	0.183	0.099	0.039	0.386*	0.166	0.007	-0.042	-0.047	-0.182	0.245	0.295	0.319*	-0.174
<i>INFORD</i>	-0.245	1.000	0.051	0.627**	0.007	-0.184	-0.120	-0.267	-0.252	-0.334*	-0.205	-0.101	-0.133	0.057	0.291	-0.392*	0.036	-0.204
<i>PRIME</i>	0.389*	0.051	1.000	0.539**	-0.026	-0.048	-0.143	0.088	0.117	0.092	-0.390*	-0.167	-0.078	0.101	0.130	0.099	0.101	-0.577**
<i>INFORD*PRIME</i>	-0.004	0.627**	0.539**	1.000	0.034	0.034	-0.245	-0.158	-0.082	-0.197	-0.148	-0.107	0.011	0.205	0.198	-0.092	0.114	-0.518**
<i>IAE₁</i>	0.019	0.054	-0.053	0.064	1.000	0.024	0.153	0.138	0.224	0.084	0.173	0.238	0.091	0.157	0.032	0.149	0.157	-0.018
<i>IAE₂</i>	0.215	-0.187	-0.035	0.032	0.043	1.000	0.205	0.166	0.230	0.179	0.070	0.160	0.313*	0.212	-0.258	0.111	-0.037	0.106
<i>IAE₃</i>	0.055	-0.040	-0.178	-0.193	0.121	0.308	1.000	0.354*	0.195	-0.061	0.073	0.125	0.002	-0.072	0.093	-0.150	0.106	0.176
<i>IAE₄</i>	0.045	-0.233	0.075	-0.186	0.099	0.182	0.420**	1.000	0.447**	0.124	0.072	0.150	0.216	0.214	-0.089	0.125	0.057	0.226
<i>SUFINF</i>	0.375*	-0.276	0.078	-0.114	0.201	0.270	0.244	0.496**	1.000	0.486**	0.216	0.224	0.209	0.298	-0.083	0.101	-0.009	0.023
<i>CERTAIN</i>	0.187	-0.321*	0.084	-0.225	0.076	0.231	-0.070	0.190	0.510**	1.000	0.080	0.163	0.262	0.344*	-0.426**	0.433**	-0.150	-0.043
<i>COMPR</i>	-0.007	-0.146	-0.409**	-0.119	0.164	0.053	0.067	-0.032	0.196	0.084	1.000	0.275	0.372*	0.285	-0.290	0.031	-0.135	0.244
<i>CARE</i>	-0.062	-0.064	-0.165	-0.058	0.184	0.194	0.116	0.189	0.215	0.116	0.287	1.000	0.703**	0.654**	-0.211	-0.088	0.099	0.322*
<i>INTENS</i>	-0.010	-0.180	-0.040	0.024	0.031	0.292	-0.010	0.197	0.196	0.280	0.357*	0.687**	1.000	0.684**	-0.529**	0.079	-0.072	0.272
<i>CONC</i>	-0.077	-0.061	0.054	0.108	0.152	0.230	-0.088	0.172	0.314*	0.338*	0.377*	0.679**	0.687**	1.000	-0.384*	0.007	-0.340*	0.172
<i>DIFF</i>	0.245	0.243	0.129	0.217	0.000	-0.179	0.125	-0.063	0.017	-0.485**	-0.240	-0.126	-0.490**	-0.317*	1.000	-0.169	0.197	-0.048
<i>YGE</i>	0.276	-0.395*	-0.014	-0.150	0.103	0.052	-0.142	0.133	0.184	0.377*	0.123	-0.154	0.023	0.035	-0.099	1.000	-0.033	-0.028
<i>PART</i>	0.335*	0.036	0.101	0.114	0.160	-0.065	0.008	0.013	-0.060	-0.184	-0.176	0.086	-0.040	-0.322*	0.204	-0.078	1.000	-0.290
<i>NAT</i>	-0.183	-0.204	-0.577**	-0.518**	-0.031	0.101	0.161	0.244	0.075	0.007	0.207	0.348*	0.228	0.196	-0.052	0.000	-0.290	1.000

Pearson correlation coefficients are presented in the lower left corner, whereas Spearman rank correlation coefficients are presented in the upper left.

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 16 shows that information order (*INFORD*) is significantly correlated with final beliefs (*FINBELS*) in agreement with the theoretically predicted direction ($r = 0.410, p = 0.009$). This implies that participants in the positive direction are more likely to score higher in terms of their final beliefs relative to participants in the negative treatment group. Furthermore, final beliefs are positively correlated with initial beliefs (*INBELS*), which implies that auditors starting with more optimistic beliefs can be expected to end up with higher final beliefs compared to the opposite scenario ($r = 0.447, p < 0.004$). It should also be noticed that final beliefs are significantly correlated with the third additional information item (*IAE₃*) ($r = 0.315, p < 0.048$). Specifically, the participants reacted positively to the information concerning the banks' willingness to renegotiate terms with the entity. Even though the correlation of *FINBEL* with the other *IAE* is not significant, it should be noted that the direction of the variables is within the set expectations. In other words, the negative cue blocks are negatively correlated with *FINBEL*, whereas the positive cue blocks are positively correlated with *FINBEL*.

The findings reported in Figure 16 are in line with prior auditing studies and the results presented in the previous sections and several other notable facts are worth exploring. For instance, participants who scored high on being careful (*CARE*) were likely to be more concentrated (*CONC*) ($r = 0.672, p < 0.001$), whereby the former was further positively correlated with their thought intensity (*INTENS*) ($r = 0.682, p < 0.001$). Moreover, the more experienced people were, the more certain (*CERTAIN*) they were in their assessments ($r = 0.389, p = 0.013$). On the other hand, if participants perceived the case as too difficult (*DIFF*), it was more likely that they would be less certain in their going-concern assessment ($r = -0.540, p < 0.001$). In addition, participants who did not apply enough effort via intensive thinking found the case to be relatively more difficult ($r = -0.349, p = 0.027$). The participants that were relatively more certain in their assessments and who perceived that the provided information was relatively sufficient (*SUFF*) were likely to place more importance on the additional information items. This is to be expected, because more value is placed on new information that could potentially alter the status quo. Lastly, it should be noted that higher professional skepticism (*PS*) is positively correlated with being careful ($r = 0.426, p = 0.006$), higher rates of thought intensity ($r = 0.429, p < 0.001$), and concentration ($r = 0.369, p = 0.019$), which is in line with predictions of previous audit studies.

The results in Table 17 show that the being exposed to a priming stimuli (*PRIME*) is a major factor which is significantly correlated with the change in auditors' total belief revision (*dBELREV*), which is in line with the theoretical prediction ($r = 0.389, p < 0.013$). Interestingly, the variable sufficient information (*SUFINF*) is also significantly and positively correlated with the dependent variable ($r = 0.375, p < 0.017$). This stipulates that individuals who perceive to have received sufficient information to form a judgement about a case, are more likely to experience a positive change in their beliefs over time. Another interesting finding is that participants who had already participated in other seminars involving professional skepticism (*PART*) experienced a positive correlation with the change in their total belief revision ($r = 0.335, p < 0.035$). This implies that exposure to awareness about professional skepticism could potentially be affecting beliefs in the long term. However, this cannot be inferred solely from a correlation analysis. As the results from the table show, the other factors were not found to significantly correlate with the dependent variable of Model 2.

Lastly, the same correlation patterns which were found in Table 16 with regards to effort- and uncertainty- related variables can also be found in Table 17. This indicates that these variables have the tendency to be generally intertwined between one another, which is clearly intuitive. A person who has applied more mental effort under the form of concentration, or thought intensity is more likely to be certain in her/his assessments. Although this provides, to a certain extent, an indication about the personal characteristics of the individuals under study, these variables do not show a significant correlation with the main factors of interest. Hence, this suggests that they are not strong predictors of how belief revision will change over time.

Table 18. Regression analysis results

Variables	Model 1				Model 2			
	Unstandardized Coefficients	Standardized Coefficients	t	p-value	Unstandardized Coefficients	Standardized Coefficients	t	p-value
Main variables of Interest								
<i>INFORD</i>	19.92	0.499	3.218	0.004***	14.01	0.278	1.093	0.286
<i>PS</i>	0.20	0.108	0.427	0.674				
<i>INFORD*PS</i>	-0.15	-0.062	-0.248	0.807				
<i>PRIME</i>					36.94	0.863	3.419	0.003***
<i>INFORD*PRIME</i>					-32.70	-0.544	-1.998	0.058*
Control Variables								
<i>IAE₁</i>	-7.73	-0.442	-3.230	0.004***	-15.73	-0.092	-0.487	0.631
<i>IAE₂</i>	-3.11	-0.172	-0.914	0.371	6.23	0.353	1.662	0.111
<i>IAE₃</i>	6.64	0.338	1.366	0.187	0.85	0.091	0.228	0.822
<i>IAE₄</i>	1.25	0.087	0.350	0.730	-7.36	-0.374	-1.656	0.112
<i>SUFINF</i>	-3.40	-0.214	-0.932	0.362	7.72	0.399	1.333	0.196
<i>CERTAIN</i>	4.41	0.307	1.398	0.177	-1.13	-0.090	-0.220	0.828
<i>COMPR</i>	3.44	0.230	1.336	0.196	6.53	0.355	1.603	0.123
<i>CARE</i>	-8.90	-0.493	-1.570	0.131	-5.15	-0.202	-0.594	0.559
<i>INTENS</i>	-3.30	-0.149	-0.579	0.569	5.64	0.082	0.563	0.579
<i>CONC</i>	8.39	0.400	1.201	0.243	-2.20	-0.081	-0.207	0.838
<i>DIFF</i>	-0.87	-0.064	-0.331	0.744	4.17	0.145	1.076	0.293
<i>YGE</i>	-0.61	-0.108	-0.669	0.511	1.87	0.342	1.640	0.115
<i>PART</i>	1.53	0.039	0.223	0.826	18.07	0.471	2.125	0.045**
<i>NAT</i>	18.81	0.413	1.765	0.092*	8.95	0.297	1.266	0.219
<i>INBELS</i>	0.67	0.630	3.725	0.001***				
Constant	16.11	0.000	0.477	0.639	-89.63	0.000	-1.843	0.079*
Adjusted R ²	0.654				0.508			
F-Statistic	5.090***				3.366***			

Coefficients with a probability of *, **, and *** are significant at levels of 10%, 5% and 1%, respectively. Both standardized and unstandardized coefficients are displayed. The former shows the amount by which a dependent variable changes if one unit change occurs in the independent variable, whereas the latter refers to how many standard deviations a dependent variable will change, per a standard deviation increase in the predictor variable. Standardized coefficients are preferred they account for the independent variable's scale of units, which makes comparisons easy.

Table 18 shows that both model specifications are statistically significant with $F(18, 21) = 5.090, p < 0.001$, adj. $R^2 = 0.654$ for Model 1 and $F(17, 22) = 3.366, p = 0.004$, adj. $R^2 = 0.508$ for Model 2. The supplemental analysis reconfirmed the findings from the previous results' subsections regarding the main variables of interest. Specifically, Model 1 shows that in Case 1, information order had a statistically significant impact on the dependent variable ($\beta = 0.499, p = 0.004$). On the other hand, professional skepticism (*PS*) did not significantly contribute in

explaining the variance of the final beliefs (*FINBELS*) of auditors ($\beta = 0.108, p = 0.674$). In addition, the interaction between skepticism and the order of information was further found to have a statistically insignificant effect on *FINBELS* ($\beta = -0.062, p = 0.807$).

In comparison, Model 2 shows that *INFORD* did not significantly provide an explanation in the variance of *dBELREV* ($\beta = 0.278, p = 0.286$), however, participants that had been exposed to a priming stimulus experienced a significant change in their belief revisions. Furthermore, the order of the presented additional evidence was found to weakly interact with the effects of priming in explaining the change of participants' total belief revision ($\beta = -0.544, p = 0.058$). This thus implies that auditors were not uniformly sensitive to the different type of information (i.e. negative or positive). This could be supported by the fact that only the first additional information cue (i.e. *IAE₁*) during Case 1 was found to significantly impact the final beliefs of auditors ($\beta = -0.442, p = 0.004$). In relation to this, the coefficients of *IAE₂*, *IAE₃*, and *IAE₄* were found to have a sign in consistency with the predicted direction, however, none was significant. Furthermore, Panel D of Table 14 presented in section 4.3, shows that participants were in fact more sensitive to negative information in comparison to positive additional evidence.

With regard to the effort-related control variables (i.e. *INTENS*, *CONC*, *CARE*, and *DIFF*), none was found to be significant in explaining the variation of the dependent variables in both model specifications. This was also the case with the other control variables relating to information (un)certainty and (in)sufficiency (i.e. *SUFINF*, *CERTAIN*, and *COMP*). Lastly, the initial beliefs (*INBELS*) of auditors were found to have a strong power in predicting the final beliefs of auditors ($\beta = 0.630, p = 0.001$). This stipulates that initial anchors are detrimental in determining the future beliefs in an individual as formally demonstrated by the belief-adjustment model in Annex A.

Interestingly, two factors were found to be significant. For instance, in Model 1, the nationality background (*NAT*) of participants was weakly related to explaining deviations of final beliefs ($\beta = 0.413, p = 0.092$). Specifically, Dutch nationals were found to be more sensitive to negative information in comparison to Bulgarian nationals. Furthermore, prior participation in seminars related to topics of professional skepticism (*PART*) was found to have an effect on the change of auditor's total belief revision. This implies that seminars increasing the self-awareness of auditors might have a potential recurring long-term effect on the beliefs of auditors.

It should be noted that the presented model specifications meet all assumptions that are generally required by an OLS regression. For instance, most of the correlations between the variables found in Table 16 and Table 17 are below the critical value of 0.8. Furthermore, the variance inflation factors (VIF) are uniformly distributed below 5, thus clearly not passing the critical value of 10. The scatterplots of the residuals of all the variables were examined thus confirming the tenability of the assumptions for linearity and normality. Lastly, heteroscedasticity-consistent standard errors were used to meet the assumption of homoscedasticity.

Given the aforementioned, the presented results from the supplemental analysis reinforce the main findings from the ANOVA parametric tests. Moreover, the different specifications of the dependent variable (under Model 1 and Model 2) further increased the internal validity of the results, thus providing robustness to the inferences made in relation to the different hypotheses in question.

Consequently, it can be concluded that auditors who evaluate negative information at the end of the sequence tend to exhibit greater downward belief revisions than auditors who evaluate positive information cues. This, thus, provides support for **H₁**.

On the other hand, participants with different levels of professional skepticism were not found to significantly differ in terms of their belief revision. Furthermore, recency was found to persist, independent of the different levels of skepticism reported by auditors. This is due to the fact that the interaction between information order and professional skepticism was not found to be statistically significant. Hence, **H₂** cannot be supported.

With regard to the third hypothesis (i.e. **H₃**), participants who were exposed to a priming stimulus experienced a significant positive change in their belief revision in contrast to participants who acted as a control group. Furthermore, the interaction of priming and information order was also found to be significant, thus implying that primed participants in both positive and negative treatment conditions experienced a change in beliefs, such that recency was diminished. Consequently, the hypothesis that auditors who evaluate mitigating factors followed by contrary information will exhibit different belief revisions post to receiving a priming stimulus can be retained.

5 CONCLUSION

The final section of the thesis shall provide a detailed discussion about the main findings and their implications. It will address the limitations of the current paperwork and will further discuss potential fields for future research areas.

5.1 DISCUSSION

The end goal of this research paper was three-fold. First of all, it aimed at contributing to existing literature with additional empirical evidence in terms of the existence and effects of information order bias in the belief-adjustment process of auditors. Secondly, the thesis attempted to reconfirm the findings of prior audit researches and to show that personal disposition traits (e.g. professional skepticism) are not sufficient factors for mitigating the overweighting of information received later in a sequence of information (i.e. recency). Lastly, and most importantly, the thesis aimed to investigate the potential effects of effort-enhancing environmental factors on alleviating recency bias through increasing the self-awareness of auditors.

The research was done via the conduct of a controlled experiment. This involved the employment of two (2) case studies over two (2) separate points in time, where participants had to sequentially assess the likelihood of an entity's going concern. Prior to completing the first case (or Case 1), subjects were randomly assigned to a positive (“--++”) or a negative treatment condition (“++--”). On a post-hoc and median-split basis, subjects were further reclassified as either having “low” or “high” professional trait skepticism, based on their score from Hurtt's scale. The research was conducted in the context of the sequential processing of mixed and complex evidence, whereby the results indicated that the belief formation of auditors is heavily influenced by the order in which information and additional evidence are processed. The results from Case 1 further showed that recency effects are not diminished even by taking into account the different levels of the participants' trait professional skepticism. Thus, this implied that subconscious bias could potentially have a more dominant effect over personal disposition traits.

Prior to the second part of the experiment, half of the participants were randomly allocated in a group that was exposed to a priming stimulus, whereas the remainder served as a control reference. Through the use of a unique 4-digid code, subjects were identified and thus allocated to the correct order group (i.e. negative “++” -- or positive “--++”) as per initial allocation in Case 1.

The results showed that the primed individuals experienced a change in their judgment in a way that alleviated the effects of recency. This inference was even stronger for primed participants in the negative group. Consequently, the results provide grounds for the argument that environmental factors could be efficient factors for mitigating information order bias.

Overall, the findings are in line with the reported results of prior auditing and psychological research, whereby all come to an agreement that recency bias is hard-wired, and a persistent information order effect which influences decision making on a subconscious level. It is worthwhile to mention that a large focus has been placed on environmental factors, task factors, experience, audit tenure or knowledge. One prominent study, which has delved into the relation between personality traits and auditors' believe revisions is an experiment conducted by Chan (1995). His analysis reveals a significant interaction between personal cognitive style and information order effects, pointing towards that field independent auditors exhibit less recency bias relative to their field-dependent counterparts. The aforementioned, thus highlights the significance of personality traits in the context of auditor's belief adjustment. In contrast, Yankova (2014) reported that high levels of professional skepticism did not alter the effects of recency on auditors. In support, the results from the present research, come closer to the reported findings by Yankova (2014), thus supporting the hypothesis that internal trait factors are weak against the effects of subconscious biases. Due to the lack of research on this topic, a more valid and reliable inference cannot be established at this point. Lastly, Kahle et. al (2005) noted that audit research has paid relatively little attention to cognitive enhancers such as priming. The findings of this paper thus showed that priming was in fact an effective tool for increasing the self-awareness of auditors to a level which reduced the impact of recency bias. As discussed in Section 2.5, the reported findings by Backof et al. (2014), Hammersley et al. (2010), and Parlee et al. (2014) indicate that even the subtlest changes in the environment can subconsciously alter the behavior of auditors. Given the aforementioned, several implications can be inferred with regard to regulators, standard setters, audit professionals and academic research.

The fact that auditors have a tendency to overweight information based on the order of information items, irrespective of their level of skepticism, posits that audit clients could potentially exploit such weaknesses. For instance, clients can provide evidence to auditors in such order so the most favorable position of the audited entity is elicited. In fact, Asare (1992) argues

that “last-minute good news” can often occur in practice. This leads to the next finding that attaining high self-awareness is key to preventing falling prey to cognitive traps that can impair the decision making process. That being said, biases tend to be largely disregarded, despite their impairing effect on audit quality. Therefore, based on the results from this study, more time should be invested in special training programs, such that auditors are more aware of cognitive traps. In addition, guidance structures ought to be implemented so that auditors are constantly exposed to reminders which control for cognitive tendencies. With regards to auditing standards, the lack of clear and unambiguous description of what professional skepticism is has casted a shadow over its proper application. As a result, it is highly essential that standard setters and regulators establish a set of coherent rules which can outline how PS can be applied in order reduce the impairment of audit quality. Given the aforementioned, this study provides and extends the support of how biases can affect the belief-adjustment process of individuals. Furthermore, it provides important insights as to how self-awareness and environmental enhancers can be used to mitigate such issues.

5.2 LIMITATIONS

Like most empirical researches, the present study was also subject to several limitations. First of all, the sample size of the study is relatively small, due to two reasons. For one, there were certain time limitations in approaching auditors of the Big 4 companies and consequently their response rate. Secondly, the research was conducted during the auditing season, which posed a major challenge. During the auditing season professionally certified auditors have a high work load within the company, which consequently means that this slowed down their response rate to taking part in an experiment, or that many of the certified auditors did not find the time to participate at all. Consequently, as mentioned before, several participants were non-certified auditors. Perhaps, if the same experiment would have been conducted outside the auditing season, the response rate, and more specifically the response rate of professionally certified auditors could have been increased.

A second limitation of the present study is the representativeness of the sample. As discussed before, auditors from two Big 4 companies participated in the experiment. Moreover, the sample was drawn on a self-selection basis, however, usually a sample should be drawn randomly from a wider population. In this case, the results are mainly generalizable to the auditors from these two companies, but not for instance to smaller auditing firms, or other auditors in

general. That being said, differences on firm-level such as company culture, and trainings were not considered, which could have caused an impact in terms of reliability of the results. Furthermore, one implicit assumption was the fact that trait PS is considered to be stable over time, however, different states in different points in time could play a role in changing skepticism and thus moderating its relationship with belief revision. Language difference could have also affected the assessments of participants due to issues with their interpretation. Nevertheless, Big 4 companies have a global policy which places strong requirements on the level of proficiency in English, thus rendering language difference issue.

Lastly, the present study faces some external validity issues. With regard to the experiment, the participants were placed in a more simplified setting, whereby each individual was confronted with two cases. However, unlike in a real-life audit setting, the available information regarding the company, its financial stability, and other factors was limited to the information provided in the case description. Consequently, the participants were only able to form judgements based on the information in the cases. Furthermore, the priming stimulus was specifically tailored to counter the effects of one specific cognitive trap, however, the question of its effectiveness against other biases remains openly debated. Moreover, the experiment was conducted in only two countries. Hence, the conducted study was not intercultural. This further causes problems in terms of the generalizability, since the focus lies only on The Netherlands and Bulgaria. National differences are a valid phenomenon, especially since the experiment took under study a country that is more sceptic (Bulgaria) and a country that is less sceptic (Netherlands). This difference is also portrayed in the results, which provides an interesting direction for future studies.

5.3 SUGGESTIONS FOR FUTURE RESEARCH

The last section of the present research will explore several avenues of future research, which could further impact and contribute to the topic of belief adjustment, priming, and professional trait skepticism in auditing.

With regard to professional skepticism, currently there are no developed scales that provide a robust, reliable *ex-ante* measurement concerning the state dimension of the factor. This is of particular importance since situational factors have been generally found to influence subjects and thus their decision making process. Consumer research has shown that situational (state) PS and

dispositional (trait) have additive and independent effects on human behavior and judgment. Specifically, Forehand and Grier (2003) found that individuals with high PS were more likely to be sensitive to a particular environmental stimuli than their counterparts with low PS. That being said, it would be of interest to investigate the potential interplay of state and trait PS and their effect on human judgment. In addition, it became evident, that the primed participants from the research sample experienced a change in their beliefs. Given that state PS is theorized to be influenced by environmental stimuli, an additional area for future research would be to prime auditors to be more sensitive to audit evidence. Consequently, this will provide more insight on the impact of priming on auditors' state PS.

Provided that the nationality background of participants resulted in some differences in beliefs and professional skepticism, it would be highly valuable to conduct a cross-cultural/international research on a much larger scope. Hofstede's cultural dimensions (2001) are an interesting phenomena which have been used in multiple research papers to capture deviations in behavior. In addition, differences in the legislative and judicial system across countries is also likely to impact auditor decision-making. In addition to that, it would be of high value added to investigate whether any of these factors would be valid predictors for countering cognitive tendencies and to what extend they interact with professional skepticism.

Lastly, although the priming of participants to be more self-aware appeared to be successful, empirical data was only collected for two points in time, i.e. before and after the subjects were primed. This, however, limits our inference about the potential long term effects of priming on self-awareness. Consequently, it would be of interest to see if the effects of priming or any other environmentally enhancing stimuli are significant in the long term or if their effect lasts for a limited amount of time after exposure. In order to answer such a question, there is necessity for a longitude analysis that has to be conducted over three or more points in time.

To sum up, the current picture of the cognitive processes which govern auditor judgment and the human mind are far from being complete. This posits the challenging task and necessity for more thorough and deeper academic research in this area. Given the increasing security measures, falling audit charge rates and new technological developments which represent a constant threat over the auditing profession, it is of essence that such challenges are tackled without neglecting others such as the ones discussed in the paperwork.

BIBLIOGRAPHY

- Abou-Seada, M., & Abdel-Kader, M. G. (2003). *Behavioural aspects of auditors' evidence evaluation: A belief revision perspective*. Aldershot, Hants, England: Ashgate.
- Adelman, L., Tolcott, M. A., & Bresnick, T. A. (1993). Examining the Effect of Information Order on Expert Judgment. *Organizational Behavior and Human Decision Processes*, 56, 348-369.
- AICPA. (2002). *Consideration of fraud in a financial statement audit*. In *Statement of Auditing Standards No. 99*. New York, NY: AICPA.
- AICPA. (2010, December 8). *Response to the European Commission's Green Paper on Audit Policy*. Retrieved from <https://www.aicpa.org/Advocacy/International/DownloadableDocuments/AICPAresponse-EUGreenpaper.pdf>
- Anderson, N. H. (1981). *Foundations of Information Integration Theory*. New York, NY: Academic Press.
- Asare, S. K. (1992). The Auditor's Going-Concern Decision: Interaction of Task Variables and the Sequential Processing of Evidence. *The Accounting Review*, Vol. 67 (2), 379-393.
- Asare, S. K., & Messier, W. F. (1991). A Review of Audit Research Using the Belief-Adjustment Model. In L. A. Ponemon, & D. R. Gabhart, *Auditing: Advances in Behavioral Research* (pp. 75-92). New York, NY: Springer-Verlag.
- Ashton, A. H., & Ashton, R. H. (1988). Sequential Belief Revision in Auditing. *The Accounting Review*, Vol. 63 (4), 623-641.
- Ashton, R. H., & Kennedy, J. (2002). Eliminating Recency with Self-Review: The Case of Auditors' 'Going Concern' Judgments. *Journal of Behavioral Decision Making*, 15, 221-231.
- Baars, B. J., & Cage, N. M. (2013). *Fundamentals of Cognitive Neuroscience: A Beginner's Guide*. Waltham, MA: Academic Press.
- Babbie, E. R. (2013). *The practice of social research*. Belmont, Calif: Wadsworth Cengage Learning.
- Backof, A. G., Thayer, J., & Carpenter, T. D. (2014, May). *Auditing Complex Estimates: Management-Provided Evidence and Auditors' Consideration of Inconsistent Evidence*. Retrieved from Social Science Research Network: <http://ssrn.com/abstract=2279138> or <http://dx.doi.org/10.2139/ssrn.2279138>
- Baird, J. E., & Zelin, R. C. (2000). The Effects of Information Ordering on Investor Perceptions: An Experiment Utilizing Presidents' Letters. *Journal of Financial and Strategic Decisions*, 13 (3), 71-80.

- Bamber, E. M., Ramsay, R. J., & Tubbs, R. M. (1997). An Examination of the Descriptive Validity of the Belief-Adjustment Model and Alternative Attitudes to Evidence in Auditing. *Accounting, Organizations and Society*, 22 (3/4), 249-268.
- Baron, R. A., & Branscombe, N. R. (2011). *Social Psychology. 13th Edition*. Boston: Pearson Education, Inc.
- Bazerman, M. H., & Moore, D. A. (2013). *Judgment in Managerial Decision Making*. Hoboken: John Wiley & Sons.
- Bazerman, M. H., Loewenstein, G., & Moore, D. A. (2002). Why Good Accountants Do Bad Audits. *Harvard Business Review*, 97-102.
- Bazerman, M., Morgan, K., & Loewenstein, G. (1997). The impossibility of auditor independence. *Sloan Management Review*, 38 (4), 89-94.
- Beasley, M. S., & Carcello, J. V. (1999). *Fraudulent Financial Reporting: 1987-1997 — An Analysis of U.S. Public Companies*. Jersey City: Committee of Sponsoring Organizations of the Treadway Commission.
- Bell, T. B., Peecher, M. E., & Solomon, I. (2005). *The 21st Century Public Company Audit: Conceptual Elements of KPMG's Global Audit Methodology*. New York, NY: KPMG LLP.
- Bentin, S., McCarthy, G., & Woods, C. C. (1985). Event Related Potentials, Lexical Decision and Semantic Priming. *Electroencephalography and Clinical Neurophysiology*, 60.
- Bonner, S. E. (1999). Judgment and Decision-Making Research in Accounting. *Accounting Horizons*, 13 (4), 385-398.
- Bonner, S. E. (2008). *Judgment and Decision Making in Accounting*. Upper Saddle River: Pearson Prentice Hall.
- Butt, J. L., & Campbell, T. L. (1989). The Effects of Information Order and Hypothesis-Testing Strategies on Auditors' Judgments. *Accounting, Organizations and Society*, 14 (5/6), 471-479.
- Chan, M. M. (1995). The moderating effects of cognitive style and recency effects on the auditors' belief revision process. *Managerial Auditing Journal*, 10 (9), 22-28.
- Chapman, G. B., Bergus, G. R., & Elstein, A. S. (1996). Order of Information Affects Clinical Judgement. *Journal of Behavioral Decision Making*, 9 (3), 201-211.
- Cohen, J. R., Dalton, D. W., & Harp, N. L. (2014, March 17). *The Effect of Professional Skepticism on Job Attitudes and Turnover Intentions within the Audit Profession*. Retrieved from Social Science Research Network: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2410547
- Costabile, K. A., & Klein, S. B. (2005). Finishing Strong: Recency Effects in Juror Judgments. *Basic & Applied Social Psychology*, 27 (1), 47-58.

- Cushing, B. E., & Ahlawat, S. S. (1996). Mitigation of Recency Bias in Audit Judgment: The Effect of Documentation. *Auditing: A Journal of Practice & Theory*, 15 (2), 110-122.
- Einhorn, H. J., & Hograth, R. M. (1981). Behavioral Decision Theory: Process of Judgment and Choice. *Journal of Accounting Research*, 19 (1), 1-31.
- Engler, B. (2014). *Personality Theories, 9th Edition*. Belmont: Wadsworth.
- Favere-Marchesi, M. (2006). "Order Effects" Revisited: The Importance of Chronology. *Auditing: A Journal of Practice & Theory*, 25 (1), 69-83.
- Forehand, M. R., & Grier, S. (2003). When Is Honesty the Best Policy? The Effect of Stated Company Intent on Consumer Skepticism. *Journal of Consumer Psychology*, Vol. 13 (3), 349-356.
- Freitas, A. L., Gollwitzer, P. M., & Trope, Y. (2004). The influence of abstract and concrete mind-sets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology*, Vol. 40, No. 6, 39-52.
- Gilbert, D. T. (1991). How Mental Systems Believe. *American Psychologist*, 46 (2), 107-119.
- Glover, S. M., & Prawitt, D. F. (2013). *Enhancing Auditor Professional Skepticism*. Retrieved from The Center for Audit Quality: <http://www.thecaq.org/docs/research/skepticismreport.pdf>
- Glover, S. M., Prawitt, D. F., Ranzilla, S., Chevalier, R., & Herrmann, G. (2011, January). *Elevating Professional Judgment in Auditing and Accounting: The KPMG Professional Judgment Framework*. Retrieved from Research Gate: https://www.researchgate.net/publication/258340692_Elevating_Professional_Judgment_in_Auditing_and_Accounting_The_KPMG_Professional_Judgment_Framework
- Guiral-Contreras, A., Gonzalo-Angulo, J. A., & Rodgers, W. (2007). Information Content and Recency Effect of the Audit Report in Loan Rating Decisions. *Accounting and Finance*, 47, 285-304.
- Hair, J. F., Black, W. C., & Babin, B. J. (2010). *Multivariate Data Analysis: A Global Perspective, 7th edition*. Upper Saddle River: Pearson Education.
- Hammersley, J. S., Bamber, E. M., & Carpenter, T. D. (2010). The Influence of Documentation Specificity and Priming on Auditors' Fraud Risk Assessments and Evidence Evaluation Decisions. *The Accounting Review*, Vol. 85 (2), 547-571.
- Higgins, E. T., & King, G. (1981). Accessibility of social constructs: Information-processing consequences of individual and contextual variability. *Personality, cognition, and social interaction*, 69, 69-121.
- Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category Accessibility and Impression Formation. *Journal of Experimental Social Psychology*, 13 (2), 141-154.

- Hilton, J. L., Fein, S., & Miller, D. T. (1993). Suspicion and Dispositional Inference. *Personality and Social Psychology Bulletin*, 19 (5), 501-512.
- Hofstede, G. H. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*, 2nd edition. Thousand Oaks: Sage Publications.
- Hogarth, R. M., & Einhorn, H. J. (1992). Order Effects in Belief Updating: The Belief-Adjustment Model. *Cognitive Psychology*, 24, 1-55.
- Hume, D. (1999). *An Enquiry Concerning Human Understanding*. Oxford, England: Oxford University Press.
- Hurley, P. J. (2016, February 19). *Ego Depletion and Auditors' Susceptibility to Fraudulent Explanations*. Retrieved from Social Science Research Network: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2735088
- Hurt, R. K. (2010). Development of a Scale to Measure Professional Skepticism. *Auditing: A Journal of Practice & Theory*, 29 (1), 149–171.
- Hurt, R. K., Brown-Liburd, H., Earley, C. E., & Krishnamoorthy, G. (2013). Research on Auditor Professional Skepticism: Literature Synthesis and Opportunities for Future Research. *Auditing: A Journal of Practice & Theory*, 32 (Supplement 1), 45–97.
- Kahle, J., Pinsker, R., & Pennington, R. (2005). Belief Revision in Accounting: A Literature Review of the Belief-Adjustment Model. *Advances in Accounting Behavioral Research*, 8, 1-40.
- Kahneman, D. (2013). *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux.
- Kahneman, D., & Frederick, S. (2005). A Model of Heuristic Judgment. In K. Holyoak, & R. G. Morrison, *Cambridge Handbook of Thinking and Reasoning* (pp. 267-293). New York, NY: Cambridge University Press.
- Kennedy, J. (1993). Debiasing Audit Judgment with Accountability: A Framework and Experimental Results. *Journal of Accounting Research*, 31 (2), 231-245.
- Keppel, G. (1973). *Design and Analysis: A Researcher's Handbook*. Englewood Cliffs: Prentice-Hall.
- Kida, T. (1984). The Impact of Hypothesis-Testing Strategies on Auditors' Use of Judgment Data. *Journal of Accounting Research*, Vol 22 (1), 332-340.
- Kliger, D., & Gilad, D. (2012). Red light, green light: Color priming in financial decisions. *The Journal of Socio-Economics*, Vol. 41, 738–745.
- Leff, H., Gordon, L., & Ferguson, J. (1974). Cognitive Set and Environmental Awareness. *Environment and Behavior*, Vol. 6 (4), 395-447.
- Libby, R., & Lewis, B. L. (1977). Human Information Processing Research in Accounting: The State of the Art. *Accounting, Organizations and Society*, 2 (3), 245-268.

- Libby, R., & Luft, J. (1993). Determinants of Judgment Performance in Accounting Settings: Ability, Knowledge, Motivation, and Environment. *Accounting, Organizations and Society, 18* (5), 425-450.
- Mayr, S., & Buchner, A. (2007). Negative Priming as a Memory Phenomenon: A Review of 20 Years of Negative Priming Research. *Journal of Psychology, Vol. 215* (1), 35-51.
- McNamara, T. P. (1994). Theories of priming: II. Types of primes. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20* (3) , 507-520.
- Melnick, E. L., & Everitt, B. S. (2008). *Encyclopedia of Quantitative Risk Analysis and Assessment, Volume 1 A-C*. Chichester: John Wiley & Sons.
- Mintz, S. M., & Morris, R. E. (2016). *Ethical Obligations and Decision-Making in Accounting: Text and Cases, 4th Edition*. Berkshire, UK: McGraw-Hill Education.
- Murphy, S. T., & Zajonc, R. B. (1993). Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Societal Psychology, Vol. 64*, 723-729.
- Nelson, M. W. (2009). A Model and Literature Review of Professional Skepticism in Auditing. *Auditing: A Journal of Practice & Theory, 28* (2), 1-34.
- Oxford University Press. (2016). *Definition of Cognition in English*. Retrieved from Oxford Dictionaries : <http://www.oxforddictionaries.com/definition/english/cognition>
- Parlee, M. C., Rose, J. M., & Thibodeau, J. C. (2014). Metaphors and Auditor Professional Judgment: Can Non-Conscious Primes Activate Professionally Skeptical Mindsets? *Working paper, Bentley University*, 1-34.
- Payne, J. W. (1982). Contingent Decision Behavior. *Psychological Bulletin, 92* (2), 382-402.
- PCAOB. (2012, December 4). *Maintaining and Applying Professional Skepticism in Audits*. Retrieved from Public Company Accounting Oversight Board: https://pcaobus.org//Standards/QandA/12-04-2012_SAPA_10.pdf
- Peecher, M. E., & Solomon, I. (2001). Theory and Experimentation in Studies of Audit Judgments and Decisions: Avoiding Common Research Traps. *International Journal of Auditing, Vol 5* (3), 193-203.
- Pei, B. K., Reckers, P. M., & Wyndelts, R. W. (1990). The Influence of Information Presentation Order on Professional Tax Judgment. *Journal of Economic Psychology, 11*, 119-146.
- Plotnik, R., & Kouyoumdjian, H. (2013). *Introduction to Psychology, 10th edition*. Belmont: Cengage Learning.
- Quadackers, L., Groot, T., & Wright, A. (2014). Auditors' Professional Skepticism: Neutrality versus Presumptive Doubt. *Contemporary Accounting Research, 31* (3), 639-657.

- Reisberg, D. (2009). *Cognition: Exploring the Science of the Mind. 4th Edition*. New York: W. W. Norton & Company.
- Rose, A. M., & Rose, J. M. (2003). The Effects of Fraud Risk Assessments and a Risk Analysis Decision Aid on Auditors' Evaluation of Evidence and Judgment. *Accounting Forum*, 27 (3), 312-338.
- Schul, Y., Burnstein, E., & Bardi, A. (. (1996). Dealing with Deceptions that are Difficult to Detect: Encoding and Judgment as a Function of Preparing to Receive Invalid Information. *Journal of Experimental Social Psychology*, 32 (3), 228-253.
- Shaub, M. K., & Lawrence, J. E. (2002). A taxonomy of auditors' professional skepticism. *Research on Accounting Ethics*, 8, 167-194.
- Sparrow, B., & Wegner, D. M. (2006). Unpriming: The deactivation of thoughts through expression. *Journal of Personality and Social Psychology*, Vol. 9, 1009-1019.
- Stanovich, K. E. (1999). *Who Is Rational? Studies of Individual Differences in Reasoning*. Mahwah: Lawrence Erlbaum Associates.
- Sternberg, R. J., & Sternberg, K. (2012). *Cognitive psychology (6th ed.)*. Belmont, California : Wadsworth.
- Theis, J. C., Yankova, K., & Eulerich, M. (2012). Information Order Effects in the Context of Management Commentary: Initial Experimental Evidence. *Journal of Management Control*, 23 (2), 133-150.
- Thorne, L. (1998). The Role of Virtue in Auditors' Ethical Decision Making: An Integration of Cognitive-Developmental and Virtue-Ethics Perspectives. *Research on Accounting Ethics*, 4, 291-308.
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, Vol. 117, No. 2, 440-463.
- Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance: Effects on representation, prediction, evaluation, evaluation and behavior. *Journal of Consumer Psychology* , Vol. 17, No. 2, 83-95.
- Tubbs, R. M., Messier, W. F., & Knechel, W. R. (1990). Recency Effects in the Auditor's Belief-Revision Process. *The Accounting Review*, 65 (2), 452-460.
- Tulving, E., & Schacter, D. L. (1990). Priming and human memory systems. *Science*, Vol. 247, No. 4940, 301-306.
- Tulving, E., Scharter, D. L., & Stark, H. A. (1982). Priming Effects in Word Fragment Completion are independent of Recognition Memory. *Journal of Experimental Psychology*, Vol.8, No. 4, 336-342.

- Vaidya, C. L., Monti, L. A., Gabrieli, J. D., Tinklenburg, J. R., & Yesevage, J. A. (1999). Dissociation between two forms of conceptual priming in Alzheimer's disease. *Neuropsychology, 13* (4), 516-524.
- Van Rinsum, M., Maas, V. S., & Stolker, D. (2014, October 7). *Disclosure Checklists and Auditors' Judgments of Aggressive Accounting*. Retrieved from Social Science Research Network: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2218408
- Venuti, E. K. (2004). The Going-Concern Assumption Revisited: Assessing a Company's Future Viability. *The CPA Journal, 74* (5) , 40-43 .
- Weld, H. P., & Roff, M. (1938). A Study in the Formation of Opinion Based upon Legal Evidence. *The American Journal of Psychology, Vol. 51* (4), 609-628.
- Yankova, K. (2014). *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions: A Theoretical and Empirical Analysis. Accounting and Auditing Studies*. Wiesbaden, Germany: Springer Gabler.

NORMATIVE REGULATIONS AND RULES

AS 1015.09 (2016): *AS 1015: Due Professional Care in the Performance of Work*. (2016, December 31). Retrieved from Public Company Accounting Oversight Board: <https://pcaobus.org/Standards/Auditing/Pages/AS1015.aspx>

ISA 200.15 (2009): *International Standard on Auditing 200: Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing*. (2009, December 15). Retrieved from International Federation of Accountants: <http://www.ifac.org/system/files/downloads/a008-2010-iaasb-handbook-isa-200.pdf>

ISA 570 (2016): *International Standard on Auditing 570 (Revised): Going Concern*. (2016, December 15). Retrieved from Independent Regulatory Board of Auditors: <https://www.irba.co.za/upload/ISA-570-Revised.pdf>

ANNEX A – DERIVATION OF THE SBS PROCESS BELIEF-ADJUSTMENT MODEL

The main assumption of the belief-adjustment model relates to the notion that people shape their initial beliefs based on an anchor. Though sequential anchoring, beliefs are thereafter adjusted either upwards or downwards when new information is received/processed. According to Weld and Roff (1938), beliefs are not shaped on an absolute basis, instead they are built upon layers of preceding beliefs. Formally stated, the belief-adjustment model can be mathematically expressed as follows:

$$(1) \quad S_n = S_{n-1} + w_n[s(x_n) - R], \text{ where}$$

S_n = belief in a hypothesis after processing n pieces of evidence ($0 \leq S_n \leq 1$);

S_{n-1} = the anchor or the measurement of a prior belief;

w_n = the adjustment weight for the n th piece of evidence ($0 \leq w_n \leq 1$);

$s(x_n)$ = subjective evaluation of the n th piece of evidence; and

R = the reference point against which the impact of the k th piece of evidence is evaluated

The “*evaluation*” process of encoding is assumed to follow a bipolar (negative versus positive) evaluation of evidence relative to a given hypothesis, such that R is inherently set at null (0), and ($-1 \leq s(x_n) \leq 1$). Consequently, equation 1) can be rewritten as follows:

$$(2) \quad S_n = S_{n-1} + w_n \times s(x_n)$$

The adjustment weight for the n th piece of evidence (w_n) can be further defined as:

$$(3a) \quad w_n = \alpha S_{n-1}, \quad \text{if } s(x_n) \leq 0$$

and

$$(3b) \quad w_n = \beta(1 - S_{n-1}), \quad \text{if } s(x_n) > 0, \text{ where}$$

α = individual sensitivity to negative evidence ($0 \leq \alpha \leq 1$);

β = individual sensitivity to positive evidence ($0 \leq \beta \leq 1$); and

α, β = constants

Taking the aforementioned into consideration and by substituting equations (3a) and (3b) into equation (2), the SbS process model takes the following form:

$$(4a) \quad S_n = S_{n-1} + \alpha S_{n-1} \times s(x_n), \quad \text{if } s(x_n) \leq 0$$

and

$$(4b) \quad S_n = S_{n-1} + \beta(1 - S_{n-1}) \times s(x_n), \quad \text{if } s(x_n) > 0$$

Verbally stated, by assuming that the type of processing is SbS and that the cognitive mode is evaluation, the belief-adjustment model suggests that individuals encode information vis-à-vis a hypothesis either positively or negatively when a new piece of evidence is assessed. In addition, the new item is subjectively evaluated according to its perceived strength and subsequently integrated in an additive matter with the current beliefs (i.e. the anchor) of individuals. When further information cues are processed, the updated beliefs act as the new anchor. This process is repeated until all information cues have been processed and thus a final belief is achieved.

ANNEX B – PREMIUM STEEL AG

Case Study #1 Premium Steel AG

Dear Participant,

Thank you for taking the time to participate in this case study. Before you start, please read the following instructions carefully. Hereinafter, you will be exposed to the financial information of a company Premium Steel AG. On the basis of this information, you will be asked for your personal assessments with respect to certain economic issues, followed by some more general questions. Please note that in this case study, **participants are not required** to complete the case within the scope of a statutory audit. Furthermore, your assessments should be solely based on the provided information, since there is no possibility to obtain further information.

It is of paramount importance that the case study is completed in the intended order; given answers cannot be revised subsequently.

The processing of the case study will take about 30 minutes. The case study materials are to be completed independently and in their entirety. Please contact the study supervisor should you have any questions.

We would like to explicitly emphasize that the results of this case study will be exclusively used for the purpose of academic research; this **is not** an internal performance evaluation. Your data and responses are treated with strict confidentiality and will be solely used for academic purposes. The evaluation of the survey results are made in the context of the research project at an aggregated level, so as conclusions on your person cannot be drawn.

Kind regards,

Ram Bambani

Thank you for your participation and support!

Part 1

Please read the following information carefully and answer the subsequent questions!

Premium Steel AG is a leading manufacturer and distributor of quality special steel products for the automotive and engineering industries. A total of (around) 10.500 employees work for the company in several locations across Germany.

After a very successful 2007 FY, Premium Steel AG, like most companies in the steel industry, had to fight from the last quarter of 2008, due to the consequences of the global economic crisis. The automotive and engineering industries, central buyers of steel products, were particularly hit hard by the economic downturn, an event which has left a mark on Premium Steel AG. During fiscal year of 2009, the company recorded a significant decline in sales of more than 50%. Furthermore, the sharp decline in the demand for steel resulted in an extreme underutilization of production capacity, and a dramatic deterioration in earnings.

In response to this situation of crisis, Premium Steel AG, by means of external consultants, developed and introduced a restructuring program with the aim of reducing operational costs, improving earnings and optimizing working capital. Already in FY 2009, the first successes of the program were recorded - through the reduction of inventories and the improvement of management claims, the net working capital (excluding cash) was reduced by around EUR 370 million, which had a positive impact on the liquidity position of Premium Steel AG. Furthermore, to preserve the company's liquidity, the investment volume (compared to previous years) was reduced by more than EUR 150 million. In FY 2006 to 2008, the company had invested over EUR 300 million into production modernization and selective capacity expansion, in anticipation of a sustained positive developing market for special steel.

The declining world economy also called for comprehensive employment adjustments to be made in all stages of the production and business units of Premium Steel AG. First of all, working time accounts, as well as holiday and overtime balances were terminated. Secondly, contracts with agency staff were canceled and, lastly, short-time working was introduced in all working sites.

Furthermore, the negative earnings development at Premium Steel AG led to a breach in financial covenants for its current credit agreement (credit line of EUR 550 million) as of 30.06.2009, since the Bank requirements (based on financial ratios) could not be met for the first time. Thus, the liabilities arising from this contract had to be classified as *current* because the underwriters have the right to terminate the Consortium Agreement. Premium Steel AG is financed through a current account bank loan (credit line unchanged since 2006 for EUR 60m), an investment term loan of EUR 90 million in 2006 with a maturity in 8 years. Furthermore, in 2006, the firm concluded a 5-year syndicated loan with a maximum credit limit of EUR 550 million. To ensure successful refinancing, Premium Steel AG pursued two strategies: Firstly, it engaged in negotiations with banks that offered financial restructuring and an adaptation of the financial covenants to the changed market situation. Secondly, the company applied for a bank guarantee from the Federal Republic of Germany as well as a contribution package from the state-owned KfW bank through a direct loan under the act of "Economic Stimulus Package II".

Given the aforementioned, for a third consecutive year, you are appointed as the auditor of Premium Steel AG for the 2009 financial year. You are asked to apply a risk-based audit, which involves the evaluation of the going concern state of the company.

As part of the protocol, initial audit procedures reveal no significant errors in previous years, however, the financial statements of fiscal years 2007 and 2008 of Premium Steel AG were audited with an unqualified opinion. The internal control system has been tested and comprehensively documented in the context of previous audits. Overall, internal controls can be considered as sufficient and effective.

Below, you can find a summary highlighting the consolidated balance sheet, income statement and cash flow statement of Premium Steel AG for FY 2007, 2008 and 2009. The audit of the 2009 financial statements has been completed, with the exception for the final assessment of the going concern of the company, and led to no significant findings.

Consolidated Balance Sheet

ASSETS	31.12.2009	31.12.2008	31.12.2007
<i>All units in (€ '000s)</i>			
D. Fixed assets			
J. Intangible assets	7.380	7.572	5.798
II. Tangible assets	593.717	661.133	588.576
III. Investments	221	84	17
	<u>601.318</u>	<u>668.789</u>	<u>594.391</u>
E. Current assets			
J. Inventory	524.456	790.960	796.672
II. Receivables	296.617	400.012	569.440
III: Cash and CE	10.184	20.174	35.236
	<u>831.257</u>	<u>1.211.146</u>	<u>1.401.348</u>
F. Prepaid expenses	<u>920</u>	<u>901</u>	<u>640</u>
Total	1.433.495	1.880.836	1.996.379
LIABILITIES			
<i>All units in (€'000)</i>			
E. Equity	188.162	519.818	450.443
F. Special items with an equity portion	0	0	718
	<u>188.162</u>	<u>519.818</u>	<u>451.161</u>
G. Provisions			
4. Provisions for pensions	229.609	229.609	214.226
5. Tax provisions	8.624	62.171	129.107
6. Other provisions	141.850	171.913	211.503
	<u>380.083</u>	<u>458.522</u>	<u>554.836</u>
H. Liabilities			
5. Bank Liabilities	561.117	458.775	447.835
6. Payables	179.209	295.733	394.740
7. Amounts owned to affiliated companies	18.387	12.881	19.249
8. Other	106.537	135.107	128.558
	<u>865.250</u>	<u>902.496</u>	<u>990.382</u>
Total	1.433.495	1.880.836	1.996.379

Income Statement

<i>All units in (€'000)</i>	31.12.2009	31.12.2008	31.12.2007
6. Sales	1.825.642	4.177.913	4.228.203
7. Increase or decrease in finished stock and work in progress	-262.861	15.094	166.327
8. Other own work	2.613	2.427	787
9. Other operating income	70.266	53.795	54.637
	<u>1.635.660</u>	<u>4.249.229</u>	<u>4.449.954</u>
10. COGS	-1.125.631	-3.119.248	-3.224.218
6. Personnel	-487.146	-581.430	-545.732
8. Depreciation and Amortization	-134.827	-147.318	-139.636
8. Other operating expenses	-145.389	-202.430	-213.477
	<u>-1.892.993</u>	<u>-4.050.426</u>	<u>-4.123.063</u>
9. Financial result	-50.419	-57.782	-23.942
10. Result from ordinary activities	-307.752	141.021	302.949
11. Taxes on income and earnings	18.576	-54.264	-117.145
12. Other taxes	-2.660	-3.005	-2.576
	<u>15.916</u>	<u>-57.269</u>	<u>-119.721</u>
13. Net profit / loss	-291.836	83.752	183.228

Notes to the financial position

Information on maturities of liabilities to banks	2009	2008	2007
<i>All units in (€'000)</i>			
Residual maturity of up to one year	510.692	43.447	31.625
Remaining term of one to five years	50.425	353.698	343.375
Remaining term of more than five years	0	61.630	72.835
Cash Flow information			
	2009	2008	2007
<i>All units in (€'000)</i>			
Cash flow from operating activities	-4.976	210.091	-12.239
Cash flow from investing activities	-67.356	-221.716	-66.431
Cash flow from financing activities	62.342	-3.437	44.637
Change in liquidity	-9.990	-15.062	-34.033

Question 1

How high or low would you rate the probability that Premium Steel AG continues its operations in the next twelve months, based on the aforementioned information?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%		

Please read the following information carefully and process the questions in the intended order!

For the implementation of the annual audit you receive the following information:

The application of Premium Steel AG for a bank guarantee from the Federal Republic of Germany under the act "Economic Stimulus package II" and the involvement of the state owned KfW bank through direct credit has not been granted.

Question 2

On the basis of this additional information, how high or low would you rate the probability that Premium Steel AG continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

For the implementation of the annual audit you additionally receive the following information:

In the spring of 2010, it was announced that Steelo GmbH & Co. KG, one of the main suppliers of Premium Steel AG, has filed for bankruptcy. Due to this, Premium Steel AG has been facing a shortage of supply, and consequently, also faces the risk of customers withdrawing their orders from the company. Currently, there are still ongoing negotiations with other suppliers, however, final agreements are pending.

Question 3

On the basis of this additional information, how high or low would you rate the probability that Premium Steel AG continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%		

For the implementation of the annual audit you additionally receive the following information:

The international consulting company, which developed and is now in charge of the restructuring program, made a report in early 2010 regarding the economic development prospects for the next two years. The report predicts a moderate revival of the economy in the end of 2010 as well as a considerable, sustainable improvement of market conditions in 2011. Based on these market estimates the Consulting experts predict that Premium Steel AG's operations remain viable. As a result of the report, several banks have signaled new willingness for a renewed negotiation with regards to the extension of credit lines.

Question 4

On the basis of this additional information, how high or low would you rate the probability that Premium Steel AG continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

For the implementation of the annual audit you additionally receive the following information:

At a press conference in April 2010, the CFO of Premium Steel AG announced that by the end of 2010, a cash capital increase of EUR 200 million is to be performed. This is post the negotiations with foreign investors from UAE who have expressed an interest in investing in the company.

Question 5

On the basis of this additional information, how high or low would you rate the probability that Premium Steel AG continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

Part 2

Please read the following information carefully and answer the subsequent questions!

Instructions

Hereinafter, you will encounter a series of general statements to which you should respond. Please assess these statements from a personal perspective on a scale from 1 “strongly disagree” to 6 “strongly agree”. It is important that you evaluate **all** statements made, even if some of them might be similar. **There are no right or wrong answers!** Therefore, please make sure that you respond as precisely and honestly as possible. These questions are simple personality questions which should not take longer than 5 minutes. Your responses will be treated completely **anonymously** and will be used solely in the present research project.

Hurt Trait Professional Skepticism Scale (Source: *Hurt* (2010): 167f.)

	Strongly Disagree				Strongly Agree	
I often accept other people's explanations without further thought.	1	2	3	4	5	6
I feel good about myself.	1	2	3	4	5	6
I wait to decide on issues until I can get more information.	1	2	3	4	5	6
The prospect of learning excites me.	1	2	3	4	5	6
I am interested in what causes people to behave the way that they do.	1	2	3	4	5	6
I am confident of my abilities.	1	2	3	4	5	6
I often reject statements unless I have proof that they are true.	1	2	3	4	5	6
Discovering new information is fun.	1	2	3	4	5	6
I take my time when making decisions.	1	2	3	4	5	6
I tend to immediately accept what other people tell me.	1	2	3	4	5	6
Other people's behavior does not interest me.	1	2	3	4	5	6
I am self-assured.	1	2	3	4	5	6
My friends tell me that I usually question things that I see or hear.	1	2	3	4	5	6

I like to understand the reason for other people's behavior.	1	2	3	4	5	6
I think that learning is exciting.	1	2	3	4	5	6
I usually accept things which I see, read, or hear at face value.	1	2	3	4	5	6
I do not feel sure of myself.	1	2	3	4	5	6
I usually notice inconsistencies in explanations.	1	2	3	4	5	6
Most often I agree with what the others in my group think.	1	2	3	4	5	6
I dislike having to make decisions quickly.	1	2	3	4	5	6
I have confidence in myself.	1	2	3	4	5	6
I do not like to decide until I've looked at all of the readily available information.	1	2	3	4	5	6
I like searching for knowledge.	1	2	3	4	5	6
I frequently question things that I see or hear.	1	2	3	4	5	6
It is easy for other people to convince me.	1	2	3	4	5	6
I seldom consider why people behave in a certain way.	1	2	3	4	5	6
I like to ensure that I've considered most available information before making a decision.	1	2	3	4	5	6
I enjoy trying to determine if what I read or hear is true.	1	2	3	4	5	6
I relish learning.	1	2	3	4	5	6

Additional questions

A. Please indicate whether the following information is positive, negative or neutral with regards to the going concern of Premium Steel AG. Furthermore, please indicate on a scale from 1 to 7 the importance that you would attribute to the information regarding the going concern evaluation, where 1 stands for “no importance” and 7 stands for “great importance”.

The application of Premium Steel AG for a bank guarantee from the Federal Republic of Germany under the act "Economic Stimulus package II" and the involvement of the state owned KfW bank through direct credit has not been granted.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

In the spring of 2010, it was announced that Steelo GmbH & Co. KG, one of the main suppliers of Premium Steel AG, has filed for bankruptcy. Due to this, Premium Steel AG has been facing a shortage of supply, and consequently, also faces the risk of customers withdrawing their orders from the company. Currently, there are still ongoing negotiations with other suppliers, however, final agreements are pending.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

The international consulting company, which developed and is now in charge of the restructuring program, made a report in early 2010 regarding the economic development prospects for the next two years. The report predicts a moderate revival of the economy in the end of 2010 as well as a considerable, sustainable improvement of market conditions in 2011. Based on these market estimates the Consulting experts predict that Premium Steel AG's operations remain viable. As a result of the report, several banks have signaled new willingness for a renewed negotiation with regards to the extension of credit lines.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

At a press conference in April 2010, the CFO of Premium Steel AG announced that by the end of 2010, a cash capital increase of EUR 200 million is to be performed. This is post the negotiations with foreign investors from UAE who have expressed an interest in investing in the company.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

B. How would you rate the extent of your experience in the steel industry? Please tick the most appropriate box:

No experience (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Great experience (=7)
	1	2	3	4	5	6	7	

C. How would you rate the extent of your experience in auditing firms that have high going concern risks? Please tick the most appropriate box:

No experience (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Great experience (=7)
	1	2	3	4	5	6	7	

D. To what extent is the provided information in this case study sufficient in order to (clearly) assess the going concern of Premium Steel AG? Please tick the most appropriate box:

Not sufficient (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very sufficient (=7)
	1	2	3	4	5	6	7	

E. How certain do you feel in your assessments regarding the going concern of Premium Steel AG? Please tick the most appropriate box:

Not certain at all (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very certain (=7)
	1	2	3	4	5	6	7	

F. How comprehensive were the provided case study materials? Please tick the most appropriate box:

Not comprehensive at all (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very comprehensive (=7)
	1	2	3	4	5	6	7	

G. Please evaluate the following statements regarding your approach to assess the nature and importance of the information provided to you on pages 4 through 10. Please assess these statements from a personal perspective on a scale from 1 “strongly disagree” to 7 “strongly agree”

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
I was careful when assessing the information	1	2	3	4	5	6	7
I was thinking intensively while assessing the information	1	2	3	4	5	6	7
I was highly concentrated while assessing the information	1	2	3	4	5	6	7
It was difficult for me to assess the information	1	2	3	4	5	6	7

H. Do you have any final remarks or comments that you would like to add?

I. How much time did you need to complete this study? _____

Thank you for your participation!

[END]

ANNEX C – GAMEPLAY B.V.

Case Study #2 GamePlay BV

Dear Participant,

Thank you for taking the time to participate in this case study. Before you start, please read the following instructions carefully. Hereinafter, you will be exposed to the financial information of a company GamePlay B.V. On the basis of this information, you will be asked for your personal assessments with respect to certain economic issues, followed by some more general questions. Please note that in this case study, **participants are not required** to complete the case within the scope of a statutory audit. Furthermore, your assessments should be solely based on the provided information, since there is no possibility to obtain further information.

It is of paramount importance that the case study is completed in the intended order; given answers cannot be revised subsequently.

The processing of the case study will take about 30 minutes. The case study materials are to be completed independently and in their entirety. Please contact the study supervisor should you have any questions.

We would like to explicitly emphasize that the results of this case study will be exclusively used for the purpose of academic research; this **is not** an internal performance evaluation. Your data and responses are treated with strict confidentiality and will be solely used for academic purposes. The evaluation of the survey results are made in the context of the research project at an aggregated level, so as conclusions on your person cannot be drawn.

Kind regards,

Ram Bambani

Thank you for your participation and support!

Part 1**Please read the following information carefully and answer the subsequent questions!**

GamePlay B.V. is an European provider of social game services with 2,326 full-time employees, headquartered in The Netherlands. The company operates within one market segment known as social digital gaming, which is a branch of the gaming industry. The business model is based upon one business activity which involves the development and the monetization of social games. The “social gaming” aspect involves the provision of live services on mobile platforms such as iOS and Android and social networking sites such as Facebook. All of the games are free to play, and the revenue stream generation occurs through in-game sales of virtual goods and advertising services.

After a successful 2010 FY, GamePlay B.V. went public in 2011 with a company valuation of around EUR 7 billion. Furthermore, GamePlay B.V. had priced its IPO at EUR 10 a share, and sold 100 million shares, thus raising EUR 1 billion. Despite the successful IPO, the FY 2011 was rather the opposite as compensation expenses ate through profits. For the full 2011 fiscal year, GamePlay posted a net loss of EUR 404 million on sales of EUR 1.2 billion. GamePlay's stock-based compensation expenses for the year totaled EUR 600 million. Without those expenses, GamePlay's net income for the year would have been \$196 million. This drop of GamePlay's net income is also attributed to its inefficient R&D cost structure in developing new games. This sharp decline has led analysts to revalue their assumptions and write down the value of the company.

In response to this situation of crisis, GamePlay B.V., by means of external consultants, developed and introduced a restructuring program with the aim of improving earnings and product pipeline, reducing marketing and technology expenditures, and consolidating certain facilities.

Already in FY 2012, the first successes of the program were recorded - through the reduction of stock-based compensation and improving the cost efficiency of R&D, operational expenses were reduced by 19%. Furthermore, to increase company's expenditure and consumer outreach, two strategies were pursued. To expand customer base, web-based accounts and games were migrated to newly developed apps equipped with cutting edge technology. Secondly, equity interests of NaturalMotion (an online social-gaming company) were acquired. NaturalMotion's shareholders and vested option holders received an aggregate of \$300 million in cash. Those changes positively impacted the revenue stream by 10%, excluding revenue from original operations.

The declining profits also called for comprehensive employment adjustments to be made in all stages of the production and business units of GamePlay B.V. This required a reduction in work force of approximately 520 employees and the closure of certain office facilities as part of an overall plan to reduce our cost structure. Lastly, the negative earnings development at GamePlay B.V. led to a breach in financial covenants for its current credit line agreement, since the Bank requirements (based on financial ratios) could not be met for the first time. This not only reduced the maximum available credit from EUR 1 billion to EUR 200 million, but agencies like Moody downgraded the credit rating of GamePlay B.V. from Baa3 (BBB-) to Ba2 (BB).

Given the aforementioned, for a third consecutive year, you are appointed as the auditor of GamePlay for the 2012 financial year. You are asked to apply a risk-based audit, which involves the evaluation of the going concern state of the company.

As part of the protocol, initial audit procedures reveal no significant errors in previous years, however, the financial statements of fiscal years 2010 and 2011 of GamePlay B.V. were audited with an unqualified opinion. The internal control system has been tested and comprehensively documented in the context of previous audits. Overall, internal controls can be considered as sufficient and effective.

Below, you can find a summary highlighting the consolidated balance sheet, income statement and cash flow statement of GamePlay B.V. for FY 2010, 2011 and 2012. The audit of the 2012 financial statements has been completed, with the exception for the final assessment of the going concern of the company, and led to no significant findings.

Consolidated Balance Sheet <i>All units in (€ '000s)</i>	Dec. 31, 2010	Dec. 31, 2011	Dec. 31, 2012
Cash and cash equivalents	854,537	1,011,354	1,302,922
Income tax receivable	37,577	18,583	5,607
Deferred tax assets	24,399	23,515	30,122
Other current assets	24,353	34,824	29,392
Accounts receivable (gross)	79,974	135,796	106,487
Allowances	(325)	(163)	(160)
<i>Total current assets</i>	<u>1,020,515</u>	<u>1,223,909</u>	<u>1,474,370</u>
Long-term marketable securities	-	410,098	367,543
Goodwill	60,217	91,765	208,955
Other intangible assets, net	44,001	232,112	133,663
Property and equipment, net	74,959	646,740	566,074
Other long-term assets	12,880	12,022	15,715
<i>Total long-term assets</i>	<u>192,057</u>	<u>1392,737</u>	<u>1,291,950</u>
TOTAL ASSETS	<u>1,212,572</u>	<u>2,616,646</u>	<u>2,766,320</u>
Accounts payable	33,431	44,020	23,298
Other current liabilities	78,749	167,271	146,883
Deferred revenue	408,470	457,394	338,964
<i>Total current liabilities</i>	<u>520,650</u>	<u>668,685</u>	<u>509,145</u>
Long-term debt	100,000	100,000	100,000
Deferred revenue	56,766	23,251	8,041
Deferred tax liabilities	14,123	13,950	24,584
Other non-current liabilities	38,818	61,221	109,047
<i>Total long-term liabilities</i>	<u>209,707</u>	<u>198,422</u>	<u>241,672</u>
TOTAL LIABILITIES	<u>730,357</u>	<u>867,107</u>	<u>750,817</u>
Convertible Preferred Stock	394,026	-	-
Common stock	79,337	2,426,168	2,725,605
Treasury stock	(1,484)	(282,897)	(295,113)
Accumulated other comprehensive income (loss)	114	362	(1,447)
Retained Earnings (loss)	10,222	(394,094)	(413,542)
TOTAL EQUITY	<u>482,215</u>	<u>1,749,539</u>	<u>2,015,503</u>
TOTAL LIABILITIES & EQUITY	<u>491,067</u>	<u>2,616,646</u>	<u>2,766,320</u>

Income Statement <i>All units in (€ '000s)</i>	Dec. 31, 2010	Dec. 31, 2011	Dec. 31, 2012
Online game	576,565	1,065,648	1,144,252
Advertising and other	20,894	74,452	137,015
<i>Total revenue</i>	<u>597,459</u>	<u>1,140,100</u>	<u>1,281,267</u>
Cost of goods Sold	136,571	234,629	210,690
<i>Gross Margin</i>	<u>460,888</u>	<u>905,471</u>	<u>1,070,577</u>
Research and development	149,519	727,018	455,648
Sales and marketing	114,165	234,199	181,924
General and administrative	32,251	254,456	189,004
Impairment of intangible assets	-	-	95,493
Depreciation & Amortization	39,481	95,414	141,479
<i>Total operating expenses</i>	<u>335,416</u>	<u>1,311,087</u>	<u>1,063,548</u>
Interest income	1,222	1,680.00	4,749.00
Other income (Financial expense), net	365	(2,206.00)	18,647.00
<i>Financial P/L</i>	<u>1,587.00</u>	<u>(526.00)</u>	<u>23,396.00</u>
Provision for (benefit from) income taxes	<u>36,464</u>	<u>(1,826.00)</u>	<u>49,873.00</u>
Net income (loss)	90,595.00	(404,316.00)	(19,448.00)

<i>All units in (€ '000s)</i>	Other Financial Information		
Reconciliation of Net Income (Loss) to Adjusted EBITDA:	Dec. 31, 2010	Dec. 31, 2011	Dec. 31, 2012
Net income (loss)	90,595	- 404,316	- 19,448
(Provision for) / benefit from income taxes	36,464	- 1,826	49,873
Other income (expense), net	- 365	2,206	- 18,647
Interest income	- 1,222	- 1,680	- 4,749
Depreciation and amortization	39,481	95,414	141,479
Stock-based expense	25,694	600,212	231,986
Impairment of intangible assets	—	—	95,493
Restructuring expense	—	—	7,862
Change in deferred revenue	241,437	15,409	- 133,640
Adjusted EBITDA	<u>432,084</u>	<u>305,419</u>	<u>350,209</u>
Stock-based expense	Dec. 31, 2010	Dec. 31, 2011	Dec. 31, 2012
Cost of revenue	2,128	17,660	12,116
Research and development	10,242	374,920	150,640
Sales and marketing	7,899	81,326	24,684
General and administrative	5,425	126,306	44,546
Total	25,694	600,212	231,986
Consolidated Statements of Cash Flows Data		Dec. 31, 2011	Dec. 31, 2012
Opening Balance		854,537	1,011,354
Cash flows provided by operating activities		- 249,171	- 74,035
Cash flows used in investing activities		- 1,265,404	78,382
Cash flows provided by financing activities		1,671,392	287,221

Question 1

How high or low would you rate the probability that GamePlay B.V. continues its operations in the next twelve months, based on the aforementioned information?

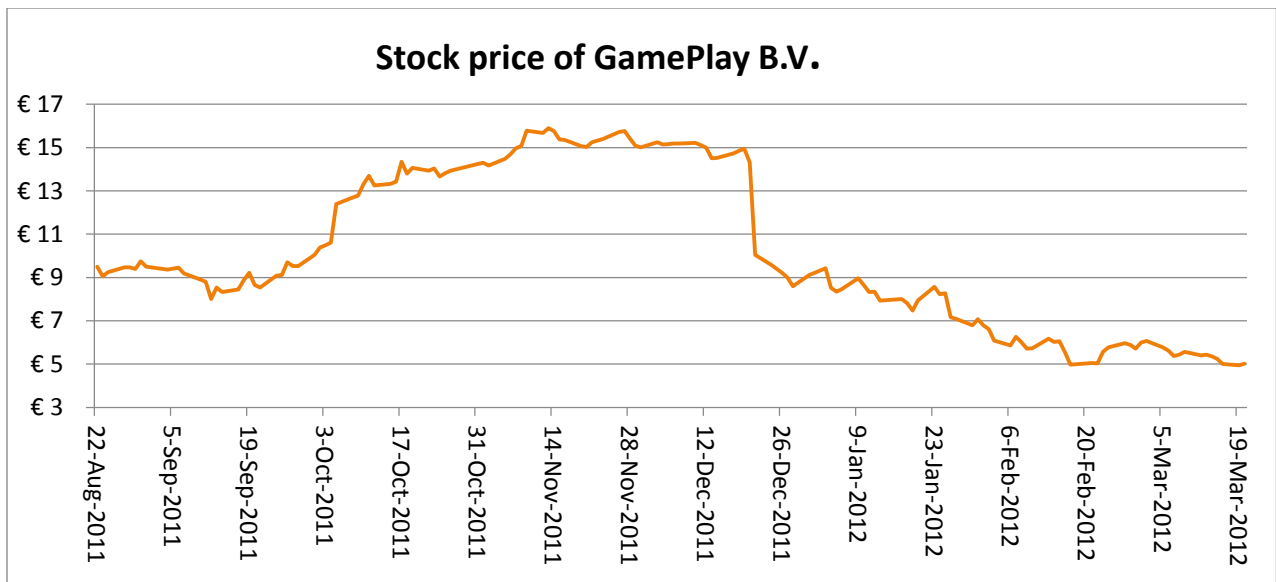
Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

Please read the following information carefully and process the questions in the intended order!

For the implementation of the annual audit you receive the following information:

Discussions with management indicate that a material liability is likely at the beginning of 2013. During the fiscal year 2012, one of the majority shareholders (7%) David Petrovic accused GamePlay’s executives of shifting the company’s revenue losses from the third quarter to the fourth quarter of 2011, which pushed the stock up in the third quarter. The figure below shows GamePlay’s performance prior to the accusation and post of releasing the fourth-quarter results.



Question 2

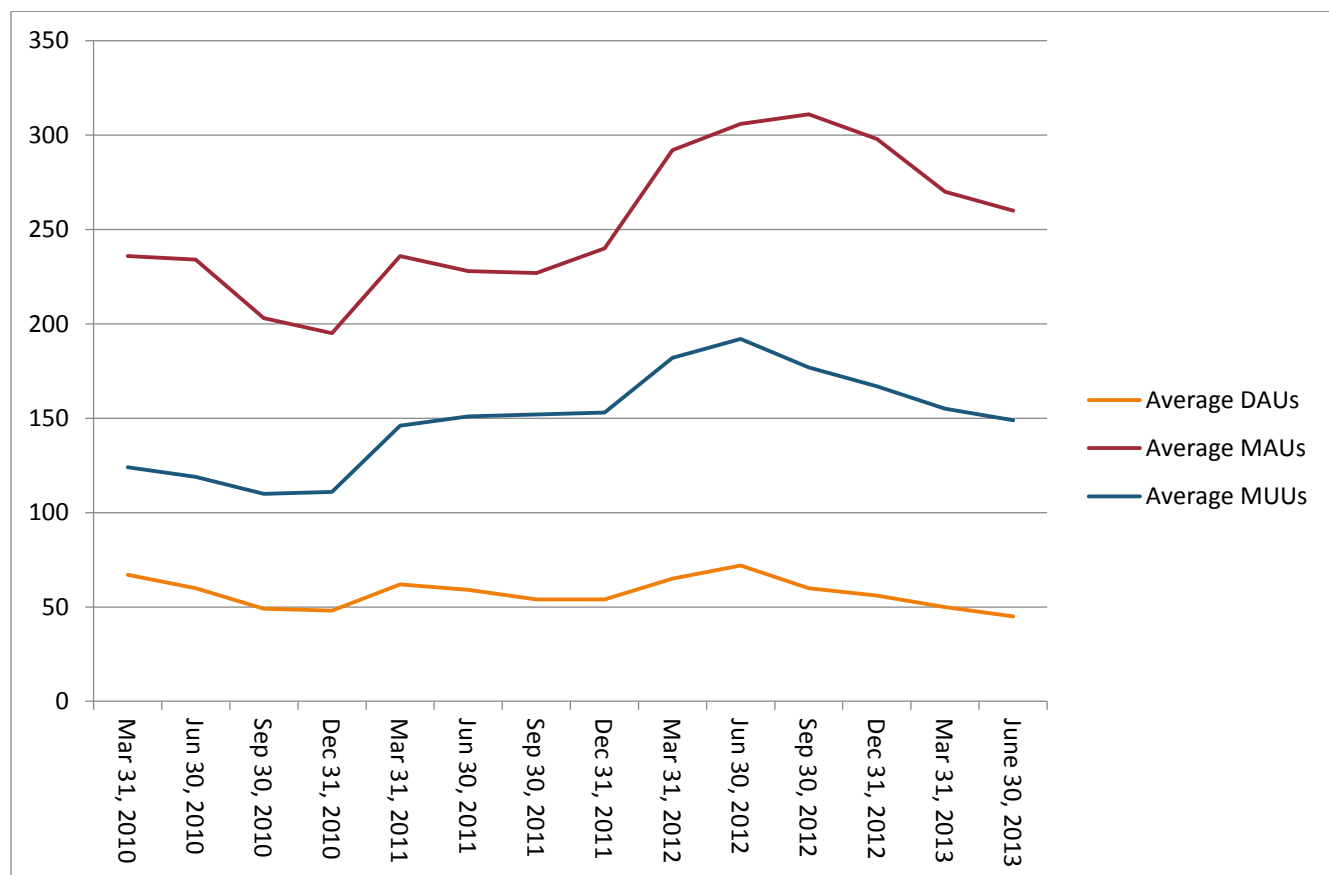
On the basis of this additional information, how high or low would you rate the probability that GamePlay B.V. continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	

For the implementation of the annual audit you additionally receive the following information:

After a private meeting with analysts, management provided forecasts of operating metrics which show a decline in DAU, MAU, and MUU. Following these forecasts, analysts are afraid that the performance of GamePlay will deteriorate in the next two quarters.



The following abstract is obtained from note 10, other operational metrics, found in the financial statements of GamePlay BV:

“We manage our business by tracking several operating metrics: “DAUs,” which measure daily active users of our games, “MAUs,” which measure monthly active users of our games, “MUUs,” which measure monthly unique users of our games, and “MUPs,” which measure monthly unique payers in our games.

DAUs. We define DAUs as the number of individuals who played one of our games during a particular day. An individual who plays two different games, or one game on two different platforms (phone or computer), or one game on two social platforms (Facebook, Twitter) is counted as two DAUs. Average DAUs for a particular period is the average of the DAUs for each day during that period.

MAUs. We define MAUs as the number of individuals who played a particular game in the 30-day period ending with the measurement date. The same rules are applicable as under DAUs, the only difference is the period measurement difference.

MUUs. We define MUUs as the number of unique individuals who played any of our games on a particular platform in the 30-day period ending with the measurement date.

Question 3

On the basis of this additional information, how high or low would you rate the probability that GamePlay B.V. continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

For the implementation of the annual audit you additionally receive the following information:

The Facebook social media recently teamed up with Unity Technologies to build a PC gaming platform in late 2013. Unity, a leading game development platform, is contracted to build a new functionality that streamlines the process of publishing games to Facebook's 650 million gamers. It will bring more developers to an ecosystem that paid out over \$1.7 billion to web-game developers alone in 2012. GamePlay B.V. has negotiated to be the first exclusive provider of social games on the new platform. The managing director of GamePlay and a Bloomberg senior research analyst expect that this would positively affect the future performance of the company.

Question 4

On the basis of this additional information, how high or low would you rate the probability that GamePlay B.V. continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

For the implementation of the annual audit you additionally receive the following information:

The international consulting company, which developed, and is now in charge of the restructuring program, made a business report in early 2012 regarding the Chinese gaming market development prospects for the next two years. This has incentivized management to start negotiations regarding the acquisition of WangGames, a mid-sized Chinese social game provider. In late 2012, GamePlay announced a tender offer of EUR 500 million to acquire WangGames, of which EUR 200 million are offered in stock. Experts in the field are saying that this is expected to have a good customer outreach, since the Chinese government has only allowed the use of domestic social networks, whereas foreign social networks (such as Facebook) are restricted.

Question 5

On the basis of this additional information, how high or low would you rate the probability that GamePlay B.V. continues its operations in the next twelve months?

Please use the following scale for your answer:

The company won't be able to continue its business operations (=0%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The company will be able to continue its business operations (=100%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	

Part 2

Please read the following information carefully and answer the subsequent questions!

Demographic and other information

A. Age: _____ Years No information/specification

B. Gender : Male Female Other

C. Position in the company: Partner Senior Manager
 Senior Associate Manager Other: _____

D. Professional examination: Auditor CPA
 Tax consultant Other: _____

E. General professional experience: _____ Years

F. Have you participated in training workshops/seminars where the topic of “Professional Skepticism” was dealt with?

No Yes Please indicate the number of times if yes: _____

Additional questions

A. Please indicate whether the following information is positive, negative or neutral with regards to the going concern of GamePlay B.V. Furthermore, please indicate on a scale from 1 to 7 the importance that you would attribute to the information regarding the going concern evaluation, where 1 stands for “no importance” and 7 stands for “great importance”.

Discussions with management indicate that a material liability is likely at the beginning of 2013. During the fiscal year 2012, one of the majority shareholders (7%) David Petrovic accused GamePlay’s executives of shifting the company’s revenue losses from the third-quarter to the fourth-quarter of 2011, which pushed the stock up in the third-quarter. The figure below shows GamePlay’s performance prior to the accusation and post of releasing the fourth-quarter results.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

After a private meeting with analysts, management provided forecasts of operating metrics which show a decline in DAU, MAU, and MUU. Following these forecasts, analysts are afraid that the performance of GamePlay will deteriorate in the next two quarters.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

The Facebook social media recently teamed up with Unity Technologies to build a PC gaming platform in late 2013. Unity, a leading game development platform, is contracted to build a new functionality that streamlines the process of publishing games to Facebook's 650 million gamers. It will bring more developers to an ecosystem that paid out over \$1.7 billion to web-game developers alone in 2012. GamePlay B.V. has negotiated to be the first exclusive provider of social games on the new platform. The managing director of GamePlay and a Bloomberg senior research analyst expect that this would positively affect the future performance of the company.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

The international consulting company, which developed, and is now in charge of the restructuring program, made a business report in early 2012 regarding the Chinese gaming market development prospects for the next two years. This has incentivized management to start negotiations regarding the acquisition of WangGames, a mid-sized Chinese social game provider. In late 2012, GamePlay announced a tender offer of EUR 500 million to acquire WangGames, of which EUR 200 million are offered in stock. Experts in the field are saying that this is expected to have a good customer outreach, since the Chinese government has only allowed the use of domestic social networks, whereas foreign social networks (such as Facebook) are restricted.

Type of the information	Importance of the information							
<input type="checkbox"/> positive	Not important (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very important (=7)
<input type="checkbox"/> negative	1	2	3	4	5	6	7	
<input type="checkbox"/> neutral								

B. How would you rate the extent of your experience in the gaming industry? Please tick the most appropriate box:

No experience (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Great experience (=7)
	1	2	3	4	5	6	7	

C. How would you rate the extent of your experience in auditing firms that have high going concern risks? Please tick the most appropriate box:

No experience (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Great experience (=7)
	1	2	3	4	5	6	7	

D. To what extent is the provided information in this case study sufficient in order to (clearly) assess the going concern of GamePlay BV? Please tick the most appropriate box:

Not sufficient (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very sufficient (=7)
	1	2	3	4	5	6	7	

E. How certain do you feel in your assessments regarding the going concern of GamePlay BV? Please tick the most appropriate box:

Not certain at all (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very certain (=7)
	1	2	3	4	5	6	7	

F. How comprehensive were the provided case study materials? Please tick the most appropriate box:

Not comprehensive at all (=1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Very comprehensive (=7)
	1	2	3	4	5	6	7	

G. Please evaluate the following statements regarding your approach to assess the nature and importance of the information provided to you on pages 4 through 11. Please assess these statements from a personal perspective on a scale from 1 “strongly disagree” to 7 “strongly agree”

	Strongly Disagree						Strongly Agree
I was careful when assessing the information	1	2	3	4	5	6	7
I was thinking intensively while assessing the information	1	2	3	4	5	6	7
I was highly concentrated while assessing the information	1	2	3	4	5	6	7
It was difficult for me to assess the information	1	2	3	4	5	6	7

H. Do you have any final remarks or comments that you would like to add?

I. How much time did you need to complete this study? _____

Thank you for your participation!

[END]