

The Mediating Effect of Blood Pressure on Budget Allocation and Audit Quality Relationship: An Experimental Investigation

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Abstract

This study investigates the mediation effects of blood pressure on budget allocation and audit quality relationships. Not being able to ignore the allocation guide that contains time, resources, and cost allocation during the auditing process can cause stress. It can reduce the physiological (e.g., blood pressure) as well as the cognitive abilities that reduce performance. This research uses social laboratory experiments. Budget allocation manipulates into three conditions (specified, partial, and unspecified). Blood pressure was categorized into three levels (high, normal, and low), and audit quality was measured during the experiment. The result of two regression model equations shows that budget allocation influences blood pressure, and a correlation between blood pressure and audit quality was found. This research employed a construal-level perspective and found that blood pressure partially mediates budget allocation on audit quality relationships. The existence of budget allocation increases low-level construal and becomes a trigger that affects blood pressure; changes in blood pressure from normal levels indicate the condition of the circulation of blood pressure in the way of blood supply to the brain is not optimal, thus affecting the individual abilities, and audit quality.

Keywords: Budget Allocation, Blood Pressure, Audit Quality, Construal Level.

Introduction

High stress and pressure in audit professions are two popular topics among researchers (Tuanakotta, 2013; Al Shbail et al., 2018; Rohma & Khoirunnisa, 2024). Accordingly, auditors' mental health, both psychological and physiological, is one of the paramount topics in behavioral accounting research (Mursita et al., 2020). In terms of psychological issues, auditors and clients have to confront audit results and reporting

deadlines. It makes deadline pressure integral to an audit process (Bennett & Hatfield, 2017). Coram et al. (2003) argue that time budget pressure declines audit quality at several public accounting offices in Australia. Hatfield (2014) also demonstrates how time deadline pressure decreases materiality assessment quality.

Auditors have to face an increased workload during deadline pressure conditions while time budget allocation levels are off (Coram et al., 2003; Rohma et al., 2023). The majority of research is seemingly concerned with increased workload and time allocation limits (Christensen et al., 2016; Coram et al., 2003). Meanwhile, research on the influence of structured guidance in the form of formal guidance concerning time allocation restraint, human resources, and cost budgeting is still rare. On this basic premise, this research proposes a budget allocation concept, structured guidance for allocating time, resources, and cost budget to carry out an audit procedure under a determined audit deadline.

Structured guidance and the tendency to comply with the procedure may affect individual construal levels. Audsabumrungrat et al. (2016) convey that materiality guidance may de-escalate auditor conservatism in planning materiality levels during auditing. The finding exhibits that formal guidance for detracting from conservatism quality is available. As such, a further examination of the effect of budget allocation on audit quality using a construal-level perspective is necessary.

In terms of physiology, Al Shbail et al. (2018) propose that pressure resulting from audit professions may trigger physiological issues, e.g., dizziness and acute pain. Blood changes from its normal position trigger health problems. Blood pressure changes may impact cognitive capability and decline the performance of individuals (Alsumali et al., 2016; Gaertner & John, 1981; Margheim et al., 2005; Woodcock & Johnson, 2019). In other words, from a construal level perspective, resources and costs may inflect a low construal level of an individual if structured guidance for allocating time budget, resources, and costs is provided. Impacts at the construal level may trigger pressure and physiologically influence cardiovascular disorders, such as blood pressure changes lessening cognitive capability. This research considers psychological and physiological aspects by investigating the mediation effect of blood pressure on the relationship between budget allocation and audit quality.

This research used a laboratory experiment method and engaged accounting students from Indonesia. We used Indonesian participants as, based on data from the World Health Organization in 2014, the country had an estimated proportion of non-communicable diseases, especially cardiovascular-related ones, as the highest causes of mortality by 37%, in comparison with some countries of the South East Asia region. The budget allocation was manipulated into three levels (specified, partial, and unspecified). Blood pressure was categorized into three (high, low, and normal). The results exhibited that blood pressure partially mediated the impact of budget allocation on audit quality. Budget allocation breeds physiological pressure, bringing about blood pressure changes and minimizing cognitive capability, i.e., audit quality.

The results are expected to afford four key contributions. First, from a construal level perspective, this research indicates that construal level limitation significantly influences physiological and cognitive conditions simultaneously. Second, research development only focuses on social psychological aspects but abandons physiological ones. Research

points out that individuals are both social and economic creatures and single organisms that should be mindful of physiological conditions to sustain lives. Physiological conditions, cognitive development, and performance are integral and indispensable to single organisms. And yet, it is often disregarded by many social and economic researchers. Third, this research addresses research development gaps, where most of the research only focuses on behavioral aspects of budget pressure and ignores standard formal procedures for allocating budget. It is observed through budget allocation phenomena during an auditing process. Fourth, the management concerned may learn from the results to consider the balance between work pressure and psychological and physiological health to engender optimum performance.

This research's structure is as follows: Part 2 discusses literature review and hypothesis development; Part 3 addresses research methods; Part 4 presents data analysis results and discussions; and Part 5 elaborates conclusions, covering research limitations and suggestions for development.

Literatur Review And Hypothesis Development

Construal Level Theory

Construal Level Theory (CLT) by Trope & Liberman (2010) defines a distant future situation as one that is interpreted at a higher level (namely, using abstract and central features) than a close present situation. The common assumption made by the theory is that the more distant the object from individuals, the more abstract the idea, whereas the closer the object, the more concrete the idea (Trope & Liberman, 2010; Rohma, 2022). By CLT, psychological distance is classified into several dimensions: temporal, spatial, social, and hypothetical (Trope & Liberman, 2010). A high construal level indicates that individuals are thinking abstractly and tend to see a larger picture instead of focusing on details (Trope & Liberman, 2010). Meanwhile, a low construal level indicates that individuals are thinking concretely and tend to focus on details (Trope & Liberman, 2010). CLT posits that psychological distance may determine actions and pressure individuals perceive. Hence, according to this research, individuals will tend to make concrete and detailed actions within a close time distance at a low construal level if structured guidance for allocation is available. It will likely generate psychological and physiological pressure, affecting the cognitive capabilities of individuals.

Hypothesis Development

Structured guidance may reduce auditor assessment performance. They make auditors process fewer factors that are absent in structured guidance but increase pressure because the auditors are limited by the information determined (Asare & Wright, 2004; Wheeler & Arunachalam, 2008; Gerber et al., 2018). Bennet & Hatfield (2017) remark that deadline pressure increases by the end of the year because of a range of possible events that have to be faced by auditors when identifying drawbacks. Dewi & Jayanti (2021) show how budget pressure perceived by auditors positively influences work stress. Al Shbail et al. (2018) state that pressure from being auditors may also trigger physiological health problems, such as headaches. From a construal-level perspective (Trope & Liberman, 2010), the use of structured guidance may cause auditors to focus

and comply with specific steps documented in the guidance. It gives off high pressure and blood pressure changes in auditors. In so doing, Hypothesis 1 is:

H1: Budget allocation levels relate to the changes in blood pressure levels.

Research on the impact of blood pressure on individual performance is growing significantly. The research suggests that hypertension increases vascular disease risks that may induce cognitive decline (Forte et al., 2020). A variety of relevant psychological tests attest that cognitive decline embraces declines in verbal learning, verbal and non-verbal memories, attention, perceptuomotor speed, visual motor scanning, mental flexibility, letter and category fluency, executive disorders, and word finding. Accountants and auditors are considered to be highly stressed (Bennet & Hatfield, 2017). Many accountants report perceiving chronic backache, headache, and other responses referring to work stress (Gaertner & John, 1981).

Al Shbail et al. (2018) suggest that pressure due to professions triggers physiological health, e.g., dizziness and acute pain. Audit quality encourages a company to be more competitive (Ghebremichael, 2018). Ghebremichael (2018) contends that quality audits are the function of the competency and independence perceptions of auditors. Previous research proves how physiological conditions may influence individual work quality. That being so, blood pressure changes from its normal level likely whittle down audit quality. Hypothesis 2 is, therefore:

H2: Blood Pressure mediates the Budget Allocation on Audit Quality Relationship

Research Method

Experiment Design and Participant

This research used a laboratory experiment design. The independent variable, budget allocation, was manipulated into three conditions (specified, partial, and unspecified). The mediation variable blood pressure was categorized into three conditions as well (high, low, and normal). Participants were accounting students. We used students as substitutes considering the research objective, i.e., to test construal levels. Thus, using students could cut social desirability biases. Trapp & Trapp (2019) argued that students had no performance measurement system existing in the working world. Accordingly, using them as experiment participants could lead to results without social desirability bias. In addition, Trotman & Tan (2011) were of the opinion that students, as naïve users, could understand general audit standards. Besides, final-year students understood supervision and budgeting concepts adequately through case studies addressed in class (Rutledge & Karim, 1999).

Operational Definition and Variable Measurement

The independent variable, budget allocation, was related to guidance for allocating the audit work hour budget, human resource allocation budget, and audit cost budget to conduct an audit procedure under the audit deadline defined. Budget allocation was manipulated into three treatments, namely specified, partial, and unspecified. Budget allocation manipulation was predicated on McDaniel (1990) and Bennett & Hatfield (2017), with some modifications to allocation types and allocation delivery criteria. Under

the condition of specified budget allocation, participants acquired information concerning valid specifications and regulations of the use of audit work hour budget allocation, auditor resource allocation, and audit cost budget to perform an audit procedure by an audit deadline. Under the condition of partial budget allocation, participants only obtained information concerning the use of auditor resource budget allocation and audit cost budget. Under the condition of unspecified budget allocation, participants only acquired information regarding the audit cost budget. Allocation of audit cost budget was included in the manipulation of unspecified budget allocation in that audit cost budget was a fundamental element of an auditing process.

The mediation variable was blood pressure. It was related to blood pressure changes from its normal condition. Blood pressure was categorized into three levels, namely high, normal, and low. Participants with high blood pressure experienced increased systolic and diastolic blood pressure. Measured before and after the assignment, the blood pressure was equal to or higher than 130/80 mmHg. Participants with normal blood pressure did not change systolic and diastolic blood pressure measured before and after the assignment. Participants with normal blood pressure were also those experiencing changes in systolic and diastolic blood pressure, either increased or decreased, measured before and after the assignment. However, the final blood pressure had to be 90/60-120/80 mmHg. Finally, participants with low blood pressure had decreased systolic and diastolic blood pressure measured before and after the assignment. Their blood pressure was 89/80 mmHg.

The dependent variable, audit quality, was measured based on assertion accuracy and answer scores based on audit risk model-related tasks. We selected an assignment related to an audit risk model since the model should be seriously understood in order to acquire effective audits and undertake all audit activities. Four components of the audit risk model risk used were acceptable audit risks, inherent risks, control risks, and planned detection risks.

Experiment Procedure

The experimental materials of this research were cases of audit risk assessment with four components of the audit risk model: acceptable audit risks, inherent risks, control risks, and planned detection risks. The experimental procedure encompassed several phases, i.e., preliminary test, main experiment, manipulation check, and demographic information. A preliminary test was carried out to observe the strength of research instrument manipulation. In this phase, we tested the research instrument on participant groups, sharing common characteristics and fields with participants in the real experiment. The main experiment was conducted using cases and assignment items of the audit risk model (ARM) with its four elements, i.e., acceptable audit risks, inherent risks, control risks, and planned detection risks. Assignment items were modified to be compatible with the research objective.

Participants were randomly assigned to manipulations to minimize the potential for error in the experiment so that each participant had an equal chance of receiving the instrument type regardless of the demographic characteristics of the participants. The manipulation check was performed to ensure that the participant understood the instrument and the scenario delivered. The manipulation check for participants

contained questions related to the assignment they did and the manipulation they acquired (Rohma & Anita, 2024). Associated with demographic information, participants provided demographic information to ensure that audit quality changes were not the product of their demographic factors. Instead, they were the product of the treatment given (Rohma, 2023).

Manipulation Check

Two questions were proposed in the manipulation check to identify participants' internalization of the given instrument. Participants were provided two options to select. The first question asked about the characteristics of budget allocation. The second inquired about participants' positions during the assignment. Participants' incorrect answers to one or two questions in the manipulation check were excluded from the subsequent data processing.

Data Analysis Technique

This research used ANOVA in hypothesis testing. ANOVA required assumptions to be fulfilled before hypotheses were tested. First, within and between subjects of the observation were independent. Second, within-group subjects were normally distributed. The normality test used One-Sample Kolmogorov-Smirnov. Residual data were normally distributed if the significance level was higher than 0.05. Third, observation variance within the data cell was homogenous (homogeneity of variance). Levene's test was carried out to identify the homogeneity of variance within the cell formed by the categorical independent variable. Data were homogenous if Levene's test resulted in a probability value of more than 0.05.

Result And Discussion

Result

This research involved 85 participants. Two participants failed to answer questions in the manipulation check, and one provided no complete demographic information. Participants proceeding to the hypothesis test were 82. As exhibited in participants' demographic information in Table 1, the youngest participant was aged 18 years old, while the oldest was aged 23. The average age of the participants was 20 years. Besides, the participants' lowest GPA was 2.80, while the highest was 3.83. Participants' average GPA was 3.40. Furthermore, participants consisted of 36 females, or 68.3%, and 26 males, or 31.7%. The demographic information multiplicity made a test of the impact of the demographic information variable on audit quality vital. The analysis results in Table 2 showed the influence of GPA on audit quality, which was $F = 1.093$, $p > 0.441$. The effect of gender on audit quality was $F = 0.145$, $p > 0.708$, and the effect of age on audit quality was $F = 0.362$, $p > 0.832$. The results in Table 3 pointed out that GPA, gender, and age had no impact on audit quality. As such, the initial assumption was that audit quality changes were not the results of participants' different information.

Table 1. Descriptive Statistic

Variables	Descriptive		
	Min	Max	Average
GPA (Grade Point Average)	2.80	3.83	3.4024
Age	18	23	20.5
Gender	n = 82, Women: 56 (68.3%); Male: 26 (31.7%)		

Source: Data Processed, 2023

Table 2. Demography Test

Variables	Mean Square	F	Sig
GPA	11.443	1.093	0.441
Age	3.793	0.362	0.832
Gender	1.518	0.145	0.708

Source: Data Processed, 2023

Table 3. Assumption Test

Test	F	Sig
Kolmogorov Smirnov	-	0.264
Levene's test	0.945	0.457

Source: Data Processed, 2023

Table 4. Hypothesis Test

Variables	Mean Square	F	Sig
Budget Allocation *	54.103	7.068	0.010
Blood Pressure**	54.899	7.172	0.001

*Blood Pressure, **Audit Quality

Source: Data Processed, 2023

This research used ANOVA, which requires an assumption test before hypothesis one. The results of the residual normality test in Table 3 suggested a $p > 0.264$. It demonstrated no residual normality issue. The homogeneity of variance test using Levene's test in Table 3 exhibited $F = 0.945$, $p > 0.457$. It implied no homogeneity problem. Hence, assumption test requirements had been met, yielding a preliminary assumption that data used in the hypothesis testing had fulfilled the criteria of best linear unbiased estimation. In so doing, hypothesis testing was permitted. Table 4 indicates hypothesis testing results. Hypothesis 1 predicted that budget allocation level was related to changes in blood pressure levels. As pointed out in Table 4, budget allocation levels affected

changes in individual blood pressure at $F = 7.068$, $p < 0.010$. That being so, Hypothesis 1 was supported. Hypothesis 2 predicted that changes in blood pressure levels impacted audit quality. The results presented the influence of blood pressure changes on audit quality at $F = 7.172$, $p < 0.033$, thereby supporting Hypothesis 2.

Using Baron & Kenny's (1986) technique, we estimated three regression equations to test the mediation effect. In Equation 1, the dependent variable (audit quality) was analyzed using the independent one (budget allocation). In Equation 2, the mediation variable (blood pressure) was analyzed using the independent one (budget allocation). In equation 3, the dependent variable (audit quality) was analyzed using the independent (budget allocation) and mediation ones (blood pressure). The results, presented in Table 5 and Figure 1, showed the effect of budget allocation on audit quality at $F = 7.638$, $p < 0.036$. Equation 2 suggested the impact of budget allocation on blood pressure at $F = 7.155$, $p > 0.033$. Equation 3 resulted in significant values, namely $F = 6.165$, $p < 0.002$ (using budget allocation) and $F = 5.508$, $p < 0.001$ (using blood pressure). The results demonstrated significance and no declined influence of blood pressure. It, therefore, indicated a partial mediation effect. Figure 1 exhibits the partial mediation effect of blood pressure. The results reinforced the results of the H1 and H2 analyses.

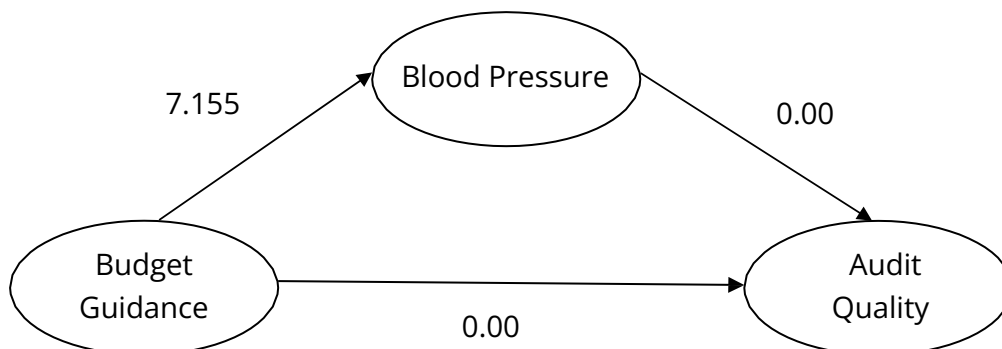
Table 5. Mediation Effect

Variables	F	Sig
Equation 1		
Budget Allocation	7.638	0.036
Equation 2		
Budget Guidance	7.155	0.033
Equation 3		
Budget Guidance	6.165	0.002
Blood Pressure	5.508	0.001

Dependent variable: 1) Quality audit, 2) Blood Pressure, 3) Quality Audit

*Source: Data Processed, 2023

Figure 1. Result of Mediation Test



*Source: Data Processed, 2023

Discussion

Hypothesis 1 predicted that budget allocation influenced changes in individual blood pressure. The results substantiated that budget allocation was related to changes in blood pressure levels. It conformed with the construal-level perspective of Trope & Liberman (2010), proposing that excessive reliance on structured guidance might foster individuals to focus on complying with applicable procedures and provisions, affecting performance. It was also in correspondence with Bennet & Hatfield (2017), Audsabumrungrat et al. (2015), Kingori (2016), and Wheeler & Arunachalam (2008), all positing that decreased performance quality was triggered by pressure auditors perceived as a scope limited by formal guidance would put them in a high-stress condition as a result of working under pressure (Chen et al., 2006). Research development testified that work stress might decline audit quality (Robinsso & Bennet, 1995; Boyd et al., 2009; Noor, 2011).

Auditors' work stress during an auditing process was influenced by some factors, one of which was allocation pressure (Otley & Pierce, 1996; Lau & Buckland, 2001). The cost budget in the audit process posed high pressure. It bred a condition where auditors found it difficult to detect fraud risks inflicting low audit quality (Verwey & Asare, 2016; Christensen et al., 2016). Besides, pressure from auditing professions might bring physiological health issues, e.g., headaches and acute pain (Al Shbail et al., 2018). The health issues were triggered by blood pressure changes from its normal position. Blood pressure changes of auditors could be caused by work stress because of the perceived pressure from the audit profession (Kingori, 2016). It was in keeping with our results indicating that budget allocation triggered auditors due to formal regulations. It gave auditors pressure, inflecting their physiological conditions.

Hypothesis 2 predicted that changes in blood pressure levels influenced audit quality. The results showed the effect of blood pressure changes on audit quality. Auditors would undergo a high-stress condition when working under pressure (Chen et al., 2006). Stress has adverse effects on the productivity, effectiveness, and personal health of individuals. Stress in organizations impacts the performance generated in terms of creativity and discipline. Gaertner & John (1981) remarked that effectiveness and efficiency losses due to stress gave off benefits in the US by almost \$150 billion per year.

It was in line with Forte et al. (2020), stating that blood pressure changes increased vascular disease risks that might lead to an individual cognitive decline. It was also in reasonable agreement with Alsumali et al. (2016), suggesting that diastolic blood pressure above a certain threshold could be related to a decrease in neuropsychological test performance. Blood pressure changes from their normal level suggest an unstable oxygen supply to brains, affecting the cognitive abilities and performance of individuals. Individuals with blood pressure changes would have declined verbal and non-verbal memories, attention, perceptuomotor speed, visual motor scanning, mental flexibility, letter and category fluency, and word finding.

Audit quality was indicated by strong ambiguity, making it almost unobservable, definite, and measurable (Causholli & Knechel, 2012). Parasuraman et al. (1985) argued that customers assessed audit service quality overall based on five general dimensions: tangibility, reliability, responsiveness, insurance, and empathy. In the professional service sector, audit services call for carefulness and cautiousness in the audit process.

Blood pressure changes that declined words, and verbal and non-verbal memories would impact auditors' carefulness and cautiousness. Assertion accuracy and response scores to the audit risk model would decline. In other words, auditors' cognitive decline would likely decrease the audit quality result. Audit quality decline would allay auditors' competencies, resulting in material mis-presentation in financial reports and an independence loss. Auditors would report that the mis-presentation emanated from their roles in de-escalating the cost concerned (Ghebremichael, 2018).

Further analysis showed blood pressure partially mediated the influence of budget allocation and audit quality. Blood pressure changes of individuals due to budget allocation might diminish audit quality. Individuals with high pressure due to work scope constraints would likely have cardiovascular issues, such as blood pressure changes lessening their cognitive capabilities. It kept pace with Al Shbail et al. (2018), conveying that pressures from audit professions might trigger physiological health problems, e.g., headaches and acute pain due to blood pressure changes.

From a construal-level perspective, blood pressure changes from its normal level might reduce cognitive abilities, as indicated by declines in verbal and non-verbal memories and mental flexibility. The probability of material mis-presentation would increase in tandem with the declined cognitive condition of auditors. It would influence audit quality. Blood pressure served as one of the informal control systems within individuals' bodies related to an auditing process. The relationship between physiological and psychological aspects influenced audit quality.

Conclusion

This research probed and attested that blood pressure partially mediated the relationship between budget allocation and audit quality. From a construal level perspective, formal regulation structures might trigger and physiologically affect blood pressure changes from their normal level. Blood pressure changes from their normal level suggest an unstable oxygen supply to brains, impacting the cognitive abilities and performance of individuals. The results demonstrated that structured guidance under a deadline condition might reduce construal levels, yielding psychological and physiological pressure conditions. Nevertheless, this research possessed some limitations.

To begin with, this research did not specifically consider hematological factors and health history issues of blood pressure as individuals' congenital diseases. Furthermore, this research only filtered and ensured using question items that participants consumed no medicine 24 hours before the experiment. Participants' dishonesty might breed inaccurate blood pressure measurements due to the effect of the medicine consumed. Finally, this research did not specifically take into account the different risk preference levels of individuals. Different risk preferences would have a different effect under specific pressure conditions. Accordingly, researchers can take into consideration different risk preference levels between individuals. In addition, they are suggested to make sure specifications, such as the impact on materiality assessment quality and others.

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