Radboud Universiteit Nijmegen

Master Thesis

Surveillance at Work? Exploring the impact of Algorithmic Monitoring on Autonomy and Job Satisfaction

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Abstract

This study investigated the relationship between Algorithmic Monitoring (AM) and job satisfaction, through the mediating effects of method autonomy, decision-making autonomy and timing autonomy. Drawing on existing theory on job design, autonomy is examined as a multidimensional construct, meaning that method autonomy, decision-making autonomy and timing autonomy were discussed and analyzed separately. To empirically test the hypotheses, a survey was conducted, using scales that were validated in existing research. A total of 91 respondents participated in the survey. These respondents were partially recruited from the researcher's social network and partially from an organization in which AM was integrated. The results of this survey were analyzed through a parallel mediation model. The findings showed that while AM significantly reduced each dimension of autonomy, only decision-making autonomy was positively related to job satisfaction. Furthermore, this was the only dimension of autonomy that significantly mediated the relationship between AM and job satisfaction. As no direct effect between AM and job satisfaction was established, the findings of this study suggest that the influence of AM on job satisfaction is only present when the mediating factor of decision-making autonomy is present. This highlights the need for future research to examine under what conditions AM impacts job satisfaction.

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1. Introduction

The rise of smart technologies, defined as interconnected, intelligent digital systems that can autonomously interact with their environment (Lu, 2017), has significantly changed the nature of work. As organizations increasingly implement digital systems, concerns grow about how these technologies affect the employee experience at work.

A notable example of these smart technologies is Algorithmic Monitoring (AM), which is defined as a way in which organizations use algorithmic systems to collect and report data on employees' actions, their work and the way that employees behave (Backhaus, 2019).

While AM is associated with increased efficiency, its effect on employee well-being remains unexplored. This makes AM a particularly relevant focus for this study, as research increasingly raises concerns about how AM may reduce key job characteristics such as autonomy, with downstream effects on job satisfaction (Parker & Grote, 2022). These concerns are especially important in the context of industry 5.0, which promotes a more human-centric implementation of technology in the workplace (Xu et al., 2021).

This study focuses on how AM affects autonomy and job satisfaction, which are key indicators of employee well-being (Hackman & Oldham, 1976).

1.1 Problem definition

While smart technologies offer opportunities to enhance efficiency and empower employees, their impact on the quality of jobs and worker satisfaction is still rather underexplored (Berkers et al., 2023). The rapid integration of advanced technologies has brought significant changes to job design, as it has led to increased automated decision-making, standardized workflows and has introduced continuous digital monitoring (Gerten et al., 2019). However, these developments may lead to a reduction in employees' control over how and when to do their work, which could ultimately lead to decreased autonomy, which is concerning since autonomy is closely linked to job satisfaction (Hackman & Oldham, 1976).

One specific and common form of digital monitoring is Algorithmic Monitoring (AM). AM systems are often implemented with the goal of enhancing efficiency and performance by collecting and analyzing real-time data on employee behavior and output (Parent-Rocheleau et al., 2022).

However, research increasingly raises concerns on whether AM systems could potentially impose unintended consequences for employee well-being, particularly in relation to autonomy, motivation, and trust (Möhlmann et al., 2021; Meijerink & Bondarouk, 2021).

As AM becomes more integrated in organizational routines, concerns are mounting about its potential to undermine human-centric job characteristics, such as perceived job control (Schlund & Zitek, 2024).

Research by Parker and Grote (2022) has shown that Algorithmic Management systems, of which AM is a part (Parent-Rocheleau et al., 2022), can potentially undermine autonomy. These systems often impose constant monitoring, which according to Parker and Grote (2022) leads to decreased control over how work is done. However, their research makes the important notion that AM systems could have very different effects when a human centric approach to technology implementation is adopted (Parker & Grote, 2022). For example, considering employee input and implementing human oversight could limit the negative effects. Research by Parker and Grote (2022) shows that this is likely due to employees retaining a sense of control.

Given these concerns on potential negative effects, this study focuses specifically on Algorithmic Monitoring (AM), as it represents a growing form of workplace surveillance that may influence key job characteristics. Research suggests that when AM is not implemented with a human-centric design approach, it could negatively affect employee autonomy, which is a core element of job design that is strongly associated with job satisfaction (Parker & Grote, 2022; Hackman & Oldham, 1976).

This focus aligns with broader concerns in recent research about the implementation of smart technologies. For instance, Berkers et al. (2023) argue that organizations often adopt such technologies without fully considering their potential effects on job quality. Similarly, Passalacqua (2024) argues that organizations often prioritize system functionality over human experience. Reiman et al. (2023) further emphasize the need to evaluate smart technologies in more human-centric ways, particularly regarding outcomes like autonomy and job satisfaction.

In this context, AM serves as a clear and pressing example of these broader challenges, making it a fitting focus for examining how technology implementation can reshape core job characteristics. Yet, despite growing academic interest, the specific effects of AM on human-centric job characteristics remain underexplored. In particular, additional research is needed to understand how AM affects employee autonomy and job satisfaction. Addressing these outcomes is key in ensuring that AM supports, rather than undermines human needs (Reiman et al., 2023).

Although prior research has shown that AM can negatively impact autonomy and job satisfaction (Laitinen & Sahlgren, 2021), several important gaps remain. First, many studies conceptualize autonomy as a single construct, which limits insight into how different forms of autonomy are uniquely affected by AM and how they affect job satisfaction. Second, autonomy is often studied as a job outcome, rather than as a mediating mechanism through which AM influences indicators of employee well-being, such as job satisfaction. These limitations point to the need for more nuanced, targeted research.

1.2 Research Objectives

To address these gaps, this study examines how AM affects job satisfaction, by testing the mediating role of the following three dimensions of autonomy: method autonomy, decision-making autonomy and timing autonomy (Parker & Knight, 2024). By analyzing the three dimensions of autonomy separately, this study aims to provide a more nuanced understanding of how AM shapes different forms of autonomy and, in turn, affects job satisfaction, which is a key outcome strongly linked to autonomy (Hackman & Oldham, 1976).

This study specifically focuses on autonomy as it is a central element of job design (Parker & Knight, 2024) and is strongly associated with job satisfaction (Hackman & Oldham, 1976). Autonomy refers to the extent to which employees have control over how they perform their tasks, the decisions they can make and when to perform their tasks (Parker & Knight, 2024).

Another reason for the focus on autonomy is that recent research has raised concerns about the potential of algorithmic management systems, including AM, to reduce employees' autonomy (Parker & Grote, 2022), making it a particularly relevant construct to investigate.

By examining the relationship between AM and autonomous work characteristics, this study aims to identify key factors that contribute to or hinder job satisfaction in work environments where AM is implemented. Focusing on job satisfaction is particularly important because it reflects how employees experience the impact of changing job characteristics like autonomy, which is a key element of job design (Parker & Knight, 2024). Since AM potentially limits employees' ability to decide how, when, and in what way they perform their tasks, job satisfaction serves as a key indicator that captures whether these changes are perceived as supportive or constraining.

Therefore, the three dimensions of autonomy are not just job characteristics of interest, but also possible mediating mechanisms through which AM may influence job satisfaction.

Building on the SMART model of job design (Parker & Knight, 2024), this study examines method autonomy, decision-making autonomy and timing autonomy separately, allowing for a more detailed analysis of how AM could interfere with different forms of autonomy. By doing so, this study responds to calls for more empirically grounded research into the implications of smart technologies, such as AM (Parker & Grote, 2022).

This study conducts a quantitative survey to address its main objective: to explore the relationship between AM and job satisfaction through the potential mediating effects of method autonomy, decision-making autonomy and timing autonomy. The preliminary research question that arises from this research objective is the following:

How do different dimensions of autonomy mediate the relationship between algorithmic monitoring and job satisfaction?

1.3 Contributions to theory and practice

Theoretical contributions

This research offers a theoretical contribution by addressing a gap in current literature: while usage of AM is growing, limited empirical research exists on how AM affects human-centric job characteristic (specifically autonomy and its effects on job satisfaction).
While most existing studies have focused on operational efficiency of AM, such as optimized workflows or increased productivity (Backhaus, 2019; Parent-Rocheleau et al., 2022), little is known about how AM systems may affect the employee experience. This lack of focus and knowledge on the potential negative effects on the employee experience is problematic as it limits human-centric approaches to the implementation of AM systems.

To address this gap, this study builds on the SMART model of job design (Parker & Knight, 2024), which conceptualizes autonomy through method autonomy, decision-making autonomy and timing autonomy. By treating these dimensions as distinct, this study moves beyond prior research that regularly conceptualizes autonomy as a single, unified construct. This allows for a more nuanced exploration of how specific dimensions of autonomy may be uniquely influenced by AM.

This study contributes to theory by proposing that different dimensions of autonomy may operate as distinct mediators in the relationship between AM and job satisfaction. This perspective provides conceptual nuance to how autonomy is theorized in technology-driven, human-centric work environments.

Practical contribution

In addition to theoretical contributions, this research also contributes to practice by providing data-driven insights for organizations that seek to implement AM systems. Specifically, it provides empirical evidence on how AM can potentially affect employees' autonomy in a negative way, which may lead to lower job satisfaction. The findings of this study are relevant for team managers, HR professionals and technology implementers, as autonomy is identified as an essential design consideration when introducing AM systems. The study explores the importance of preserving different forms of autonomy in work environments in which AM systems are implemented, by proposing possible interventions.

1.4 Outline of the thesis

This thesis has the following outline: chapter 2 consists of the theoretical framework. This entails a review of existing literature on AM, autonomy and job satisfaction. Chapter 3 presents the research methodology. In this chapter the design of the research is described, to create insight into how data is collected and analyzed. Chapter 4 presents the main findings of the research and provides an analysis. Chapter 5 gives insight into the main conclusion of the research and contains a discussion.

2. Theoretical framework

This chapter will provide insight into existing literature that is relevant for this study. It lays a theoretical foundation towards understanding the relationship between AM and job satisfaction. The theoretical framework will discuss each of the relevant variables. Additionally, the hypotheses of the research will be stated in this chapter.

2.1 Algorithmic Monitoring

AM refers to a way in which organizations use algorithmic systems to collect and report data on employees' actions, their work and employee behavior (Backhaus, 2019). AM assists with automated decision-making systems, which are systems that are used to assist or make decisions on behalf of human beings (Dowding & Taylor, 2024) and to process complex and heterogeneous data (Parent-Rocheleau & Parker, 2022). While this can be beneficial, it is important to understand the potential implications of AM beyond its technical functionality. To do so, AM is examined through the lens of existing literature on workplace surveillance.

Surveillance practices in organizations have historically been tied to control, discipline, and productivity. These are themes that are explored in research by Foucault (1977). In this research, the concept of the panopticon is discussed as a metaphor for modern surveillance. This metaphor stems from a prison design in which inmates could never know if they were being watched, leading to them regulating their own behavior as if they are constantly being watched. Foucault (1977) argues that the uncertainty of whether people are being watched leads to internalized discipline, which entails that people are likely to change their behavior. Not because they are constantly being watched, but because they believe they might be.

This concept is particularly relevant in the context of AM, as it demonstrates how monitoring shapes not only external behavior but also internal attitudes by forming a sense of self-regulation and internal discipline. Moore and Hayes (2017) argue that employees may begin to monitor themselves and modify their own goals based on managerial expectations, simply due to the perceived possibility that they are being monitored. This demonstrates how Foucault's concept of the panopticon can exert influence, even when actual monitoring is absent.

Building on this, various researchers have applied the panopticon concept to analyze technological monitoring in the workplace, especially in call centers and digital environments (Ball, 2010; Sewell & Wilkinson, 1992). These studies emphasize how even traditional forms

of monitoring, such as performance dashboards, can significantly affect autonomy, trust, and job satisfaction. This occurs because constant visibility into performance metrics can lead to pressure to conform to managerial expectations and fosters a sense of being judged or distrusted, even in the absence of feedback or interventions.

AM can be viewed as a modern form of the panopticon. The monitoring is more detailed, happens more frequently and is often less clear to employees (Manokha, 2020). It strengthens the feeling of being watched, because it is done automatically by systems that constantly collect and evaluate data. This can lead to employees feeling more pressure, as they know their actions are being continuously monitored (Newlands, 2021).

In this light, AM is not merely a new tool, but a continuation of long existing trends in managerial control through surveillance. Understanding this helps place the impacts of AM within larger theories and gives a deeper look at how it might affect autonomy and job satisfaction.

2.2 Job satisfaction

2.2.1 The importance of job satisfaction.

Job satisfaction is defined as the extent to which an employee experiences their job as favorable or not (Meier et al., 2015). Job satisfaction is of high essence, as it reflects on the employee as well as on the organization. This is due to several factors. Firstly, from the employer's perspective, high job satisfaction is beneficial because it stimulates creativity, increases productivity and aids with the ability to resolve issues (Rana & Singh, 2024). This view that job satisfaction is essential is supported by organizational research. For instance, Judge et al. (2001) in a meta-analysis on 312 studies, found a consistent positive relationship between job satisfaction and job performance.

Foundational models, such as the Job Characteristics Model (Hackman & Oldham, 1976), view job satisfaction as an outcome that arises when jobs are designed to include core job characteristics, such as autonomy and task variety. According to this model, key job characteristics enhance important psychological states, such as meaningfulness and responsibility, which ultimately predict higher job satisfaction (Hackman & Oldham, 1976). Within these characteristics, autonomy is considered influential, as it creates a sense of control and responsibility for work outcomes.

2.2.2 Job Satisfaction as a relevant outcome

Job satisfaction is widely recognized as a core outcome in job design theory and organizational psychology because it reflects how employees evaluate their work and influences retention, performance, and engagement (Judge et al., 2001; Locke, 1976). As organizations more often adopt AM systems (Parent-Rocheleau & Parker, 2022), it becomes increasingly important to understand how these systems affect job satisfaction. This is especially relevant because AM may undermine core job characteristics, such as autonomy (Parker & Grote, 2022), which is closely linked to job satisfaction (Hackman & Oldham, 1976). This aligns with the key concepts of the SMART model (Parker & Knight, 2024), which identifies autonomous job characteristics as essential in contributing to employee well-being and job satisfaction.

Together with the Job Characteristics Model, the SMART model demonstrates that job satisfaction is deeply embedded in job design theory, making it a theoretically grounded and appropriate outcome for evaluating whether AM supports or undermines principles of human-centric job design .

2.2.3 The impact of AM on job satisfaction

A growing concern in research is AM's potential to negatively affect job satisfaction. While AM can provide benefits, such as increased efficiency (Parent-Rocheleau & Parker, 2022), it could potentially also undermine essential job characteristics that support job satisfaction.

Continuous algorithmic oversight can be perceived as intrusive or dehumanizing, potentially reducing employees' perceived fairness, trust, and recognition (Newlands, 2021). When performance evaluations rely on AM systems, the lack of human input and transparency could reduce employees' overall experience of value and trust within the organization, which are mechanisms that have been shown to lead to reduced job satisfaction (Colquitt et al., 2001).

Siegel et al. (2022) conducted a meta-analysis of 70 independent studies on electronic monitoring systems, including AM. Their findings revealed that continuous monitoring and the absence of human oversight may contribute to feelings of stress and reduced motivation (Siegel et al., 2022). Furthermore, their findings show that the use of AM is associated with a slight but statistically significant decrease in job satisfaction. Although the effect may initially appear small, Siegel at al. (2022) emphasize that daily exposure to AM is likely to compound this dissatisfaction over time.

Taken together, these findings indicate a consistent pattern in which AM potentially erodes the employee experience, resulting in reduced job satisfaction. Therefore, the following hypothesis is proposed:

H1: *Algorithmic Monitoring (AM) is negatively related to employee job satisfaction.*

2.3 Autonomy

Autonomy refers to the extent to which employees have the ability to choose their own way of working and have the freedom to make decisions and choose when to execute their tasks (Parker & Knight, 2024). This definition reflects autonomy as a feature of the job, rather than a psychological feeling or internal state. According to Parker and Knight (2024), autonomy comprises multiple dimensions: method autonomy, decision-making autonomy and scheduling autonomy (Parker & Knight, 2024).

High levels of autonomy have shown to be beneficial for the employees within the workplace, as well as the organization. Research shows that organizations in which employees experience high levels of autonomy, it is likely to result in higher levels of performance, as well as overall job satisfaction. This is shown in research by Gajendran and Harrison (2007), who in their meta-analysis on telecommuting found that autonomy partially mediated the positive effects on job satisfaction. Lopes et al. (2014) even observed lower levels of autonomy to be, together with increasing work pressure accountable for the majority of decrease in job satisfaction. This stresses the importance of autonomy in relation to job satisfaction, which indicates that the level of autonomy of employees is likely to be positively related to employee satisfaction.

When it comes to the relationship between autonomy and AM, valuable research has been done by Parent-Rocheleau et al. (2024). The research was of quantitative nature and measured the construct of AM through a set of four items. Their findings indicate that there is a negative relationship between AM and employees´ level of autonomy (Parent-Rocheleau et al, 2024). This claim is supported by research of Schlund and Zitek (2024). Their findings show that algorithmic surveillance, which they define in line with AM (Schlund & Zitek, 2024), reduces autonomy.

This reduced perception of autonomy stems from employees feeling as though they need to behave in a certain way to gain rewards and/or avoid punishment, when being monitored. This pressure could lead to changes in their attitudes and behavior as they might feel that they do not have the freedom to choose how to behave (Schlund & Zitek, 2024).

However, important to note is that the degree to which AM affects autonomy, may depend on what aspects of work are being monitored, how AM is implemented an what is expected. For example, according to Schlund & Zitek (2024), AM is more likely to decrease autonomy when it is of evaluative nature than when it is of developmental nature. Although this research dos not empirically test how the nature of AM affects autonomy, recognizing it is important for the interpretation of results and establishing recommendations for future research.

Despite these nuances, if autonomy is reduced due to AM, it is likely to negatively impact job satisfaction. According to Hackman & Oldham (1976), autonomy is seen as a defining feature of jobs and is associated to job satisfaction, meaning that the higher the level of autonomy, the better the overall job satisfaction (Oldham & Hackman, 2010). These theoretical insights suggest that autonomy could play a significant role in how employees experience AM.

In this study, autonomy is not treated as a singular, unidimensional construct. Instead, autonomy is operationalized through three distinct dimensions: method autonomy, decision-making autonomy, and timing autonomy (Parker & Knight, 2024). Each of these dimensions is analyzed separately to capture a more profound understanding of how AM affects each dimension and how these in turn relate to job satisfaction.

2.3.1. Method autonomy

Method autonomy refers to the extent to which employees feel like they have the freedom to apply their own way of working (Parker & Knight, 2024). In environments in which AM is used, method autonomy may be significantly restricted by limiting the flexibility in how tasks can be executed.

Rather than allowing employees to form their own methods towards executing the tasks, AM systems often stimulate a uniform way of working by imposing pre-approved methods of task completion (Parent-Rocheleau et al., 2024). As a result employees may feel obligated to follow these predefined procedures, rather than create their own methods on how to work on the tasks at hand, even when they have a different preference on what methods to use. From a job design perspective, this undermines a key element of method autonomy: the ability to use their own judgement and skills to fulfill tasks. As this key element of method autonomy is undermined, it is likely that it will result in decreased method autonomy.

The potential constraint that AM may have on method autonomy is further reinforced by Schlund and Zitek, (2024). Their findings showed that AM can have negative impact on method autonomy by making employees feel like they are constantly being monitored. This dynamic aligns with the panopticon concept (Foucault, 1977), which suggests that employees will regulate themselves due to the perception of constant surveillance. As a result, employees may feel compelled to conform to predefined methods, reducing their method autonomy, as they are limited in choosing their own way of working (Schlund & Zitek, 2024). Taken together, these insights suggest that there is likely a negative relationship between AM and method autonomy, which results in the following proposed hypothesis:

H2: *Algorithmic Monitoring (AM) is negatively related to method autonomy.*

Breaugh (1985) argues that method autonomy is particularly effective in increasing job satisfaction as it allows employees to align work processes with personal strengths and preferences. This can lead to an increased sense of competence and intrinsic motivation, because employees feel more effective and in control over their work.

Empirical research by Morgeson & Humphrey (2006) has further confirmed the link between method autonomy and job satisfaction. According to the insights from this research, increased method autonomy is associated with higher employee engagement and job satisfaction (Morgeson & Humphrey, 2006). This is partially explained by the fact that method autonomy contributes to increased responsibility for work outcomes. When employees feel ownership over how to execute their tasks, they are more likely to perceive their work as satisfying.

Collectively, these theoretical insights and findings from empirical studies suggest that increased method autonomy is likely to lead to higher levels of job satisfaction. Therefore, the following hypothesis is proposed:

H3: *Method autonomy is positively related to job satisfaction.*

2.3.2. Decision-making autonomy

Decision-making autonomy refers to the extent to which employees can influence decisions to their work goals and priorities (Parker & Knight, 2024). Given the importance of decision-making autonomy, concerns are rising regarding AM's impact on decision-making autonomy. This is due to the likelihood that when there is an AM system is implemented within an organization, they regularly impose predefined productivity thresholds and performance targets that employees have to meet (Schlund & Zitek, 2024). As a result, employees may feel limited in their ability to make their own decisions on which goals to prioritize or how to respond unforeseen situations, as these decisions are increasingly formed by the expectations of AM systems (Parker & Grote, 2022).

Beyond imposed targets, AM may also reduce flexibility in how decisions can be made. Within job design theory, decision-making autonomy also relies on the degree of variation and adaptability that comes with the job (Hackman & Oldham, 1976). AM systems often standardize procedures and workflows in such a manner, that little room remains for employees to change their decision-making based on situational factors (Parent-Rocheleau, 2024).

This could result in the job becoming so tightly defined that the ability to make impactful decisions is largely eliminated. This task standardization in which employees have to follow predefined processes, rather than having the ability to choose themselves, may restrict decision-making autonomy (Parent-Rocheleau et al., 2024). Consequently, employees may feel like their role is solely to execute instructions, rather than engage in active decision-making. This suggests that AM may limit the extent to which employees can exercise decision-making autonomy. Therefore, the following hypothesis is proposed:

H4: *Algorithmic Monitoring (AM) is negatively related to decision-making autonomy.*

Importantly, empirical research has also shown that decision-making autonomy is likely to be positively related to job satisfaction, due to earlier discussed ownership, but also through increased sense of responsibility that results from it (Spector, 1986). Additionally, when employees are trusted to make important decisions within their job, it results in them having a greater sense of responsibility for work outcomes. This is shown to positively affect the perceived meaningfulness of their work, which ultimately leads to job satisfaction (Hackman & Oldham, 1976).

Moreover, decision-making autonomy may reduce role ambiguity and work-related stress by allowing employees to structure their own tasks and make decisions without the need for constant external input (Morgeson & Humphrey, 2006). This control over work processes can lead to a more stable and more manageable work experience, which in turn is positively associated with job satisfaction (Morgeson & Humphrey, 2006). Therefore, the following hypothesis is proposed:

H5: *Decision-making autonomy is positively related to job satisfaction.*

2.3.3. Timing autonomy

Timing autonomy is the extent to which employees feel like they have the freedom to choose when they can make particular decisions (Parker & Knight, 2024). It enables employees to arrange their workdays in a way that aligns with their energy levels, task complexity and personal rhythms (Thompson & Prottas, 2006).

In work environments where AM is implemented, timing autonomy is increasingly constrained. This is likely because AM systems often impose strict working schedules and track real-time performance (Wood et al., 2019). This could mean that employees may be expected to fulfil their tasks within a time frame that is defined by the AM system. Even when strict timing is not explicitly enforced, the possibility of constantly being monitored can change employees' natural work pace (Wood et al., 2019).

This aligns with the logic of Foucault's concept of the panopticon (1977), as employees become aware that they can be monitored at any time, which according to the concept of the panopticon is likely to result in them self-regulating (Foucault, 1977). In environments in which AM is used, this could lead to employees changing their timing behavior because they feel as if they are being observed constantly. Ultimately, this leads to limited timing autonomy, as they will not feel as though they have control over the timing of their work. Therefore, it is hypothesized that:

H6: *Algorithmic Monitoring (AM) is negatively related to timing autonomy.*

While AM may restrict timing autonomy, this dimension of autonomy plays a critical role in supporting employee well-being and job satisfaction, as timing autonomy contributes to employees being able to structure their working days according to their own productivity pace. This has been shown to lead to an increased well-being and increased job satisfaction (Thompson & Prottas, 2006). Timing autonomy furthermore supports self-regulation and helps individuals manage their workload in a way that leads to reduced stress and overload.

This is supported by the research of Fenwick and Tausig (2001), which implies that employees' control over their working schedules reduces job strain and leads to higher job satisfaction. This is particularly true for employees who have high interest in balancing job demands and personal demands (Fenwick & Tausig, 2001). When employees can decide when to execute certain tasks, they become more able to avoid time pressure, which supports a more sustainable work experience.

From a job design perspective, timing autonomy is considered a resource that can increase perceived control and supports feelings of competence, both of which are strongly associated with job satisfaction (Morgeson & Humphrey, 2006). Following these insights, it is hypothesized that:

H7: *Timing autonomy is positively related to employee satisfaction.*

2.3.4 Mediating role of autonomy

As shown in previous sections, autonomy plays a central role in job design theory and is a consistent predictor of job satisfaction (Hackman & Oldham, 1976). AM may undermine this autonomy by imposing standardized procedures, continuous tracking, and limitation of employees' discretion in how, when, and what decisions to make (Parent-Rocheleau et al., 2024; Parker & Grote, 2022). These constraints may reduce employees' sense of control and ownership, which are essential for maintaining satisfaction in their work (Hackman & Oldham, 1976).

To better understand how AM may reduce job satisfaction through its impact on autonomy, this study treats autonomy as a multidimensional construct, consisting of method autonomy, decision-making autonomy, and timing autonomy (Parker & Knight, 2024). Each of these dimensions has previously been linked to job satisfaction and may be differently affected by AM.

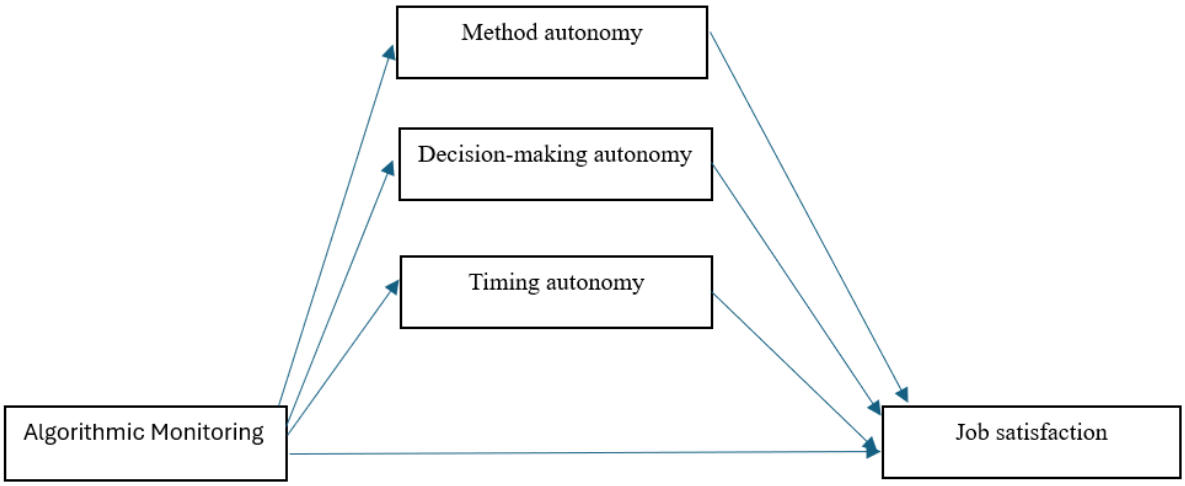
By analyzing these subdimensions separately, this study provides a more nuanced understanding of how AM may influence job satisfaction not only directly, but potentially also through the reduction of the different dimensions of autonomy. Drawing on these insights and the preceding sections that outline how AM may reduce each autonomy dimension, and how these reductions in turn affect job satisfaction, the following mediation hypotheses are proposed:

H8a: *The relationship between Algorithmic Monitoring (AM) and job satisfaction is mediated by method autonomy.*
H8b: *The relationship between Algorithmic Monitoring (AM) and job satisfaction is mediated by decision-making autonomy.*
H8c: *The relationship between Algorithmic Monitoring (AM) and job satisfaction is mediated by timing autonomy.*

2.4 Conceptual model

The conceptual model, that is visualized in figure 1, explains the variables that are being researched. The main hypothesis that can be derived from this conceptual model is that AM is negatively related to job satisfaction, under the mediating effects of method autonomy, decision-making autonomy and timing autonomy.

Figure 1
Conceptual model



3. Methodology

The methodology chapter explains how the research was conducted and thus explain how this research aimed to explain the relationship between AM, the three dimensions of autonomy, and job satisfaction. This is done through a description of the research design, the data collection methodology, the measurement of variables and the data analysis strategy.

3.1 Research design

To examine how AM affects job satisfaction, through the mediating effects of the three dimensions of autonomy, this study required a research design capable of testing indirect effects and statistical relationships between the variables. Since the objective of the study was to test hypotheses about statistical relationships and mediation, a quantitative research was most appropriate. This research method allows for structured data collection using empirically validated scales, which ensured consistent and reliable measurement across respondents within the data set.

The use of empirically validated scales was especially important as it increases construct validity (Boateng et al., 2018), meaning that the items within the survey accurately reflect the constructs that are studied: AM, method autonomy, decision-making autonomy, timing autonomy and job satisfaction. This ultimately increased credibility of the findings, which leads to reduced measurement bias (Lim, 2024).

The quantitative approach enabled the use of mediation analysis to examine both direct and indirect relationships, which was essential for testing the strength and direction of hypothesized relationship. Furthermore, by collecting structured and numerical data, the study could identify patterns across respondents that could be generalized towards a more broad population, enhancing external validity (Findley et al., 2021).

This research adopted a positivist epistemology, as it aligns with the aim of objectively examining the relationships between AM, the three dimensions of autonomy and job satisfaction. This perspective guided the use of validated survey instruments, the operationalization of the construct into quantifiable variables and usage of statistical techniques to test the hypotheses (Walker, 2005). This epistemological stance is consistent with previous research in the field of AM (e.g., Parent-Rocheleau & Parker, 2022; Schlund & Zitek, 2024), which leads to improved methodological consistency and allows for comparison with existing studies.

3.2 Data collection method

3.2.1 Sampling strategy

For this research, data was collected using two sources: an organization that has AM integrated into its job design and the personal network of the researcher. A sample size of 100 respondents was targeted. This choice was made due to the fact that mediation models, such as the one in this research, require a minimum sample size of 100 (Boomsma, 1982).

A convenience sampling strategy was used for this survey. This is a sampling strategy where participants are selected based on their accessibility (Jager et al., 2017). It helps with obtaining a large sample size and has the advantages of being efficient and easy to implement, making it suitable for this research, as feasibility is prioritized (Jager et al., 2017).

In order to find sufficient respondents, the researcher used social media platforms, such as LinkedIn and Instagram in order to obtain the desired response rate from people that are currently working. This means that a link of the survey was created and through this link, respondents could fill out the survey.

Furthermore, the second portion of the data was collected within an organization. The survey was shared with colleagues via internal communication channels, and responses were gathered anonymously. This organization was used to gather data as it was known to have AM integrated into its job design. In this way, it was ensured that a substantial portion of respondents experience AM at their work.

Including both respondents from the general working population and those from an organization with AM practices, enhanced the study's external validity, as it increased generalizability towards a larger population (Findley et al., 2021). At the same time it ensured that the core phenomenon, AM in job design, is well represented. This approach allows for a broader understanding of how AM influences job satisfaction across different organizational contexts.

3.2.2 Survey design

The survey was of such nature that the employees remained in complete anonymity. This anonymity contributes towards ethical considerations, as well as with the reliability of the research because of respondents feeling more free to express their opinions (Murdoch et al., 2014).

The construction of the research survey had the aim to obtain relevant insights into:

- The extent to which AM is present within organizations;
- Resulting effects of AM into work design on the different dimensions of autonomy;
- Resulting effects of the dimensions of autonomy in regards to employee satisfaction;
- Whether the dimensions of autonomy mediate the relationship between AM and job satisfaction.

The desired insights were obtained through a 7-point Likert scale. This 7-point Likert scale was applied, instead of the regular 5-point scale, as it allows for more answering options. This is important, because it increases the likelihood of finding the actual view of these employees, which results in increased reliability (Joshi et al., 2015).

The survey itself was constructed in Qualtrics, which is a tool that helps with the assembly and conduction of surveys. This system was used as data can directly be exported to SPSS, which is the system that provided the statistics that were used in the analysis.

To comply with the General Data Protection Regulation (GDPR), the survey was designed in a way that ensures anonymity and voluntary participation. No personally identifiable information was collected, and participants were informed about the purpose of the study, the right to withdraw at any time, and how their data would be used. Furthermore, respondents were requested to give consent to the processing of their answers. Only when this consent was given, respondents could proceed with the survey.

3.3 Measurement of variables

The items that were used to measure the variables were all based on previously validated, English scales. Since the target respondents were Dutch, all items of the questionnaire had to be translated accordingly. To ensure that the scales that were translated were reliable, a reliability analyses were performed using Cronbach's Alpha. This was an essential step as it ensured that the items within the Dutch questionnaire measured the intended constructs consistently.

Independent variable (Algorithmic Monitoring):

Algorithmic Monitoring (AM) was measured using a four item scale ($\alpha = .93$) from the Algorithmic Management Questionnaire (Parent-Rocheleau et al., 2024). This questionnaire measures Algorithmic Management as a multidimensional construct, consisting of five dimensions, including AM. For this study, only the items related to AM were used. Responses

were rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). An example item is: *"An automated system closely monitors me while I am doing my work."*

Mediating variables (Method autonomy, Decision-making autonomy, Timing autonomy):

Autonomy was measured as a multidimensional construct using the Work Design Questionnaire (Morgeson & Humphrey, 2006). The construct included three sub-dimensions: method autonomy, decision-making autonomy, and timing autonomy. Each sub-dimension was assessed using three items, rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores for each dimension were calculated by averaging the responses.

The scale for method autonomy ($\alpha = .85$) captured employees' freedom in choosing how to do their work. An example item that was used is: *"The job allows me to decide on my own how to go about doing my work."*

The scale for decision-making autonomy ($\alpha = .91$) assessed the extent to which employees have the freedom to make their own work-related decisions. An example item is: *"The job provides me with significant autonomy in making decisions."*

Lastly, the scale for timing autonomy ($\alpha = .89$) measured the degree of control employees had over scheduling and timing of their tasks. An example item that was used is: *"The job allows me to make my own decisions about how to schedule my work."*

Dependent variable (Job satisfaction)

Job satisfaction was measured using four items of the Job Satisfaction Survey (Spector, 1985). The reason that only four items from the Job Satisfaction Survey were selected, was to keep the survey concise and reduce respondent fatigue, which ensures higher response quality (Meade & Craig, 2012). This reduction does not compromise measurement quality, as research has shown that well-selected subsets of items can maintain acceptable levels of reliability and validity while reducing respondent fatigue and improving data quality (Stanton et al., 2002). Furthermore, research by Nagy (2002) has shown that even single-item measures of job satisfaction can demonstrate acceptable validity when compared to full-scale versions, further supporting the use of shortened scales.

The scale ($\alpha = .88$) was measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), and responses were averaged to calculate a total job satisfaction score. An example item that was used is: *"My job is enjoyable."*

Control variables and sample characteristics

Demographic characteristics, including the age, gender and educational level were collected in order to describe the sample. This information was solely used for descriptive purposes and was not used in order to include control variables in the statistical analyses. This decision to not include control variables was made to preserve focus on the hypothesized relationship between AM, the dimensions of autonomy and job satisfaction. Including control variables without theoretical justification can unnecessarily make the model more complicated and could lead to reduced interpretability (Berneth et al., 2018). Since the study aimed to examine the mediating effects of method autonomy, decision-making autonomy and timing autonomy, a more parsimonious model was considered to be appropriate.

3.4 Analytical approach

To examine the relationship between AM, the three dimensions of autonomy and job satisfaction, a parallel mediation analysis was conducted. This was the appropriate method to use as it allowed for analysis of the effect of AM on each dimension of autonomy separately and allowed for analysis of the effect of each dimension of autonomy on job satisfaction.

Prior to conducting the analysis, missing values were deleted and assumptions were tested, in order to make sure that the data was suitable for proceeding with the parallel mediation analysis. In addition, descriptive statistics were formed in order to gain insight into the characteristics of the sample. Furthermore, reliability analyses were performed for all multi-item scales in order to confirm internal consistency. Additionally, correlations were computed to measure associations between the variables.

After constructing the correlations, the parallel mediation analysis was performed using PROCESS v4.2 in SPSS (Hayes, 2022). Specifically, model 4 was used. This model supports the estimation of direct, indirect and total effects, while accounting for multiple mediators operating simultaneously. To ensure robustness, the analysis used bootstrapping with 10,000 resamples to estimate indirect effects and construct 95% confidence intervals. This method is considered to be more reliable when testing mediation (Preacher & Hayes, 2008). Lastly, the hypotheses were tested based on the results of the mediation analysis. A 95% confidence interval is chosen as this provides for the best balance between statistical reliability and practical feasibility (Tan, 2010).

4. Data analysis

4.1 Preliminary data analysis

The sample that was used for this research initially consisted of 99 respondents. However, 8 did not fully complete the survey. Therefore, only for 91 respondents, a demographic is given. Looking at the results, it can be concluded that the majority of the sample consists of respondents that have finished a degree in higher education. 40.7% of respondents have finished a degree at a university, while 38.5% of respondents have a degree at a university of applied sciences (HBO). This adds to a total of 79.2% of respondents having a degree on higher education level. 14.3% of respondents have a degree at the secondary vocational level (MBO), while 5.5% of the respondents have a high school diploma as highest finished education and only 1.1% of respondents finished just primary school. From this analysis it can be concluded that this sample consisted of relatively highly educated respondents.

In terms of gender, data shows that 54.9% of respondents identified as men and 45.1% of respondents identified as women, meaning that this sample only consisted of men and women, and not people who identify as other. The distribution was rather balanced, however there was a slightly bigger representation of men over women in this sample.

Lastly, the age of respondents was measured. The lowest measured age was 20, while the highest age was 70. The average age was 34. The largest groups within the sample were 24-year-olds (15.2%) and 25-year- olds (18.2%). More than half of the respondents within the sample are 25 or younger (56.5%). After the age of 30, the amount of respondents drastically decreases, indicating that this sample consisted of a relatively young set of respondents.

4.1.1 Data Preparation and Screening

In the data preparation and screening stage, incomplete responses were removed from the data. Responses with one or more missing values across all items were removed. The analysis was conducted with 91 respondents, out of the initial 99 respondents, meaning there was a missing value of approximately 8.1%. Additionally, for the data cleaning, the questions ‘Sometimes I feel my job is meaningless’ and the question ‘I sometimes feel that the work I do is not appreciated’ had to be reverse coded, to ensure internal consistency and avoid construct validity errors (Venta et al., 2022).

4.1.2 Descriptive statistics

Table 1 shows the number of respondents per scale, the minimum and maximum score, the mean score for the scales, the standard deviation and Cronbach's Alpha. All items were measures on a 1 to 7 Likert scale.

Firstly, table 1 shows that the mean for AM was 3.00 (*SD* = 1.88). This indicates that respondents within the sample generally experience low levels of AM. The high standard deviation indicates that there was much variety in the experiences of the respondents in terms of AM. Secondly, in terms of the three dimensions of autonomy, on average, higher scores were observed. Method autonomy had a mean of 5.23 (*SD* =1.36). This high mean indicates that respondents generally experienced quite a lot of method autonomy. The same can be concluded for decision-making autonomy, as the mean score within this scale was 5.29 (*SD* = 1.39). The standard deviation within this scale again indicates a strong variety in answers. For timing autonomy, the mean was a bit lower, but still on the higher side of the scale. For this variable, a mean of 4.88 (*SD* = 1.6) was observed, which indicates high experienced levels of timing autonomy across the sample.

Lastly, job satisfaction had a mean of 5.42 (*SD* = 1.21). This suggests that respondents generally experienced high amounts of job satisfaction, with moderate variation across respondents.

Table 1

Descriptive statistics

Variable	M	SD	Min	Max	α	1	2	3	4	5
1.Algorithmic Monitoring	3.00	1.88	1	7	.93	1.00				
2. Method Autonomy	5.23	1.36	1.67	7	.85	-.41*	1.00			
3. Decision-Making Autonomy	5.29	1.39	1.67	7	.91	-.28*	.72*	1.00		
4. Timing Autonomy	4.88	1.60	1	7	.89	-.40*	.68*	.70*	1.00	
5. Job Satisfaction	5.42	1.21	1.75	7	.88	-.08	.28*	.54*	.32*	1.00
N						91	91	91	91	91

Note. * = Correlation is significant at the alpha level of .05. M = mean, SD = Standard Deviation, α = Cronbach's Alpha

4.1.3 Correlations

As shown in table 1, the correlation between AM and job satisfaction was negative and not significant ($r = -.08, p = .44$). As $p > .05$, it exceeds the threshold of $\alpha = .05$, which was used in this research. Since this threshold was exceeded, no significant direct correlation was found between AM and job satisfaction.

In contrast, all three sub dimensions of autonomy were significantly and positively correlated to job satisfaction. As shown in table 1, method autonomy is slightly positively correlated to job satisfaction ($r = .28, p < .01$). Decision-making autonomy had a stronger positive correlation to employee satisfaction ($r = .54, p < .001$). Lastly, timing autonomy was also positively correlated to job satisfaction ($r = .32, p < .01$).

Furthermore, table 2 shows that AM was negatively correlated to method autonomy ($r = -.41, p < .001$), timing autonomy ($r = -.40, p < .001$) and decision-making autonomy ($r = -.28, p < .01$). While these correlations indicate associations between variables, causal or mediating relationships are not implied by these findings. To assess the actual effects, mediation analysis was performed.

4.1.4 Reliability analysis

To make sure that the data set is suitable for analysis, the internal consistency of the scales was assessed using Cronbach's Alpha. As shown in table 1, all scales demonstrated strong reliability, with Cronbach's Alpha values of .85 or higher, meaning that they exceeded the threshold of .80, which indicates good internal consistency (Ahmad et al., 2024). The findings suggest that the scales that were used were internally consistent and could be considered appropriate for use in subsequent analyses.

4.1.5 Testing assumptions

To make sure that the mediation analysis could be performed, several assumptions were tested. Firstly, an important assumption is the linearity of relationships between the variables (Field, 2018). To test this assumption, a scatterplot matrix was analyzed.

Secondly, the assumption of independence of errors was tested. This assumption was tested using the Durbin-Watson test in SPSS. The result of 1.98 falls in the acceptable range of 1.5-2.5 (Field, 2018), which means that the assumption was met.

Thirdly, the assumption of homoscedasticity was tested. Residual plots show that data points are distributed randomly, and residuals remain constant across the reach of the expected values, which means that the assumption of homoscedasticity was met.

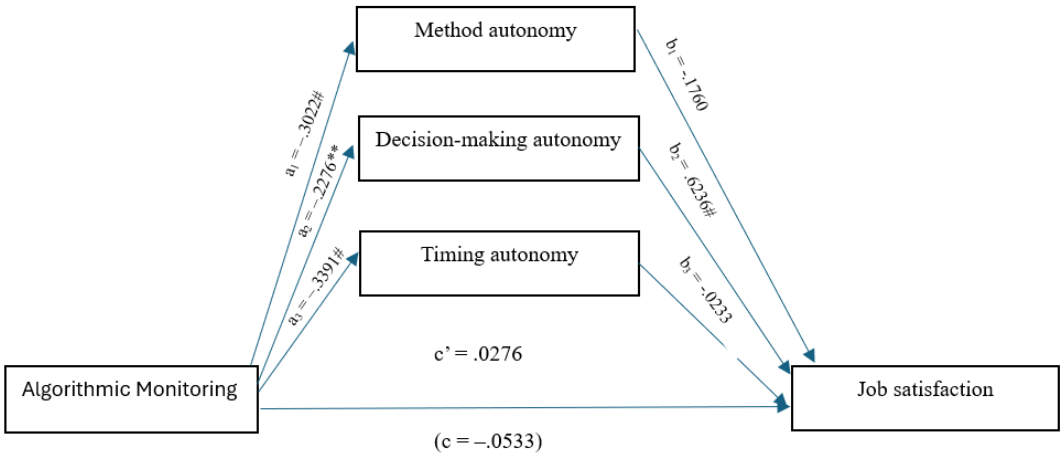
Fourthly, the assumption of multicollinearity was tested. All VIF scores were lower than 3.00, while all tolerance scores were well above .20, meaning that there were no issues with multicollinearity.

Lastly, the assumption of normality was tested. The histogram that was generated for the standardized residuals was bell shaped. Also, the P-P plot showed that data points were distributed closely across the diagonal line. These two factors are both indicators for normality. Furthermore, skewness and kurtosis values were examined. All skewness and kurtosis values fall within the -2 to 2 range, meaning that they fall within the acceptable range (Hair et al., 2022). Therefore, the assumption of normality could be considered as met. With this considered, all assumptions were met, meaning that the mediation analysis could be performed.

4.2 Mediation analysis

To examine whether the relationship between AM and job satisfaction is mediated by the three dimensions of autonomy, a mediation analysis was conducted using PROCESS v4.2 in SPSS (Hayes, 2022). This parallel mediation model allowed the simultaneous estimation of direct, indirect, and total effects. 10,000 bootstrapped samples were used to improve reliability of indirect effect estimates (Hayes, 2022). Figure 2 provides a visual summary of the mediation model that was used in the analysis.

Figure 2
Parallel mediation model with standardized coefficients



Note. *p < 05, **p < 01, #p < 001

To provide a clearer overview of the relationships that were tested in the model, table 3 presents the unstandardized effects (b), the standard errors (SE), the confidence intervals and the significance values (p) for each path in the mediation analysis.
This table helps interpret both direct and indirect effects within the mediation model.

As shown in table 2, the complete model has an explained variance of 32% in job satisfaction (R^2 = .32). This means that according to the outcome of the model 32% of the differences that employees experience in job satisfaction can be explained by AM and the three dimensions of autonomy. This indicates a strong explanatory power by the model (Cohen, 1988).

Additionally, the full model, including mediators is statistically significant (F = 8.34, p < .001). This indicates that the predictors together have a meaningful level of contribution towards job satisfaction.

Likewise, the direct effect of AM on job satisfaction, while controlling for the mediators was also not significant (B = 0.03, p = .68), suggesting that there is no direct relationship when the dimensions of autonomy are accounted for, as the significance level again exceeds α = .05.
When looking at the total effect of AM on job satisfaction, without mediators, the explained variance was much lower: (R^2 = .01, p = .51). Furthermore, it can be concluded that this effect is not statistically significant (B = -0.05, p = .51), as the significance level exceeds α = .05. This indicates that without considering the mediators, AM does not directly predict job Satisfaction.

When it comes to the indirect effect through decision-making autonomy, this was significant. The results show that AM significantly decreases decision-making autonomy (B = -0.23, p = .01), which in turn significantly predicts job satisfaction (B = 0.62), *CI* [0.33, 0.91]. The model predicting decision-making autonomy from AM explained 9.5% of the variance (R^2 = .10, p = .01).

AM also significantly reduced both method autonomy (B = -0.30, p < .001) and timing autonomy (B = -0.34, p < .001). However, their relationship with job satisfaction was not statistically significant. This is indicated by confidence intervals that included zero. The findings show *CI* [–0.44, 0.08] for method autonomy and *CI* [–0.24, 0.20] for timing autonomy. The model predicting method autonomy explained 17% of the variance (R^2 = .17, p < .001), and the model predicting timing autonomy explained 16% (R^2 = .16, p < .001).

Furthermore, findings show that method autonomy and timing autonomy do not significantly mediate the relationship between AM and job satisfaction. This is concluded as

both confidence intervals include zero. For method autonomy, the findings show *CI* [–0.02, 0.14] and for timing autonomy, findings show *CI* [–0.06, 0.08]. However, for decision-making autonomy, findings did show significant results, as the confidence interval did not include zero, *CI* [–0.28, –0.04].

These results indicate partial mediation: only decision-making autonomy acts as a significant mediator in the relationship between AM and job satisfaction. While the total and direct effects of AM on job satisfaction were not statistically significant, the indirect effect through decision-making autonomy was statistically significant. This suggests that AM negatively influences job satisfaction indirectly, by decreasing employees' decision-making autonomy.

Table 2
PROCESS analysis

Effect	B	R^2	SE	95% CI
AM → Job Satisfaction (Total effect model)	–.0533 (.513)	.0068 (.513)	.0811	[–.2143, .1078]
AM → Job Satisfaction (Direct effect model)	.0276 (.676)	.3183 (<.001*)	.0657	[–.1042, .1594]
AM → Method Autonomy	–.3022 (<.001*)	.1742 (<.001*)	.0737	[–.4489, –.1556]
Method Autonomy → Job Sat.	–.1760 (.182)		.1308	[–.4369, .0849]
AM → Decision-Making Autonomy	–.2276 (.009*)	.0947 (.009*)	.0841	[–.3946, –.0605]
Decision Autonomy → Job Sat.	.6236 (<.001*)		.1458	[.3334, .9138]
AM → Timing Autonomy	–.3391 (.001*)	.1583 (<.001)	.0891	[–.5142, –.1639]
Timing Autonomy → Job Sat.	–.0233 (.822)		.1025	[–.2435, .1969]
Indirect via Method Autonomy	.0532		.0403	[–.0232, .1406]
Indirect via Decision Autonomy	–.1419		.0612	[–.2784, –.0365]
Indirect via Timing Autonomy	.0079		.0350	[–.0615, .0816]
Total Indirect Effect	–.0808		.0625	[–.2133, .0288]

Note. Effect sizes (B) are followed by significance values (*p*) in parentheses. $p < .05$ indicates statistical significance (marked with *)

4.3 Hypotheses testing

The hypotheses of this study were tested using Hayes' PROCESS v4.2 macro (model 4) in SPSS. This macro was used run a parallel mediation analysis, which examines how several mediators simultaneously explain the relationship between an independent and a dependent variable (Kane & Asbaugh, 2017).

4.3.1 Direct effect of AM on job satisfaction

As shown in figure 2, the PROCESS analysis revealed no significant direct relationship between AM and job satisfaction (B = -0.05, p = .51). Therefore, hypothesis 1 is not supported.

4.3.2 Method autonomy hypotheses

AM was shown to be significantly negatively related to method autonomy (b = –.30, p < .001). This is indicated by a significant p value. Therefore, hypothesis 2 is supported. However, method autonomy was not significantly related to job satisfaction, (B = –0.30, p < .001). This means hypothesis 3 is not supported.

4.3.3 Decision-making autonomy hypotheses

A significant negative relationship was found between AM and decision-making autonomy (B = –0.23, p = .01). Therefore, hypothesis 4 is supported. Decision-making autonomy was also shown to be positively related to job satisfaction as the confidence interval did not include zero *CI* [.33, .91]. Therefore, hypothesis 5 is also supported.

4.3.4 Timing autonomy hypotheses

AM was significantly negatively associated with timing autonomy (B = –0.34, p < .001). Therefore, hypothesis 6 is supported. However, timing autonomy was not significantly related to job satisfaction, as the confidence interval included zero, *CI* [–0.24, 0.20]. Therefore, hypothesis 7 is not supported.

4.3.5 Mediation hypotheses

Firstly, the indirect effect of AM on job satisfaction through method autonomy was not significant, as the confidence interval included zero, *CI* [–.02, .14]. This suggests that method autonomy does not mediate the relationship between AM and job satisfaction. Therefore, hypothesis 8a is not supported.

Secondly, the indirect effect via decision-making autonomy was statistically significant, as the confidence interval did not include zero *CI* [–.28, –.04]. This indicates that decision-making autonomy mediates the relationship between AM and job satisfaction. Therefore, hypothesis 8b is supported.

Thirdly, the indirect effect of timing autonomy on job satisfaction was not significant, as the confidence interval included zero *CI* [–.06, .08]. This indicates that timing autonomy does not mediate the relationship between AM and job satisfaction. Therefore, hypothesis 8c is not supported.

5. Discussion

This study examined how AM relates to job satisfaction, by focusing on the potential mediating role of the three dimensions of autonomy. Findings showed that AM significantly reduced all dimensions of autonomy, but only decision-making autonomy was significantly related to job satisfaction. It was also the only significant mediator in the relationship between AM and job satisfaction. No direct effect of AM on job satisfaction was found.

By analyzing autonomy as a multidimensional construct, this study built on the SMART model (Parker & Knight, 2024). The study extends existing research that regularly studies autonomy as a unidimensional construct. This contributes to a better understanding of how AM shapes the employee experience. This chapter discusses the key findings, the limitations of the study, and the practical and theoretical implications.

5.1 Key findings

5.1.1 Direct effect of AM on Job Satisfaction

The findings regarding the direct relationship between AM and job satisfaction were not aligned with the proposed hypothesis. In contrast to expectations that AM affects job satisfaction (Schlund & Zitek, 2024; Parent-Rocheleau et al., 2024), no significant direct relationship was found between the two. This suggests that AM may not directly affect job satisfaction. An explanation for this unexpected outcome could be that, in many jobs, AM is implemented in subtle ways, without, for instance, performance evaluations or employee feedback. While AM may still trigger behavioral self-regulation, as explained by the panopticon effect (Foucault, 1977), it may not always be consciously experienced by employees as something that decreases their job satisfaction. Prior research suggests that intensity and nature of monitoring influence the extent to which AM is experienced as something threatening or emotionally taxing (Newlands, 2021; Ball, 2010). This could explain why AM in this study did not present a statistically significant effect on job satisfaction, but instead exercised its influence through the reduction of decision-making autonomy.

Furthermore, the negative effects of AM on job satisfaction may only become evident when it alters core job characteristics, such as autonomy. In this study, autonomy is conceptualized as a structural feature of job design, referring to the degree of freedom employees have in choosing how, when, and in what way they perform their tasks (Parker & Knight, 2024). This conceptualization is in alignment with broader literature on job design,

which suggests that changes to structural work characteristics, like reduced autonomy, can lead to downstream impact on job satisfaction (Hackman & Oldham, 1976). These findings therefore suggest that the impact of AM on job satisfaction is not necessarily direct, but likely operates through the altering of job characteristics, with decision-making autonomy potentially having an important role.

5.1.2 Method Autonomy

Findings regarding method autonomy were mixed. This is due to the fact that findings showed that AM has a significant negative effect on method autonomy, which is in line with the proposed hypothesis. However, the findings also illustrate that method autonomy does not significantly predict job satisfaction. A possible explanation for this is that method autonomy may be perceived as less relevant for job satisfaction in organizations where predefined routines and procedures dominate the work environment. In such contexts, employees often have limited opportunity to choose how to perform their tasks, which is a constraint that has been shown as typical for highly structured roles (Parker & Wall, 1998).

As a result, employees may begin to view discretion over task methods as irrelevant. From a job design perspective, the potential of a job characteristic like method autonomy to act as a motivational factor, depends on how important it is to the tasks and whether it can be exercised in a meaningful way (Hackman & Oldham, 1976). In routine-based environments, particularly when driven by AM, discretion over task methods may provide limited motivational value to employees, and therefore may not play a significant role in shaping job satisfaction. This suggests that the influence of AM on job satisfaction is likely to be conditional, not only on which dimension of autonomy is affected, but also on how relevant the particular dimension is within the specific structure of the job.

5.1.3 Decision-Making Autonomy

Findings regarding decision-making autonomy showed that this was the only dimension of autonomy that significantly mediated the relationship between AM and Job Satisfaction. Additionally, decision-making autonomy was shown to have a significant positive effect on job satisfaction. This suggests that AM indirectly influences employees' job satisfaction, by diminishing decision-making autonomy.

These findings contribute to existing job design theory, by indicating that decision-making autonomy might be the most essential form of autonomy, in work environments where AM is present. One possible explanation is that decision-making autonomy gives employees a sense of control over what work they do, enabling them to influence task

prioritization and exercise their own judgement (Parker & Knight, 2024). In contrast, method autonomy and timing autonomy may provide less motivational value when AM systems already prescribe how employees should exercise and time their tasks.

In the context of AM, preserving decision-making autonomy may be especially important in maintaining job satisfaction, as method autonomy and timing autonomy are often limited due to the nature of AM systems. These systems often describe how and when to execute tasks, which limits these forms of autonomy. However, decision-making autonomy can still offer employees a sense of control and ownership. Therefore, it may serve as a compensating mechanism when other dimensions of autonomy are constrained. This emphasizes the need that designs of AM systems should preserve or enhance employees' decision-making capabilities, in order to prevent a decrease in job satisfaction, thereby aligning AM implementation with human-centric design principles.

5.1.4 Timing Autonomy

Regarding the effect of AM on timing autonomy, findings were in line with expectations. The findings showed a negative relationship between AM and timing autonomy, suggesting that when AM systems are integrated into the organization, it leads to a decrease in employees' timing autonomy. However, expectations deviated from the outcomes in terms of the effect of timing autonomy on job satisfaction. The findings of the study showed that there was no significant relationship between the two. This suggests that even though timing autonomy is negatively impacted by AM, this does not necessarily lead to a decrease in job satisfaction.

A possible explanation is that in AM-driven contexts, structured schedules are already the norm. In such environments, employees may not expect flexibility over when to execute their tasks, and thus may not feel like restrictions that AM imposes are impactful. From a job design theory perspective, the impact of timing autonomy depends on whether it is valued by the employee, but also whether it applies to their specific role (Hackman & Oldham, 1976). If timing autonomy is consistently limited, it may become less of an important factor for job satisfaction.

Newlands (2021) states that in gig platforms, where timing autonomy is essential for workers, reductions in this particular dimension of autonomy are likely to result in lower levels of job satisfaction. This suggests that the relevance of timing autonomy could be dependent on the type of sector that workers are employed in, with the importance of timing

autonomy diminishing in more structured environments, like AM driven work contexts. Therefore, timing autonomy may be less important in jobs where flexibility is already limited.

5.1.5 Mediation Effects of Autonomy

The parallel mediation analysis revealed that only decision-making autonomy significantly mediated the relationship between AM and job satisfaction. In contrast, method autonomy and timing autonomy were only significantly related to AM, but did not significantly predict job satisfaction and therefore did not mediate the relationship between AM and job satisfaction.

This finding implies that not all dimensions of autonomy equally contribute to job satisfaction in AM-driven work environments. Ad discussed earlier, decision-making may provide a unique sense of control and ownership that is particularly relevant when other forms of autonomy are already constraint by AM. By empirically demonstrating that only decision-making autonomy mediated the effect, this study highlights the importance of factoring this dimension of autonomy when implementing AM systems.

5.2 Theoretical contributions

This study provides several theoretical contributions to existing literature on job design in environments where AM is implemented. First, it offers a refinement to the SMART model (Parker & Knight, 2024), as the study demonstrates that the dimensions of autonomy do not equally affect job satisfaction under the condition of AM. While the SMART model conceptualizes method autonomy, decision-making autonomy and timing autonomy as equally important, this study established that only decision-making autonomy significantly mediated the relationship between AM and job satisfaction. By analyzing each dimension of autonomy separately, this study highlights how relative importance of the autonomy dimensions may shift, depending on how work is technologically structured. This adds clarity to the theoretical framework, suggesting that decision-making autonomy may have a central role in preserving job satisfaction, when the other dimensions of autonomy are negatively affected by AM.

Secondly, the findings also contribute to broader debates about the human-centric implementation of smart technologies in the workplace. In line with the goals of Industry 5.0, which promotes a more human-centric approach to the implementation of smart technologies, this study demonstrates how AM may undermine the quality of job design. Findings show that AM, when not carefully implemented, has the potential to undermine the quality of job

design, particularly by constraining decision-making, a core job characteristic (Parker & Knight, 2024).

Although AM may provide benefits in terms of operational efficiency, or handling of complex data (Parent-Rocheleau & Parker, 2022), it may also unintentionally lead to erosion of crucial elements of human-centric job design, such as decision-making autonomy. This emphasizes the need to ensure that AM supports, instead of constrains the core characteristics that contribute to job satisfaction.

These insights offer a theoretical basis for future research that aims to integrate AM with job design, to promote sustainable, human-centric work environments.

5.3 Practical contributions

This study offers several practical contributions for organizations that seek to implement AM systems, or already have them integrated. Most importantly, the vital role of decision-making autonomy in preserving and enhancing job satisfaction is emphasized. Organizations should be considerate when designing AM systems. These systems should be designed in such a way that they do not constrain employees' perceptions of decision-making autonomy. Instead, these systems should be designed in such a way that it supports decision-making autonomy. For example, by providing suggestions instead of fixed instructions, or allowing employees to overrule decisions made by AM. This is particularly important, as AM systems are desired to be supportive of human-centric job design (Xu et al., 2021).

To summarize, organizations that seek to work with AM systems should maintain a balance between efficiency goals and core job characteristics, such as decision-making autonomy. Furthermore, they should design these systems in such a manner that it contributes to, rather than constrains decision-making autonomy in particular.

5.4 Limitations

Despite the contributions that this study delivers, the study also has its limitations.

Firstly, a limitation of this study is that it may be difficult to generalize findings due to the demographic characteristics of the sample. Most respondents within the sample were young and highly educated, which may not effectively reflect the broader working population. This limits the extent to which findings can be applied across different ages, educational levels or different sectors.

Secondly, the actual sample size of 91 participants fell below the recommended sample size of 100 for mediation analysis (Boomsma, 1982). A smaller sample size reduces the

statistical power of the analysis (Fritz & MacKinnon, 2007), meaning that true effects, particularly smaller, indirect effects become harder to measure. As a result, it is a possibility that actual relationships were not identified as statistically significant. This means that findings of this study should be interpreted with caution, as they may underestimate the strength or presence of some effects due to reduced power to detect indirect relationships.

Thirdly, a key limitation of this research is that it did not distinguish between different intensities of exposure to AM. While part of the sample consisted of employees who work in an organization known to use AM, the rest of the sample was drawn from the researcher's personal network, with unknown levels of AM exposure. This introduces a risk that some participants may have responded to the AM items in the survey based on limited or no direct experience, relying heavily on assumptions or general attitudes towards monitoring. As a result, the measurement of AM may have lacked consistency across the respondents, potentially leading to decreased internal validity of the findings and obscuring the true relationships between AM, autonomy and job satisfaction.

Moreover, this study did not regard the nature or purpose of how AM was implemented, such as whether it was of supportive or punitive nature. This is an important limitation of this research, as Schlund and Zitek (2024) suggest that AM is more likely to decrease autonomy when it is of punitive nature than when it is of supportive nature. As a result, this limitation may reduce the ability to accurately interpret how AM may differently affects dimensions of autonomy and job satisfaction.

Furthermore, the cross-sectional design of this study is considered a limitation, as data was collected at a single point in time. This restricts the ability to assess causal relationships or changes over time. This is particularly important, given concerns that in the long run negative effects of AM on job satisfaction are likely to compound over time (Siegel et al., 2022).

Finally, for the mediation analysis, PROCESS v 4.2 (Hayes, 2022) was used, instead of the latest version. This version was used as the most recent version was not compatible researcher's resources. This is considered a minor limitation, however important to emphasize. Addressing these limitations would contribute to future research as it will result in a deeper understanding of how AM affects key aspects of human-centric job design.

5.5 Implications for future research

This study presents numerous implications that are relevant to future research, which help refine the understanding of how AM affects different dimensions of autonomy and job satisfaction. First, future research should examine how the effects of AM develop over time, by conducting a longitudinal approach. This study's cross-sectional design was not able to capture compounding effects of AM, as data was collected at a set point in time. This is particularly important as these effects are likely to only become apparent with longer exposure (Siegel et al., 2022)

Secondly, although this study measured autonomy as a multidimensional construct, it remains unclear why only decision-making autonomy significantly mediates the relationship between AM and job satisfaction. Future research should explore why decision-making autonomy seems to be more sensitive to AM, and whether this pattern remains across different contexts and job types.

Thirdly, this study did not consider the variation in AM exposure or the purpose of AM (supportive or punitive). As a result, a lack of understanding remains on which features of AM most strongly constrain decision-making autonomy, and under what conditions these constraints are most present. future research should assess how variations in AM systems and employee perceptions may moderate the effect of AM on different dimensions of autonomy.

5.6 Methodological reflection

This study was shaped by numerous methodological choices that impacted the outcomes of the study. The usage of a cross-sectional survey contributed to efficient data collection. However, it limited the opportunity to draw conclusions over how relationships evolve over time. As the sample was largely obtained through the researcher's network, the demographics indicated an overrepresentation of young and highly educated participants, which makes it more difficult to generalize the findings across a larger population.

A key strength of the research was the grounding of the study in theory regarding job design. The application of the SMART model (Parker & Knight, 2024) allowed the study to distinct between different forms of autonomy and perform a multidimensional analysis. Furthermore, the usage of empirically testes scales resulted in a reliable data collection (Lim & Park, 2025).

5.7 Conclusions

This study investigated the relationship between AM and job satisfaction, specifically by focusing on how method autonomy, decision-making autonomy and timing autonomy could potentially mediate this relationship. While AM was found to significantly reduce all the dimensions of autonomy, only decision-making autonomy showed a significant positive relationship to job satisfaction and significantly mediated the relationship between AM and job satisfaction. No direct effect of AM on job satisfaction was observed, suggesting that the effect is indirect and works primarily through decision-making autonomy.

These results challenge the assumption that all dimensions of autonomy would explain how AM affects job satisfaction. Instead, findings suggest that decision-making autonomy in particular plays a central role, while method autonomy and job satisfaction appear less important in the context of AM-driven environments. This points towards the indication that not all dimensions of autonomy matter equally in terms of affecting job satisfaction, in these work environments. These findings also supports the view that autonomy should be conceptualized as a multidimensional construct, as treating autonomy as one overarching dimension may conceal meaningful distinctions between different forms of autonomy.

The main takeaway from this study is that decision-making autonomy is key to understanding how AM affects job satisfaction. While previous studies established that AM often reduces overall autonomy, it may be especially important to preserve decision-making autonomy, in order to prevent a decrease in job satisfaction. This implies that the design of AM systems should be approached with caution. Not only to increase efficiency, but also to preserve key job characteristics, such as decision-making autonomy. For this, future research is needs to explore how decision-making autonomy can be preserved or even increased in AM-driven work environments.

Overall, while AM can provide benefits, such as increased efficiency, it also risks undermining key job characteristics that contribute to job satisfaction, such as decision-making autonomy. Understanding how to implement AM without undermining key job characteristics within job design is critical for organizations that seek to implement AM systems.

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Appendices

Appendix 1: English survey

Algorithmic Monitoring

1. *An automated system closely monitors me while I am doing my work.*
2. *An automated system tracks me carefully to ensure I am completing my tasks.*
3. *An automated system inspects my work closely.*
4. *I am constantly being watched by an automated system to see that I obey the rules pertaining to my job (Parent-Rocheleau et al., 2024).*

Method autonomy

5. *The job allows me to make decisions about what methods I use to complete my work.*
6. *The job gives me considerable opportunity for independence and freedom in how I do the work.*
7. *The job allows me to decide on my own how to go about doing my work.*

Decision-making autonomy

8. *The job gives me a chance to use my personal initiative or judgment in carrying out the work.*
9. *The job allows me to make a lot of decisions on my own.*
10. *The job provides me with significant autonomy in making decisions.*

Timing autonomy

11. *The job allows me to make my own decisions about how to schedule my work.*
12. *The job allows me to decide on the order in which things are done on the job.*
13. *The job allows me to plan how I do my work.*

Job Satisfaction

14. *My job is enjoyable.*
15. *I like doing the things I do at work.*
16. *I sometimes feel my job is meaningless.*
17. *I do not feel that the work I do is appreciated.*

Appendix 2: Dutch survey

This appendix illustrates the actual survey that was conducted.

Algorithmic Monitoring (AM)
De volgende stellingen gaan over de mate waarin u tijdens uw werk wordt gemonitord door geautomatiseerde systemen. Hiermee worden systemen bedoeld die zonder menselijke tussenkomst uw werk observeren, controleren of evalueren.

1. Een geautomatiseerd systeem houdt me nauwlettend in de gaten terwijl ik mijn werk uitvoer.
2. Een geautomatiseerd systeem volgt mij zorgvuldig om te controleren of ik mijn taken volbreng.
3. Een geautomatiseerd systeem inspecteert mijn werk nauwkeurig.
4. Ik word voortdurend in de gaten gehouden door een geautomatiseerd systeem dat controleert of ik me aan de regels houd die bij mijn werk horen.

Method autonomy

De volgende stellingen gaan over de mate van vrijheid die u ervaart in hoe u uw werk uitvoert. Het gaat hierbij om de keuzes die u zelf kunt maken met betrekking tot de methoden, werkwijzen of technieken die u gebruikt om taken te voltooien.

5. Mijn baan stelt me in staat om beslissingen te nemen over welke methoden ik gebruik om mijn werk uit te voeren.
6. Mijn baan biedt me aanzienlijke mogelijkheden voor onafhankelijkheid en vrijheid in hoe ik het werk uitvoer.
7. Mijn baan stelt me in staat om zelfstandig te beslissen hoe ik mijn werk aanpak.

Decision-making autonomy
De volgende stellingen gaan over de mate waarin u zelf beslissingen kunt nemen in uw werk. Het gaat hierbij om de ruimte die u heeft om uw eigen oordeel te gebruiken, zelfstandig keuzes te maken en initiatief te nemen bij het uitvoeren van uw taken.

8. Mijn baan geeft me de kans om mijn eigen initiatief of oordeel te gebruiken bij het uitvoeren van het werk.
9. Mijn baan stelt me in staat om veel beslissingen zelfstandig te nemen.
10. Mijn baan geeft me aanzienlijke vrijheid in het nemen van beslissingen.

Timing autonomy
De volgende stellingen gaan over de vrijheid die u ervaart om te bepalen wanneer u uw werk doet. Het betreft de mate waarin u zelf kunt beslissen wanneer en in welke volgorde u de taken uitvoert, en hoe u uw werkdag inplant.

1. Mijn baan stelt me in staat om zelf te beslissen hoe ik mijn werk inplan.
2. Mijn baan stelt me in staat om te bepalen in welke volgorde taken worden uitgevoerd.
3. Mijn baan stelt me in staat om te plannen hoe ik mijn werk uitvoer.

Job satisfaction
De volgende stellingen gaan over hoe uw ervaring is ten opzichte van uw werk in het algemeen. Het gaat hierbij om uw ervaring van plezier, waardering en zingeving in uw functie.

4. Ik haal plezier uit mijn werk.
5. Ik voer mijn werkzaamheden met plezier uit.
6. Ik heb het gevoel dat het werk wat ik doe **niet** wordt gewaardeerd.
7. Ik heb soms het gevoel dat mijn werk betekenisloos is.

Demografics
8. Wat is uw leeftijd (in jaren)
9. Ik ben een (man, vrouw, anders, zeg ik liever niet)
10. Wat is uw hoogst afgeronde opleiding?
11. Indien u nog aanvullende opmerkingen heeft, noteer deze dan hieronder

Appendix 3: SPSS Output

Figure 3:
Reliability analysis for the complete model

Cronbach's Alpha	N of Items
,777	17

Figure 4:
Descriptive statistics

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Alg_Mon	91	1,00	7,00	3,0073	1,88036	,510	,253	-1,209	,500
Met_Aut	91	1,67	7,00	5,2308	1,36146	-,794	,253	,036	,500
Dec_Aut	91	1,67	7,00	5,2894	1,39063	-,931	,253	,359	,500
Tim_Aut	91	1,00	7,00	4,8828	1,60276	-,792	,253	-,237	,500
Job_Sat	91	1,75	7,00	5,4231	1,21088	-1,024	,253	,794	,500
Valid N (listwise)	91								

Figure 5:
Reliability analysis for AM

Reliability Statistics

Cronbach's Alpha	N of Items
,932	4

Item Statistics

	Mean	Std. Deviation	N
De volgende stellingen gaan over de mate waarin u tijdens uw werk wordt gemonitord door geautomatiseerde systemen. Hiermee worden systemen bedoeld die zonder menselijke tussenkomst uw werk observeren, controleren of evalueren. Een geautomatiseerd syste	3,02	2,050	99
Een geautomatiseerd systeem volgt mij zorgvuldig om te controleren of ik mijn taken volbreng.	3,15	2,130	99
Een geautomatiseerd systeem inspecteert mijn werk nauwkeurig.	3,05	1,945	99
Ik word voortdurend in de gaten gehouden door een geautomatiseerd systeem dat controleert of ik me aan de regels houd die bij mijn	2,71	1,859	99

Figure 6:

Reliability analysis for method autonomy

Reliability Statistics

Cronbach's Alpha	N of Items
,849	3

Item Statistics

	Mean	Std. Deviation	N
De volgende stellingen gaan over de mate van vrijheid die u ervaart in hoe u uw werk uitvoert. Het gaat hierbij om de keuzes die u zelf kunt maken met betrekking tot de methoden, werkwijzen of technieken die u gebruikt om taken te voltooien. Mijn baan stelt me in staat om beslissingen te nemen over welke methoden ik gebruik om mijn werk uit te voeren.	5,09	1,523	95
Mijn baan biedt me aanzienlijke mogelijkheden voor onafhankelijkheid en vrijheid in hoe ik het werk uitvoer.	5,17	1,674	95
Mijn baan stelt me in staat om zelfstandig te beslissen hoe ik mijn werk aanpak.	5,24	1,521	95

Figure 7:

Reliability analysis for decision-making autonomy

Reliability Statistics

Cronbach's Alpha	N of Items
,912	3

Item Statistics

	Mean	Std. Deviation	N
De volgende stellingen gaan over de mate waarin u zelf beslissingen kunt nemen in uw werk. Het gaat hierbij om de ruimte die u heeft om uw eigen oordeel te gebruiken, zelfstandig keuzes te maken en initiatief te nemen bij het uitvoeren van uw taken. Mi	5,40	1,447	94
Mijn baan stelt me in staat om veel beslissingen zelfstandig te nemen.	5,18	1,538	94
Mijn baan geeft me aanzienlijke vrijheid in het nemen van beslissingen.	5,05	1,668	94

Figure 8:

Reliability analysis for timing autonomy

Reliability Statistics

Cronbach's Alpha	N of Items
,892	3

Item Statistics

	Mean	Std. Deviation	N
De volgende stellingen gaan over de vrijheid die u ervaart om te bepalen wanneer u uw werk doet. Het betreft de mate waarin u zelf kunt beslissen wanneer en in welke volgorde u de taken uitvoert, en hoe u uw werkdag inplant. Mijn baan stelt me in staat	4,76	1,791	91
Mijn baan stelt me in staat om te bepalen in welke volgorde taken worden uitgevoerd.	4,81	1,843	91
Mijn baan stelt me in staat om te plannen hoe ik mijn werk uitvoer.	5,08	1,662	91

Figure 10:
Reliability analysis for job satisfaction

Reliability Statistics

Cronbach's Alpha	N of Items
,882	4

Item Statistics

	Mean	Std. Deviation	N
De volgende stellingen gaan over hoe uw ervaring is ten opzichte van uw werk in het algemeen. Het gaat hierbij om uw ervaring van plezier, waardering en zingeving in uw functie. Ik haal plezier uit mijn werk.	5,4945	1,32810	91
Ik voer mijn werkzaamheden met plezier uit.	5,4176	1,29156	91
Ik heb het gevoel dat het werk wat ik doe niet wordt gewaardeerd.	5,4835	1,41706	91
Ik heb soms het gevoel dat mijn werk betekenisloos is.	5,2967	1,58110	91

Figure 11:
Residual plot

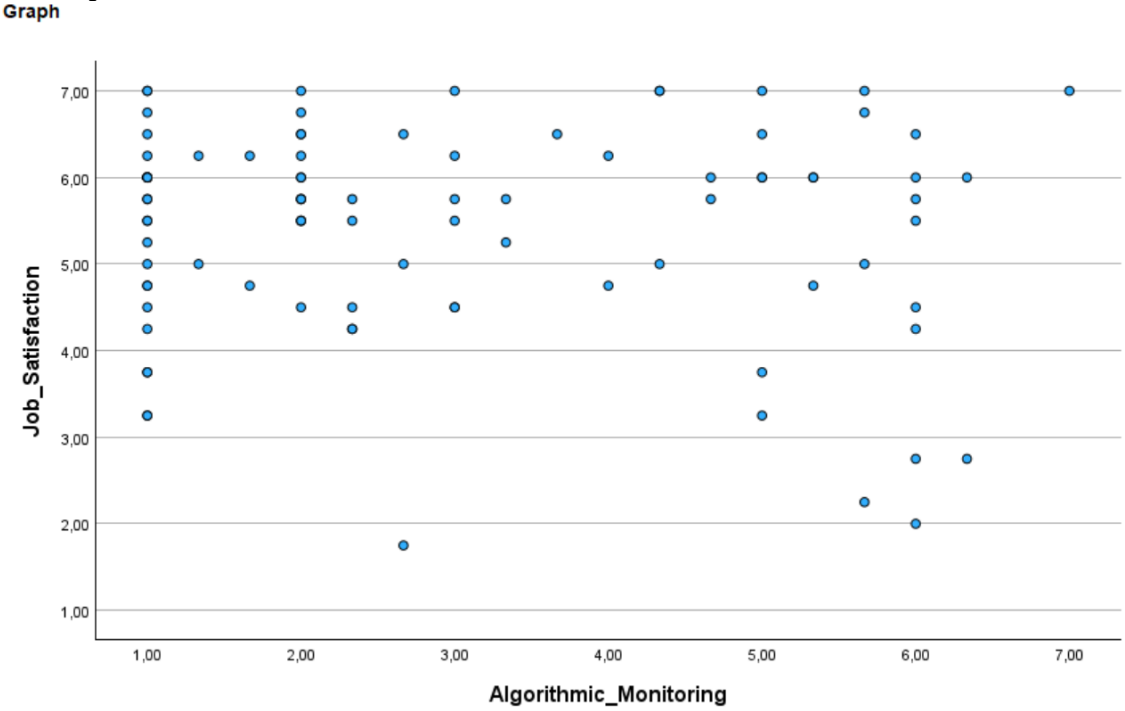


Figure 12:
Model summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,083[a]	,007	-,004	1,21350	1,977

a. Predictors: (Constant), Algorithmic_Monitoring

b. Dependent Variable: Job_Satisfaction

Figure 13:
Residual histogram

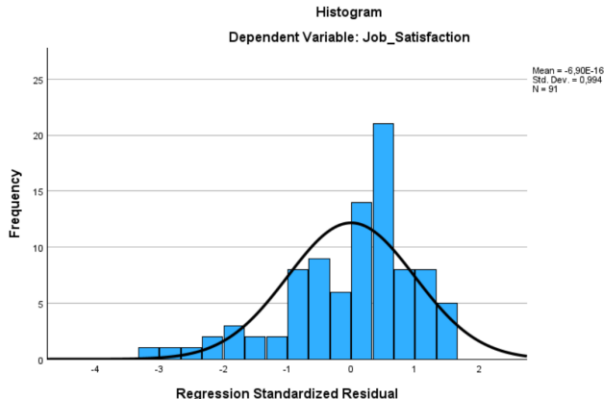
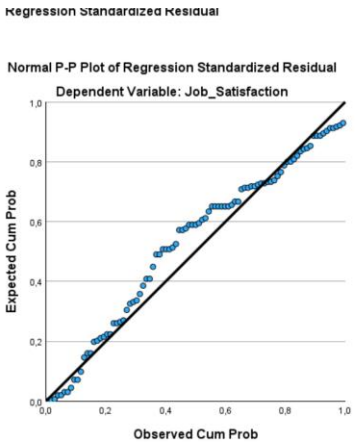


Figure 14:
P-P Plot for residual



Appendix 4: PROCESS Mediation analysis output

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.2 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

****
Model : 4
Y : Job_Sat
X : Alg_Mon
M1 : Met_Aut
M2 : Dec_Aut
M3 : Tim_Aut

Sample
Size: 91

****
OUTCOME VARIABLE:
Met_Aut

Model Summary

R	R-sq	MSE	F(HC3)	df1	df2	p
,4173	,1742	1,5479	16,7156	1,0000	89,0000	,0001

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	6,1395	,2194	27,9849	,0000	5,7036	6,5754
Alg_Mon	-,3022	,0739	-4,0885	,0001	-,4490	-,1553

Standardized coefficients

	coeff
Alg_Mon	-,4173

****
OUTCOME VARIABLE:
Dec_Aut

Model Summary

R	R-sq	MSE	F(HC3)	df1	df2	p
,3077	,0947	1,7704	7,1932	1,0000	89,0000	,0087

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	5,9737	,2543	23,4944	,0000	5,4685	6,4790
Alg_Mon	-,2276	,0848	-2,6820	,0087	-,3962	-,0590

Standardized coefficients

	coeff
Alg_Mon	-,3077

****
OUTCOME VARIABLE:
Tim_Aut

Model Summary

R	R-sq	MSE	F(HC3)	df1	df2	p
,3979	,1583	2,1864	14,2182	1,0000	89,0000	,0003

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	5,9027	,3072	19,2117	,0000	5,2922	6,5132
Alg_Mon	-,3391	,0899	-3,7707	,0003	-,5179	-,1604

Standardized coefficients

	coeff
Alg_Mon	-,3979

****
OUTCOME VARIABLE:
Job_Sat

Model Summary

R	R-sq	MSE	F(HC3)	df1	df2	p
,5642	,3183	1,0460	8,3447	4,0000	86,0000	,0000

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	3,0758	,7407	4,1524	,0001	1,6033	4,5484
Alg_Mon	,0276	,0657	,4201	,6755	-,1029	,1581
Met_Aut	-,1760	,1309	-1,3443	,1824	-,4363	,0843
Dec_Aut	,6236	,1157	5,3923	,0000	,3937	,8535
Tim_Aut	-,0233	,1033	-,2254	,8222	-,2286	,1820

Standardized coefficients

	coeff
Alg_Mon	,0428
Met_Aut	-,1979
Dec_Aut	,7162

Tim_Aut -,0308

********** TOTAL EFFECT MODEL
****
OUTCOME VARIABLE:
Job_Sat

Model Summary

R	R-sq	MSE	F(HC3)	df1	df2	p
,0827	,0068	1,4726	,4318	1,0000	89,0000	,5128

Model

	coeff	se(HC3)	t	p	LLCI	ULCI
constant	5,5833	,2331	23,9504	,0000	5,1201	6,0465
Alg_Mon	-,0533	,0811	-,6571	,5128	-,2143	,1078

Standardized coefficients

	coeff
Alg_Mon	-,0827

********** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y
****

Total effect of X on Y

Effect	se(HC3)	t	p	LLCI	ULCI	c_cs
-,0533	,0811	-,6571	,5128	-,2143	,1078	-,0827

Direct effect of X on Y

Effect	se(HC3)	t	p	LLCI	ULCI	c'_cs
,0276	,0657	,4201	,6755	-,1029	,1581	,0428

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	-,0808	,0615	-,2133	,0277
Met_Aut	,0532	,0406	-,0230	,1393
Dec_Aut	-,1419	,0602	-,2695	-,0346
Tim_Aut	,0079	,0354	-,0654	,0787
(C1)	,1951	,0805	,0586	,3702
(C2)	,0453	,0626	-,0769	,1746
(C3)	-,1498	,0735	-,3070	-,0209

Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TOTAL	-,1255	,0911	-,3123	,0455
Met_Aut	,0826	,0612	-,0356	,2090
Dec_Aut	-,2204	,0859	-,3949	-,0573

Tim_Aut ,0123 ,0552 -,0980 ,1266
(C1) ,3030 ,1145 ,0975 ,5425
(C2) ,0703 ,0955 -,1224 ,2614
(C3) -,2326 ,1096 -,4638 -,0344

Specific indirect effect contrast definition(s):
(C1) Met_Aut minus Dec_Aut
(C2) Met_Aut minus Tim_Aut
(C3) Dec_Aut minus Tim_Aut

********** ANALYSIS NOTES AND ERRORS
****

Level of confidence for all confidence intervals in output:
95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
10000

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

------ END MATRIX -----