ABSTRACT: This research studies the influence of the anchoring bias on auditors with the possible reinforcing effect of workload. The anchoring bias is a cognitive phenomenon whereby a certain value holds significant sway over an individual’s decision-making process. A total of two experiments were conducted to test if auditors are susceptible to anchoring bias and if their workload is correlated. This study shows that auditors can be susceptible to anchoring bias when the anchoring points are rather strong but are not susceptible to more subtler anchor points. There is found little evidence in an additional analysis that workload could significantly affect auditors’ anchoring bias when we exclude audit partners.

Keywords: Anchoring Bias, Audit Quality, Experimental Audit Cases, Professional Judgment, Workload Pressure
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>1</td>
</tr>
<tr>
<td>I.  INTRODUCTION</td>
<td>2</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT</td>
<td>5</td>
</tr>
<tr>
<td>AUDITORS’ ANCHORING BIAS</td>
<td>5</td>
</tr>
<tr>
<td>WORKLOAD AND AUDITORS’ ANCHORING BIAS</td>
<td>6</td>
</tr>
<tr>
<td>III. METHODOLOGY</td>
<td>8</td>
</tr>
<tr>
<td>CONCEPTUAL MODEL</td>
<td>8</td>
</tr>
<tr>
<td>DATA COLLECTION AND PARTICIPANTS</td>
<td>8</td>
</tr>
<tr>
<td>EXPERIMENT</td>
<td>8</td>
</tr>
<tr>
<td>MODERATOR VARIABLE</td>
<td>10</td>
</tr>
<tr>
<td>DATA ANALYSIS</td>
<td>10</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>11</td>
</tr>
<tr>
<td>PREPARATION FOR DATA ANALYSIS</td>
<td>11</td>
</tr>
<tr>
<td>DEMOGRAPHIC SAMPLE CHARACTERISTIC</td>
<td>11</td>
</tr>
<tr>
<td>DIRECT EFFECT OF THE ANCHORING</td>
<td>12</td>
</tr>
<tr>
<td>MODERATOR VARIABLE</td>
<td>13</td>
</tr>
<tr>
<td>ADDITIONAL ANALYSES</td>
<td>15</td>
</tr>
<tr>
<td>V.  DISCUSSION AND CONCLUSION</td>
<td>19</td>
</tr>
<tr>
<td>FINDINGS</td>
<td>19</td>
</tr>
<tr>
<td>PRACTICAL IMPLICATIONS</td>
<td>21</td>
</tr>
<tr>
<td>LIMITATIONS AND FUTURE RESEARCH</td>
<td>21</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>23</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>29</td>
</tr>
<tr>
<td>EXPERIMENT 1</td>
<td>29</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>30</td>
</tr>
<tr>
<td>EXPERIMENT 2</td>
<td>30</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

Auditors are responsible for formulating judgments about the fairness of their client’s financial statements, making their professional judgment essential to perform their work (NBA, 2017; Soloman & Trotman, 2003; Joyce & Biddle, 1981). A high-quality auditor should detect errors in reported earnings and enhance financial statements’ reliability (Gul, Lynn & Tsui, 2002). However, the professional judgment of auditors has been under pressure over the last years. The Authority of Financial Market (AFM) has, for instance, imposed high fines because a high number of audit files are said to be below standard (Piersma, 2016). Moreover, inspectors have found 132 violations in an investigation into the working conditions at audit firms in the Netherlands. The firms would do too little against the high workload (Leeuwen, 2019; Pols, 2020).

Professional judgment is key for audit work and can be defined as an attitude that includes a questioning mind and a critical assessment of audit evidence during the audit (Nelson, 2009; NBA 2017). Although many solutions have been offered to increase auditors’ professional judgment, perhaps one of the most striking realizations of late is that auditor workload appears to undermine audit quality (López & Peters, 2012). Last year, Minister Hoekstra of Finance in the Netherlands, also stressed that new measures taken to increase audit quality should not only focus on audit controls itself, but also the culture within audit firms that propagate high work pressure (Pols, 2020).

Previous research has found that auditors’ workload pressures could result in dysfunctional behaviors and lower the quality of audits (Ponemon, 1992; Johnson-Moreno, 2003). Auditors that take on too much work are prone to make commitments that are difficult to meet, limit the collection of audit evidence, or accept audit evidence without considering how this evidence also could be wrong (Wallage, 2010). Research indicates that workload pressures transcend the quality control mechanisms, undermining audit quality (López & Peters, 2012). Svanström’s (2016) study on how time pressure impacts dysfunctional auditor behavior, and finds that such pressure diminishes an auditors’ decision-making ability and the effective gathering of audit evidence. Other findings show a negative correlation between speed and accuracy in perceptual decision making and suggest that drift rate modulations in response to time pressure in simple perceptual decisions and confirm their validity in the context of more complex tasks (Dambacher & Hübner, 2015).

The question is, what could be of influence on auditors’ independent and professional judgment. In their study ‘Why good accountants do bad audits’ Bazerman et al. (2002), for
instance, find that the majority of auditors are susceptible to unconscious biases. Unconscious biases can be defined as natural deficiencies in judgment by people throwing distorting the interpretation of information (Bazerman, Loewenstein, & Moore, 2002). Research about unconscious bias in audit is necessary because the demand for auditors’ effective judgment and decision-making skills is increasing, and auditors must adapt to the changing environment (Ranzilla, Chevalier, Hermann, Glover, & Prawitt, 2011). These deficiencies in auditors’ judgment may lead to audit failure, which could ensure that the audited financial statements could eventually be misleading to the users (Francis, 2004). Psychological research indicates that the anchoring bias, whereby an individuals’ decision-making may rely too heavily on a given value, may potentially play a crucial role in this regard. This value is considered as the ‘anchor point’ (Kahneman & Tversky, 1974). The anchoring bias is a particularly relevant bias for auditors because auditors have to deal with ‘anchors’ every day, mainly when dealing with work pressure in moving from one task to the next. For example, the numbers that clients provide for verification (Quadackers, 2011). Previous research shows that auditors anchor on arbitrarily provided values when assessing fraud on an error risk (Joyce & Biddle, 1981; Butler, 1986; McDaniel & Kinney, 1995). Additional research adds that auditors could also anchor on unaudited book values when conducting analytical tests, which can have a negative effect on audit effectiveness when wrong values are used (Kinney & Uecker, 1982; Biggs & Wild, 1985; Shields, Solomon & Waller, 1988; Heintz & White, 1989). Besides that, auditors would rely too heavily on numbers of previous years in audit planning (Wright, 1988; Bedard, 1989). A potential risk can be that auditors "anchored" their decisions on the prior year hours and did not sufficiently adjust for differences in risks (Kinney & Uecker, 1982).

It is important to be aware that only a very small proportion of auditors deliberately deliver low-quality audits (Bazerman et al., 2002). My research aims to obtain insight into if and how auditors’ workload impacts auditors’ anchoring bias. Because of the possible motioned negative impact of anchoring and workload, I predict that auditors under a high workload are more susceptible to anchoring. The research question in this paper is therefore twofold: (1) Are auditors susceptible to anchoring biases, (2) Are auditors more susceptible to the anchoring bias when working under a high workload?

Data is collected throw a survey distributed to 126 auditors from different audit firms in the Netherlands. This study’s findings have implications for auditors and audit firms, considering that they will know if they are susceptible to the anchoring bias and whether a high workload amplifies this. Since there is a lot of commentary on auditors’ workload, it is interesting for the audit sector to see to what extent this may have a negative influence
(Leeuwen, 2019; Pols, 2020). At the moment, the overlap of experimental psychology and experimental economics is very limited, and therefore the conducted experiments in this study may contribute to this missing overlap (Koch & Wüstermann, 2019). Initiatives are that more research is required on how biases influence auditors’ professional judgment, and therefore audit firms will be interested in this study’s findings (Nelson & Tan, 2005; Ranzilla et al., 2011; Luppe & Fávero, 2012).

In the literature review, I will first draw from literature to further detail the concepts that are touched upon in the introduction section. Also, I will present my hypotheses. Subsequently, in the method section, I will describe the conducted experiment to accept or reject my hypotheses. In the result section, the output of the experiment will be presented, followed by a discussion and conclusion of the results.
II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Auditors’ Anchoring Bias

Auditing can be defined as the process of evaluating an assertion in terms of specified criteria and reporting the findings to interested parties (Ashton & Ashton, 1995). Auditors are supposed to judge the correct mechanisms for certain everyday judgmental tasks. A lot of research has already been done about auditing judgment and decision-making (Solomon & Trotman, 2003). Libby & Luft (1993) state that auditors’ judgments are part of a more complex sequence of judgments that may be repeated period after period. Auditors’ professional judgment is essential to perform such tasks (NBA, 2017; Soloman & Trotman, 2003). Professional judgment consists of applying the relevant training, knowledge and experience in the context of an audit, applying accounting and ethical standards and making informed decisions about the proper procedure in the context of the engagement circumstances (Boureanu, 2006; NBA, 2017). The judgment of the auditor is part of the audit process. Additional research shows that incentives and motivation lead to preferences for the desired outcome, which unintentionally influences the auditors’ judgments and decision making (Knechel, Krishan, Pevzner, Shefchik & Velury, 2013).

Notwithstanding the importance of auditor judgment for the audit process, it is important to realize that in general, judgments are heavily influenced by initial beliefs. For instance, decision-makers would be prone to anchor the values in subsequent evidence when rendering a revised judgment (Hogarth and Einhorn 1992). Many researchers have conducted experiments with auditors that show that the anchoring bias directly affects auditing in many different settings. For example, the auditor is charged with objectively assessing the fairness of an account balance. The management’s estimates of the unaudited account balance can serve as an anchor, and the objectivity of the auditor might be compromised. As a consequence, the auditor might become anchored to the management’s estimate (Kinney & Uecker, 1982; Wild & Biggs, 1990; Ranzilla et al., 2011). According to Kinney and Uecker (1982) analytical review, auditors should be aware of the potential importance of forming expectations concerning a client audited values without considering the recorded book values. Their compliance testing settings suggest that auditors’ judgment procedure mitigates the potentially dangerous consequences of anchoring when their judgmental inferences are based on presented sample information. Tanone & Harindahyani (2018) illustrate a more practical setting of the anchoring bias in audit. In their example, they suggest that the auditor happens to make a decision regarding the materiality in the audit of company X, based on the materiality of company Y. This without too little
considering any other factor such as the difference between company size or company internal controls.

The anchoring bias exists of two components, first the tendency to anchor on an initial value, and second, the tendency to make adjustments away from this initial value that is smaller or bigger than what is actually justified in the situation (Ranzilla et al., 2011). Auditors’ may be influenced by anchoring because they deal with anchor points on a daily basis. Both psychology and accounting research find that decision-makers’ adjustments to their initial judgments are sometimes insufficient. Individuals are prone to rendering their adjustment toward their initial anchor, resulting in a greater propensity to exhibit a confirmatory evaluation of evidence (Tversky & Kahneman 1974; Chapman & Johnson 2002; Pike, Chui, Martin & Olvera, 2016). As a consequence, anchoring in audit could lead to ineffectiveness audit settings and improper attention from auditors to audit evidence (Shields et al., 1988, Kowalczyk & Wolfe, 1998). As said, professional judgment is essential for auditors to perform their work. Typically, adjustments are in the ‘right’ direction but are insufficient to bring the judgment to its ‘correct’ value, the value that would have been obtained if no anchoring had occurred evidence (Tversky & Kahneman 1974). As said, only a very small proportion of auditors deliberately deliver low-quality audits, and the majority of auditors would be susceptible to anchoring (Bazerman et al., 2002). Based on the above, I hypothesize the following:

**H1: Auditors are susceptible to the anchoring bias**

**Workload and Auditors’ Anchoring Bias**

The audit sector is well known for its busy season, a period in which the workload is very high (Jones, Strand & Bier, 2010). You can speak of a high workload when someone’s working time is higher than contractually determined, very dispersed and irregular (Méda & Vendramin, 2017). Previous research indicates that busy season pressures in audit can lead to burnouts and time constraints and can reduce audit quality at individual auditor level (Alderman & Dietrick, 1982; Kelley & Margheim 1990; Raghunathan, 1991; Willet & Page 1996; Sweeney & Summers, 2002; Coram & Woodliff, 2004; Cianci & Bierstaker, 2009). Archival research suggests that these pressures in the busy season can also transcend the audit firm’s quality control mechanisms, affecting quality at the audit engagement level (Lopez & Peters, 2012).

According to the research of Svanström (2016), there is time budget pressure and time deadline pressure in the audit sector. Time budget pressure means an inadequate number of hours is allocated to complete the audit specified procedures. Time deadline pressure means that it is challenging to complete specified procedures by a required deadline. The results of the
research show that time pressure could lead to dysfunctional auditor behavior. Furthermore, Wolf (1981)’s research shows that a reporting problem in audit with the audit manager is the managers’ failure to provide a timely review. However, deadlines in auditing make it necessary for auditors to screen available information efficiently in order to identify and evaluate what is relevant in time (Arens & Loebbecke, 1994). In addition, according to the results of McDaniel (1990), the audit effectiveness decreases as time pressure increased.

Decision-makers’ judgment would be strongly influenced by irrelevant factors like their current mood, the time since their last meal, and the weather. This chance variability of judgments is called ‘noise’ (Kahneman, Rosenfield, Gandhi, & Blaser, 2016). One such factor could be the workload pressure of auditors. When you are under a high workload, you probably take less time to make decisions. This could increase the probability that a decision might become biased (Kahneman, Lovallo, & Sibony, 2011). Previous research shows that decision-making in a team is also vulnerable to unconscious biases and could be even more susceptible to the effect of time stress than other decision procedures. Moreover, the results suggest that when time stress is increased, respondents use a decision processing strategy that was less effective than the strategy they were trained to use (Lehner, Seyed-Solorfrough, O’Connor, Sak & Mullin, 1997). Based on these considerations, I expect that auditors are even more influenced by the anchoring bias when working under high workload pressures. I hypothesize the following:

\[ H2: \textit{Anchoring impacts auditors’ anchoring bias even more when auditors are working under a high workload} \]
III. METHODOLOGY

Conceptual Model

Figure 1 shows the conceptual model of this study. First, I will test if auditors are susceptible to anchoring. Second, the moderating role of the workload is added. To answer the hypotheses, two experiments are conducted. Predicted is that auditors under a high workload are more susceptible to the anchoring biases.

![Conceptual Model](image)

Data Collection and Participants

This research obtained data will be based on survey responses from auditors working for Big Four and non-Big Four audit firms in the Netherlands. To obtain enough respondents, auditors were personally asked to participate in the survey by one of a group of four auditing master students. Convenience sampling is used to approach auditors with two or more years of experience in audit. Assumed is that at least two years of experience is necessary to conduct the established survey questions.

In early November of 2020, an email was sent with the joint survey of all group members to 141 participating respondents. After that, two more reminders were sent. Of the 141 auditors who initially agreed to participate, 127 auditors (89.36%) completed the questionnaire. A higher than 80% response rate can be seen as a very acceptable percentage (Baruch, 1999; Smit, 2015). One person is removed from the data because this person did not fully complete the experiment. This means that 126 respondents are left for this study. All respondents were assured that their responses would be confidential and used for research purposes only.

Experiment

An experiment is a method of inquiry in which the researcher randomly assigns subjects within a controlled setting to reproduce some phenomenon and actively manipulates that phenomenon to make various observations of or related to the phenomenon. Often these observations or measurements cannot be made in a natural setting (Reynolds, 1987). Judgments
Based on the anchoring bias occurs when decision-makers focus highly on the value of the anchor point. A total of two experiments were conducted to see if auditors are susceptible to the anchoring bias or not. The purpose of the experiments is to provide a starting (anchor) point and test if the auditors are susceptible. In each of the experiments, the respondents get either a low or a high starting point. The difference in the starting points should be irrelevant for the purposes of making a response. This means that the response of the first group should not differ from the second group. But when the auditors are susceptible to the anchoring bias, the first group’s mean will be lower than the seconds group’s mean because of the lower anchor (Joyce & Biddle 1981).

**Experiment 1**

For the first experiment, the respondents were asked to evaluate an experimental audit case, which is represented in Appendix A. In this case, the auditor must imagine that they have recently been appointed as the responsible auditor of a new and very important client. Everything seems to be right, and the client is also well known, but a possible material point of attention has been identified on the accruals. Any additional investigation to prevent fraud will lead to a substantial budget overrun, something which the client has emphatically said not to tolerate. Each respondent was asked two questions about the change that they would carry out a detailed analysis and if they would pass this extra cost on to the client. For both questions, the respondents use a response scale with the probability of one to a hundred. The respondents were divided into two groups. The first group can choose from a response scale set at 10. For the second group, the response scale is set at 90. From this anchor point, the respondent must decide for both questions what their desired probability is. The anchor point on the response scale in this experiment is very subtle.

**Experiment 2**

For the second experiment, Joyce & Biddle (1981)’s research is used, which is represented in Appendix B. Their experiment asked experienced auditors about an estimation of the number of executive-level management fraud in Big Eight clients per 1,000 clients audited. Again, the respondents were divided into two groups. The first group had the number 10 in each 1,000 audited as a low anchor point, and the second group the number 200 as a high anchor point. Compared to the first experiment, the anchor point is now more in the picture and less subtle.
**Moderator Variable**

To be able to research whether auditors are more susceptible to the anchoring bias under a high workload, a moderator was added to the experimental cases. It must be established if the respondents were completing the survey under a high workload or not. In order to keep the workload constant, both groups were divided again. One group has to make the case under a 2-minute timer, and the other group did not. The group with a timer received a message in advance that the timer was added to simulate auditors’ normal workload pressure and that the faster is the better. The second group’s respondents started the cases without the moderator effect and were only asked to read and answer the case carefully. To determine whether or not the respondents actually made the cases under time pressure, an extra question was asked at the end. The respondents were asked if they were asked before to answer the previous audit cases as soon as possible or not. The respondents could choose between three answer options: 1 (Yes), 2 (No), or 3 (I don't know). Second, the respondents were asked to what extent they experienced time pressure when answering the audit cases. They could choose between a seven-point response scale from 1 (strongly disagree) to 7 (strongly agree).

**Data Analysis**

Data analyses were performed to determine the direction and extent of the relationships among auditors’ anchoring bias and their workload. The data analysis starts with an examination of the sample characteristics. Since the mean is the most interesting value in both experiments, both hypotheses will be answered by using an ANCOVA analysis. The one-way ANCOVA analysis will show us if an increase of the anchor point leads to an increase of the mean from the auditors’ professional judgment. A two-way ANCOVA analysis will examine if auditors’ workload as moderator increases or decreases auditors’ anchoring bias.
IV. RESULTS

Preparation for Data Analysis

To examine whether the hypotheses are statistically significant, a one-way ANCOVA is performed to test hypothesis 1 and a two-way ANCOVA for hypothesis 2. A critical part of the process involves checking if the data can be analyzed with an ANCOVA, including normality, homogeneity of variance, and homogeneity of regression slopes. For all the performed tests in this section, the pre-tests show us no significant interaction. Due to this, the assumption of homogeneity of regression will not be violated. In addition, for the homogeneity of variance assumption between groups, Levene’s test was conducted. This test is briefly mentioned for each performed test. Moreover, a couple of outliers were noticed. Before each test, the outliers are increased or decreased to the point where these values are no longer outliers. For missing values at the tenure, the average tenure is used. Due to privacy regulations, the age and tenure of the auditors are standardized with a Z-score.

Table 1 presents the four experimental conditions that were created to conduct the experiment. The auditors were randomly assigned to one of the groups. A conditional variable is used to separate each group, and a dummy variable is established for the independent variables.

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Group classification</th>
</tr>
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<tbody>
<tr>
<td>Time pressure</td>
<td>Anchor point</td>
</tr>
<tr>
<td></td>
<td>Group 1: time pressure, low anchor</td>
</tr>
<tr>
<td></td>
<td>Group 2: time pressure, high anchor</td>
</tr>
<tr>
<td>No time pressure</td>
<td>Anchor point</td>
</tr>
<tr>
<td></td>
<td>Group 3: no time pressure, low anchor</td>
</tr>
<tr>
<td></td>
<td>Group 4: no time pressure, high anchor</td>
</tr>
</tbody>
</table>

Demographic Sample Characteristic

Table 2 shows the demographic information about the respondents for each group and the total. Notable is that 40% of the respondents are female. The majority of the respondents have a full-time job and a medior position in the audit firm. Furthermore, the respondents’ average age is 31 year, and their average tenure is 7 year.
Table 2

Demographic Information Respondents

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total respondents</td>
<td>32</td>
<td>31</td>
<td>32</td>
<td>31</td>
<td>126</td>
</tr>
<tr>
<td>Men</td>
<td>19</td>
<td>16</td>
<td>23</td>
<td>18</td>
<td>76</td>
</tr>
<tr>
<td>Women</td>
<td>13</td>
<td>15</td>
<td>9</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td>Part-time</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Full-time</td>
<td>28</td>
<td>26</td>
<td>27</td>
<td>25</td>
<td>106</td>
</tr>
<tr>
<td>Junior</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Medior</td>
<td>11</td>
<td>15</td>
<td>16</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>Senior</td>
<td>12</td>
<td>4</td>
<td>7</td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Very senior</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Partner</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Direct Effect of the Anchoring

To answer hypothesis 1, a one-way ANCOVA is conducted for both experiments. The dependent variable in this test is the respondent auditors’ given value. The factor is the dummy variable for a low anchor point, and the used covariate is tenure. Table 3 presents the results of both experiments.

Experiment 1

Before starting the one-way ANCOVA, Levene’s test was examined and violated with a significance level of $p = .670$. A one-way ANCOVA is conducted and the results show no significant effect of $F(1,125) = .005$, $p < .942$. The covariate tenure had a significant effect on the interaction between the dependent and the independent variables with $p < .013$.

For the second question of the first experiment, Levene’s test was examined and violated with a significance level of $p = .172$. Conducting a one-way ANCOVA shows no significant effect of $F(1,125) = .220$, $p < .640$. The covariate had no significant effect. In conclusion, we cannot accept hypothesis 1 based on the results from the first experiment.

Experiment 2

For the second experiment, there are 124 respondents left because two respondents did not complete this experiment. Levene’s test shows us evidence that the homogeneity of variance
assumption between groups has been violated with a significant level of \( p = .000 \). This indicates that the two groups are significantly different. However, since we have made nearly equal groups, this should not affect the results. Conducting a one-way ANCOVA shows us a significant effect of \( F(1,123) = 15.470, p < .000 \). The covariate had no significant effect. Expected was that the group of respondents with a low anchor would have a lower mean, and comparatively, the group with a high anchor would have a higher mean. The mean is 32.17 for the group with a low anchor point, and the mean is 78.35 for the group with a high anchor point. These results show us clearly this anchoring effect. Based on the second experiment, we can accept hypothesis 1 and conclude that auditors are susceptible to the anchoring bias.

**Table 3**

*Direct Effect of Auditors’ Anchoring Bias*

<table>
<thead>
<tr>
<th></th>
<th>Low anchor</th>
<th>High anchor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n )</td>
<td>( M ) (SD)</td>
</tr>
<tr>
<td>Experiment 1.1</td>
<td>64</td>
<td>88.70 (12.86)</td>
</tr>
<tr>
<td>Experiment 1.2</td>
<td>64</td>
<td>70.36 (17.41)</td>
</tr>
<tr>
<td>Experiment 2</td>
<td>64</td>
<td>32.17 (38.58)</td>
</tr>
</tbody>
</table>

**Moderator Variable**

To research if auditors’ workload reinforces auditors ‘anchoring bias, this moderator is added to the experimental cases. For each experiment, a two-way ANCOVA is conducted. The dependent variable is the given value from the respondent auditors, and the independent variable is the dummy variable for a low anchor point. The moderator is the dummy variable for time pressure and the covariates are the tenure and the average working hours of the auditor. Table 4 presents the results of the moderator effect for both experiments.

To determine whether or not the respondents actually made the cases under time pressure, a manipulation check is conducted afterward. For the group with time pressure, 13 respondents said that they were not under time pressure. For the group without time pressure, 3 respondents said that they were under time pressure. This total of 20 respondents that fill in the wrong question where removed from the data. This means that 110 respondents were left for the first experiment, and 108 respondents are left for the second experiment.

**Moderating Effect of Workload**

For the first question of the first experiment, Levene’s test was examined and violated with a significance level of \( p = .865 \). A two-way ANCOVA shows no significant effect \( F(1,109) \)
The covariate tenure has a significant effect of $p < .004$. The covariate working hours shows no significant effect.

For the second question of the first experiment, Levene’s test was violated with a significance level of $p = .186$. The two-way ANCOVA shows no significant interaction effect $F(1,109) = .095$, $p < .759$. Both covariates had as well no significant effect.

For the second experiment, the one-way ANCOVA also shows no significant interaction effect $F(1,107) = .065$, $p < .799$. The homogeneity of variance assumption between groups cannot be violated as Levene’s test has a significance level of $p < .001$. However, since we have made nearly equal groups, this should not influence our results. Both covariates had not a significant effect.

Expected was that the group with the high anchor point of 200 would have a higher mean and that the mean would be even higher for the group with time pressure. For the group with time pressure and a low anchor point, the mean is 37.04, which is a little higher than the mean of 27.57 for the group without time pressure and a low anchor point. For the group with time pressure and a high anchor point, the mean is 90.61 and a mean of 80.59 for the group without time pressure and a high anchor point. For the group with a low anchor point of 10, we would expect that this mean would be even lower for the group under time pressure, which is not the case. Based on the second experiment results, we cannot accept hypothesis 2 because we do not see a significant interaction between auditors’ anchoring bias and their workload.

**Manipulation Check**

In the end, the survey asked if the respondents had experienced time pressure or not, as a manipulation check. These answers are tested and are used as moderator instead of the dummy variable for time pressure. The dependent variable is still the given value from the respondent auditors. The independent variable is the dummy variable for a low anchor point, and the covariates are tenure and average working hours.

For the first question of the first experiment, Levene’s test was violated with a significance level of $p = .153$. A two-way ANCOVA is conducted, and the results show no significant effect of $F(1,109) = 1.211$, $p < .308$. The covariate working hours significantly affected the interaction between the dependent and the independent variables with $p < .022$. The covariate tenure shows no significant effect.

For the second question of the first experiment, Levene’s test was violated with a significance level of $p = .132$. A two-way ANCOVA shows no significant effect of $F(1,109) = .685$, $p < .662$. The covariates had no significant effect.
For the second experiment, Levene’s test has been violated with a significance level of \( p = .670 \). A two-way ANCOVA shows no significant effect of \( F(1,125) = .005, \ p < .942 \). The covariates had no significant effect.

**Additional Analyses**

Expected was that auditors under a high workload would be more susceptible to the anchoring bias. Since I did not find an effect of time pressure based on the 2-minute timer, this may have not produced the desired workload effect. Whereas I did not find an effect on time pressure, it is still an important issue in practice, since auditors’ workload still may undermine audit quality ((López & Peters, 2012). A possible other variable that could be used for this additional analysis could be auditors’ average working hours. It would not be the first time to research workload measured by the number of working hours (Kaldenberg & Becker, 1992; Akerstedt, Fredlund, Gillberg, & Jansson, 2002; Britt & Dawson, 2005). We have information about auditors’ average working hours since this was asked in the completed joined survey.

**Additional Analysis with Auditors’ Average Working Hours**

There are three equal groups created with SPSS to be able to use this variable as a moderator in a two-way ANCOVA. The first group has, on average, the lowest working hours. The second group has an average number of working hours. The last group has an above-average number of working hours. The used dependent variable is still the given value from the respondent auditors. The other independent variable is the dummy variable for a low anchor point, and the used covariate is tenure. Because the manipulation check is not relevant for this test, the first sample of 126 respondents is used for the first experiment. The sample of 124 respondents is used for the second experiment. See table 5 for the results of the additional analysis for each experiment.

For the first question of the first experiment, Levene’s test was violated with a significance level of \( p = .366 \). A two-way ANCOVA is conducted and the results show no significant effect of \( F(1,125) = .127, \ p < .881 \). The covariate tenure had a significant effect on the interaction between the dependent and the independent variables with \( p < .020 \).

For the second question of the first experiment, Levene’s test was violated with a significance level of \( p = .364 \). A two-way ANCOVA shows no significant effect of \( F(1,125) = 1.198, \ p < .305 \). The covariate had no significant effect.

For the second experiment, Levene’s test shows us evidence that the homogeneity of variance assumption between groups has been violated with a significant level of \( p = .000 \). However, since we have made equal groups, this should not affect the results. A two-way
ANCOVA shows no significant effect of F(1,123) = 2.655, p < .075. Based on this results, we are still not able to accept hypothesis 2. The covariate had no significant effect.

Despite the fact we did not yet find a significant effect, it is still interesting to look more closely at the results. Predicted was that the group with the highest average working hours would be more susceptible to anchoring than the groups with less average working hours. This signify that group 3 with a low anchor point should have on average the lowest mean, and that group 3 with a high anchor point should have the highest mean, compared to the other two groups. If we look at the results in table 5, we do not see this anchoring effect for group 3, but for group 1. To illustrate this clearly, we made a plot in figure 2. This figure shows us this opposite effect of the predetermined expectation. Therefore, the group with a lower number of working hours looks more susceptible to the direct effect of anchoring, compared to the other groups.

![Figure 2](image)

**Figure 2**
Plot of Additional Analysis of Working Hours of Experiment 2

---

**Additional Analysis Excluding Audit Partners**

To look for a possible explanation for the before motioned results, figure 3 presents a graph that compares the average number of working hours for each position in the audit firm. This figure shows that more experienced auditors have on average more working hours. This may explain the results from the additional analyses, since it could suggest that more experienced auditors are less susceptible to the anchoring bias when working under a high workload. Therefore, I repeated the additional test but this time I excluded the auditors with the position of partner. To still have three equal groups for the two-way ANCOVA, the groups have
been reclassified. Table 6 presents the results of this additional analysis and the average working hours of the new groups.

If we focus on the second experiment, Levene’s test shows us still evidence that the homogeneity of variance assumption between groups has been violated with a significant level of $p = .001$. Because we have rearranged the groups to be nearly equal, this should not affect the results. A two-way ANCOVA shows us now a significant effect of $F(1,109) = 3.216$, $p < .044$. The covariate had no significant effect.

In conclusion, we can say that the workload can have a significant effect on auditors’ anchoring bias when we exclude the position of partners. However, we are still not able to accept hypothesis 2. Predicted was that the group with the highest average working hours would be more susceptible to anchoring than the groups with less average working hours. Table 6 shows us the opposite results suggesting that the group with the lowest average working hours seems more susceptible to anchoring compared to the other groups. We have to decline hypothesis 2 because we cannot say that anchoring impacts auditors’ anchoring bias even more when auditors are working under a high workload. Notice that if we look more closely at results and compare table 5 and table 6 of the group with a high anchor point, we can see a shift from the mean from group 2 to group 3. The reclassification of the groups could may cause the different result, making it difficult to make a certain conclusion. Moreover, deleting the sample with the highest average of working hours could also affect the results.

![Figure 3](image)

**Figure 3**

Mean of Average Number of Working Hours for each Position
### Table 4
*Effect of Auditors’ Anchoring Bias with the Moderating Effect of Workload*

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Low anchor</th>
<th>High anchor</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time Pressure</td>
<td>No Time Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>M</td>
<td>(SD)</td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>Experiment 1.1</td>
<td>26</td>
<td>87.73</td>
<td>(11.982)</td>
<td>30</td>
</tr>
<tr>
<td>Experiment 1.2</td>
<td>26</td>
<td>74.50</td>
<td>(14.664)</td>
<td>30</td>
</tr>
<tr>
<td>Experiment 2</td>
<td>26</td>
<td>37.04</td>
<td>(47.449)</td>
<td>30</td>
</tr>
</tbody>
</table>

### Table 5
*Effect of Auditors’ Anchoring Bias with Additional Analysis of Working Hours*

<table>
<thead>
<tr>
<th>Exp.</th>
<th>Low anchor</th>
<th>High anchor</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 (32-42 hours)</td>
<td>Group 2 (43-47 hours)</td>
<td>Group 3 (48-60 hours)</td>
<td>Group 1 (32-42 hours)</td>
</tr>
<tr>
<td>n</td>
<td>M</td>
<td>(SD)</td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>1.1</td>
<td>21</td>
<td>85.43</td>
<td>(12.572)</td>
<td>21</td>
</tr>
<tr>
<td>1.2</td>
<td>21</td>
<td>69.14</td>
<td>(16.344)</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>24.67</td>
<td>(23.506)</td>
<td>21</td>
</tr>
</tbody>
</table>

### Table 6
*Effect of Auditors’ Anchoring Bias with Additional Analysis of Working Hours Excluding Audit Partners*

<table>
<thead>
<tr>
<th>Exp.</th>
<th>Low anchor</th>
<th>High anchor</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 (32-42 hours)</td>
<td>Group 2 (43-45 hours)</td>
<td>Group 3 (46-60 hours)</td>
<td>Group 1 (32-42 hours)</td>
</tr>
<tr>
<td>n</td>
<td>M</td>
<td>(SD)</td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>1.2</td>
<td>21</td>
<td>85.43</td>
<td>(12.572)</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>24.67</td>
<td>(23.506)</td>
<td>17</td>
</tr>
</tbody>
</table>
V. DISCUSSION AND CONCLUSION

Findings

Recent research suggests that auditors face a high workload, which could lead to time constraints and reduce the audit quality (Alderman & Dietrick, 1982; Kelley & Margheim 1990; Raghunathan, 1991; Willet & Page 1996; Sweeney & Summers, 2002; Coram & Woodliff, 2004; Cianci & Bierstaker, 2009). It is important to be aware that only a very small proportion of auditors deliberately deliver low-quality audits. The majority of auditors would be susceptible to unconscious biases (Bazerman et al., 2002). The anchoring bias is a relevant bias for auditors because auditors have to deal with ‘anchors’ every day, particularly when dealing with work pressure in moving from one task to the next. Previous research shows that auditors are susceptible to anchoring when auditing unaudited book values or with fraud risk assessments (Joyce & Biddle, 1981; Butler, 1986; McDaniel & Kinney, 1995). My research aims to obtain insight into auditors’ susceptibility for the anchoring bias and if auditors are even more susceptible to anchoring when working under a high workload.

The findings of the first experiment, with a subtle anchor point, show no significant results. When the auditors are not sensitive to the anchoring bias, the experiment’s anchor point should be irrelevant for their response. This means that the response to the first group did not differ from the second group. If we look at the results of the first experiment, we see that the groups’ means are almost similar and that there is no sign of the anchoring effect.

The results of the second experiment do show us a significant effect of $p < .000$. The mean is 32.17 for the group with a low anchor point, and 78.35 for the group with a high anchor point. Expected was that the group of respondents with a low anchor would have a lower mean, and that comparatively the group with a high anchor would have a higher mean. Based on the second experiment results, we can accept hypothesis 1 and conclude that anchoring can impact auditors’ anchoring bias.

If we compare both experiments, we could say that experimental cases with subtler anchor points do not lead to the anchoring effect. This indicates that the number set on the response scale did not influence the respondents’ chosen value to the questions. This may be because the point was too subtle. Another reason could be the fact that they could only choose between a scale from one till hundred, which limits the range of the answers.

The repeated experiment of Joyce & Biddle (1981) shows that auditors are susceptible to the anchoring bias. This means that we can say that 40 years later, it is still the case that auditors are susceptible to anchoring. If we compare this study results with 40 years ago, it is remarkable
that the results are now on average higher for both anchor points. This does not indicate a stronger effect of the anchoring bias because a strong effect of the anchoring bias would be closer to the anchor point. Since 1983 there is an upsurge in litigation in the audit sector (Chandler & Edwards, 1996). In the last years, fraud has received significant and growing attention from regulators, auditors, and the public (Isitman, 2019; Kassem & Higson, 2012). The fact that fraud is a bigger topic today than it was 40 years ago, may lead to the fact that auditors today estimate fraud as a higher risk. As a result, the means in this study are on average higher. This could also ensure that the first experiment does not show significant results when there would be a certain average level of thinking among auditors about the likelihood that they expect fraud and are willing to do something about it these days. Besides that, in the sample of Joyce & Biddle (1981), there were 50 participating auditors in the group with a low anchor point and 132 auditors in the group with a high anchor point. This difference may also lead to other results.

Next, the moderator workload was added to the experiments. At first, no significant effect was found. In the additional analysis, the auditors’ average working hours were used to measure the workload. The results show an opposite effect to the predetermined expectation because the group with a lower average number of working hours is looking more susceptible to anchoring. Another additional analysis of a two-way ANCOVA, with auditors’ working hours and excluding audit partners, show us a significant effect of p < .044. This indicates that the workload could have a significant effect on auditors’ anchoring bias. However, we cannot accept hypothesis 2 since the group with the lowest average working hours still looks the most susceptible to the anchoring bias.

Moreover, if we compare the results of the additional analyses, we should notice the shift of the mean of the group with a high anchor point, from group 2 to group 3. Furthermore, deleting the sample with the highest average of working hours could also be a reason for a different effect of the results. Therefore, the reclassification of the groups could also cause this effect, making it difficult to make a certain conclusion. Additional results should explain this in further detail.

In conclusion, we can say that anchoring can impact auditors’ anchoring bias. We cannot say that anchoring impacts auditors’ anchoring bias even more when auditors work under a high workload. Nevertheless, we can say that workload could significantly affect auditors’ anchoring bias when we exclude audit partners.
Practical Implications

This research adds to the existing literature on auditors’ anchoring bias and workload. The study’s findings could have important implications for practice, considering that audit firms will know if auditors are susceptible to the anchoring bias and whether a high workload amplifies this. Audit quality and the workload of auditors are crucial topics at the moment. Initiatives are that more research is required on how biases influence auditor’s professional judgment (Nelson & Tan, 2005; Ranzilla et al., 2011; Luppe & Fávero, 2012). Since auditors’ workload appears to undermine audit quality, audit firms are very motivated to find ways to improve audit quality at the moment (López & Peters, 2012). This research may help and suggest to look more at unconscious judgments of auditors. In consideration of the limited overlap of experimental psychology and experimental economics, this research may complete this gap of missing overlap a little more (Koch & Wüstermann, 2019).

This study shows that auditors could be susceptible to anchoring. More awareness and understanding of the traps of biases could improve auditors’ professional judgment and low-quality audits (Ranzilla et al., 2011). Therefore, audit firms should adapt audit processes with a high probability that the anchoring bias will occur. Managing unconscious bias at the workplace could be done through awareness training, confront the employees, label the biases, discuss them, and reorganize the company’s structures and systems (Oberai & Anand, 2018). According to the KPMG Professional Judgment Framework, audit firms’ most important subjects are coaching and reflecting on previous experience. According to this framework, the steps for avoiding traps and mitigating biases are clarifying issues and objectives, considering alternatives, gathering and evaluating information, reaching a conclusion, and articulating and documenting rationale (Ranzilla et al., 2011).

Limitations and Future Research

Several limitations characterize this research. A first limitation is that the auditors under a very high workload may not take the time to fill in this survey. This could lead to different results than when, for example, every auditor in a company had complete the survey. In addition, in this research we have spoken about auditors’ busy season. However, the conducted survey was well ahead of the busy season. Therefore, the results in this research could be different from a survey that was performed during the busy season. Furthermore, the 2-minute timer may not have produced the workload effect that was desired. For future research, other settings to reproduce workload should be considered. Since the additional analysis did give us results, it would be a possibility to research workload measured by the number of working hours
or by using a quantitative workload inventory scale (Kaldenberg & Becker, 1992; Spector & Jex, 1998; Akerstedt, Fredlund, Gillberg, & Jansson, 2002; Britt & Dawson, 2005).

Since the results of the moderator workload show an opposite effect than expected, this may indicate that we have observed the wrong perspective in this research. For future research, it would therefore be interesting to focus on auditors with a low workload or on the different positions within the audit firm. Another possibility would be to make a distinction between certified and non-certified auditors. Moreover, it may also be interesting to look at the possible positive consequences of workload.

Since we find evidence of auditors’ anchoring bias, it may be interesting for future research to search how this impacts auditors’ independence. Research suggests that audit frameworks and their processes imply the goal to eliminate auditors’ biases to achieve objectivity (Bazerman, Morgan & Loewenstein, 1997). The fact that accounting firms are pushing the limits of independence may lead to an independence bias problem. Additional research suggests reprioritizing professional and ethical objectives will best serve the public interest to establish reliability in fact and appearance as the cornerstone of the auditors (Taylor, DeZoort, Munn & Thomas, 2003). More research about auditors’ independence could therefore be relevant. Moreover, based on the results of the additional analysis it would be worthily to look at the susceptibility of audit partners to unconscious biases. Future research could distinguish the different positions within an audit firm when testing auditors’ anchoring bias. Since the first experiment has not led to the predicted effect, future experimental cases should be a little skeptical for using a response scale or set a certain range in this kind of way.

For future research, it could also be interesting to have a look at other biases. Other relevant biases for auditors could be the availability bias, the confirmation bias, or the overconfidence bias (Ranzilla et al., 2011; Koch & Wüstermann, 2019). First, the availability bias could be relevant because auditors may weigh the information received most recently from a client more heavily relative to information received earlier during the audit. Second, the confirmation bias could lead to auditors putting more weight on consistent information with their initial beliefs or preferences. Third, the overconfidence bias could ensure that auditors overestimate their ability to perform tasks or make accurate diagnoses or other judgments and decisions (Ranzilla et al., 2011). These biases may unconsciously influence the quality during the audit and would therefore be interesting for future research (Koch & Wüstermann, 2019). Lastly, it would also be interesting to better look at the consequences of biases in audit, since they could be negative but also be positive (Arkes & Hammond, 1986).
REFERENCES


Appendix A

Experiment 1

- Case description is private –

Experiment 1 - Case questions first group

1.1 What is the chance that you, the audit manager, will carry out a detailed analysis on the accruals?

1.2 To what extent will you include the full amount of these additional analysis in the budget and pass it on to the client; even if this means that you may lose this client as a result?

Experiment 1 - Case questions second group

1.1 What is the chance that you, the audit manager, will carry out a detailed analysis on the accruals?

1.2 To what extent will you include the full amount of these additional analysis in the budget and pass it on to the client; even if this means that you may lose this client as a result?
Appendix B

Experiment 2 (Joyce & Biddle, 1981)

Experiment 2 - Case questions first group

2.1 Is the incidence of significant executive-level management fraud more than 10 in each 1,000 firms audited by Big Four accounting firms (circle one)?

A. Yes, more than 10 in each 1,000 Big Four audit clients have significant executive-level management fraud.

B. No, fewer than 10 in each 1,000 Big Four audit clients have significant executive-level management fraud.

2.2 What is your estimate of the number of Big Four audit clients per 1,000 that have significant executive-level management fraud (fill in the blank)? ______ in each 1,000 Big Four audit clients have significant executive-level management fraud.

Experiment 2 - Case questions second group

2.1 Is the incidence of significant executive-level management fraud more than 200 in each 1,000 firms audited by Big Four accounting firms (circle one)?

A. Yes, more than 200 in each 1,000 Big Four audit clients have significant executive-level management fraud.

B. No, fewer than 200 in each 1,000 Big Four audit clients have significant executive-level management fraud.

2.2 What is your estimate of the number of Big Four audit clients per 1,000 that have significant executive-level management fraud (fill in the blank)? ______ in each 1,000 Big Four audit clients have significant executive-level management fraud.