

M.Sc. in Social, Health and Organizational Psychology



The Relationships Between Self-Leadership, Job Autonomy,  
Self-Efficacy and Innovative Work Behavior

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## Abstract

Innovative behavior in the workplace is becoming increasingly important to keep up with the market changes. To investigate potential antecedents of innovative work behavior, this study examined the mediation role of self-efficacy on the relationship between self-leadership and innovative work behavior. Also, the moderation role of job autonomy between self-leadership and self-efficacy was researched. Lacking one overarching theory, the social cognitive theory (Bandura, 1986) and the job characteristics model (Hackman & Oldham, 1976) are used as a theoretical basis in describing the proposed relationships. The sample consisted of 147 working adults from 23 nations, primarily from the Netherlands, who completed a cross-sectional online survey. The findings revealed that an employee's belief in their abilities, self-efficacy, mediates the relationship between self-leadership behavior and their tendency to show innovative work behavior ( $\beta = .16, p < .05$ ). This indicates that employees who exhibit self-leadership behaviors tend to have higher levels of self-efficacy, which in turn leads to more innovative work behavior. However, the moderation effect of job autonomy on the relationship between self-leadership and self-efficacy was not found to be significant. Similarly, no correlation between self-leadership behavior and job autonomy could be found. Job autonomy thus operates independently from self-leadership behavior on innovative work behavior. A post-hoc analysis revealed that job autonomy acts as a direct antecedent of innovative work behavior, being even a stronger predictor than self-efficacy. Therefore, organizations aiming to foster innovative work behavior of employees should encourage job autonomy and create supportive environments for self-efficacy development.

*Keywords:* self-leadership, self-efficacy, innovative work behavior, job autonomy

## Introduction

In today's rapidly changing business environment, organizations are increasingly relying on innovation as a crucial factor for achieving success (Barsh et al., 2008; Tohidi & Jabbari, 2012). While more work is getting automated, employees are assigned to different work with other tasks, which cannot be done by machines. This offers employees opportunities to be creative and innovative at work, as they put their effort in less automatable tasks (Ghosh et al., 2022). Innovative work behavior (IN) refers to an individual's intentional and proactive behavior within a work role, group, or organization to create, introduce, and apply new and useful ideas, processes, products, or procedures (Janssen, 2000). Studies show a positive correlation between IN and the performance, success, and long-term sustainability of an organization (Anderson et al., 2014; DiLiello & Houghton, 2006; Kim & Park, 2017). It is, therefore, relevant for most organizations that innovative work behavior of employees is fostered in the work context. This study is going to address this topic by looking at different antecedents of innovative work behavior.

According to a McKinsey & Company survey, over 70% of senior executives believe innovation will drive their companies' growth in the next three to five years. However, fostering a culture of creativity and idea generation is challenging due to the lack of best-practice solutions and insufficient structures and processes. People and corporate culture are considered the most important drivers of innovation (Barsh et al., 2008). In this study, the focus will be on what personal characteristics and job characteristics might exist that foster innovative behavior in employees.

Research suggests that the concept of self-leadership may hold the key to unlocking innovative work behavior (Carmeli et al., 2006; Kusdinar & Haholongan, 2019). Some authors refer to SL as the process through which individuals influence their own behavior, directing themselves towards their goals and motivating themselves to perform well (Neck & Houghton, 2006; Stewart et al., 2011). In this study, SL is considered as a behavioral preference, and it will be called self-leadership behavior (SL). The aim of SL is to navigate personal and professional life more adequately, achieve goals, and maintain a positive mindset (Kusdinar & Haholongan, 2019). Fostering SL among employees might not only drive organizational innovation forward (Kalyar, 2011), but could also increase collaboration, commitment, and engagement within a team or organization (Bryant & Kazan, 2013).

Over 80% of the implemented innovative ideas come from employees, and only 20% come through planned improvement activities, from top-down managerial strategies (Getz & Robinson, 2003). When self-leadership behavior among employees may drive forward these

ideas, then bottom-up processes for idea generation and management across the organization should be fostered. Therefore, in this study, further aspects from the individual and from tasks are looked at, more specifically self-efficacy and job autonomy.

When looking at job descriptions and performance measures, adaptive behavior is a relevant factor that can be found in almost every job. Adaptive behavior as a performance dimension, regarding the performance required in job descriptions, also encompasses innovation (Koopmans et al., 2011). Therefore, studies that explored the antecedents of job performance may as well be taken into account in this study to build hypotheses concerning the dependent variable innovative work behavior. Learning and performance has already been shown to be affected by self-efficacy (SE) (Bernacki et al., 2015). SE is defined as an individual's belief in their ability to successfully carry out the necessary actions to achieve their desired outcomes (Chen et al., 2001). SE has a big impact on performance outcomes, such as job performance and academic achievement (Harrison et al., 1997). SE also shapes an employee's motivation and goal setting: Employees that believe in their capabilities to perform tasks successfully, may be more prone to set ambitious goals, invest effort and show perseverance when they face difficulties (Prussia et al., 1998).

Within the framework of Bandura's (1986) social cognitive theory (SCT), cognitive processes mediate the relationship between knowledge and action. It may therefore be argued that SE could be needed to get from an employee's SL to IN. The SCT also states that an individual's SE can influence their choice of activities, effort invested, resilience to challenge, and subsequent performance. To be able to work on an idea, an employee may need to believe in the success thereof, while being confident that the idea will be of use. In the job characteristics model (JCM) of Hackman and Oldham (1976), job autonomy stands out as a core job characteristic. This model suggests that when employees have more autonomy, they feel more responsible for their work outcomes. This responsibility can, in turn, influence their beliefs in their capabilities. Drawing from the JCM, it could be argued that fostering employees' job autonomy (JA) could enhance job satisfaction and effectiveness, possibly leading to a positive impact on the productivity of the organization. Hackman and Oldham (1976) defined job autonomy as the extent to which a job grants an employee the freedom and independence to organize their work and choose the best methods to complete their tasks. JA as a job characteristic allows employees some room to stimulate their self-leadership behavior. Therefore, it can be argued that the higher the job autonomy, the more employees are fostered to exercise self-leadership behavior. In jobs with high autonomy, the relationship between SE and SL could be stronger, while SL might generally lead to increased SE. SL and

SE might be influenced by how much control employees feel they have over their work. Within this framework, this study attempts to explore if job autonomy might moderate the link between self-leadership and self-efficacy.

This study aims to investigate the relationship between self-leadership and innovative behavior, while also exploring the moderating role of job autonomy in the workplace and the mediating role of self-efficacy. In particular, the study will address the following research questions:

*To what extent is self-leadership behavior related to innovative work behavior, and to what extent is this relationship mediated by self-efficacy? and To what extent does job autonomy strengthen the relationship between self-leadership and self-efficacy?*

### **Theoretical Framework**

Prior studies have not provided a theoretical model that accounts for these relationships within an integrative framework. This study uses the social-cognitive theory and the job characteristics model to design a conceptual model to study the relationships between the constructs.

#### **Self-leadership**

Neck and Houghton (2006) define self-leadership as the process through which individuals influence their own behavior, directing themselves towards their goals and motivating themselves to perform well. While literature associates self-leadership with three strategies that direct behavior (see Appendix A for an elaboration), this study centers its attention on the overarching concept of the preference for self-leadership behavior (SL).

Even though this study is not primarily focused on self-leadership strategies, past research underscores the importance of the strategies, which can also be found in Appendix A. Each of these strategies offers a different mechanism by which self-leadership can shape work-related behavior. However, this study will be mainly focusing on self-leadership as a behavioral preference, rather than the specific strategies.

Self-leadership is crucial in the workplace for all employees, regardless of if they have a managerial position or if they are subordinates (Pearce & Manz, 2005). It has been found that self-leadership can have an indirect positive impact on employees' perceptions of their work environment.

## **Self-Leadership and Innovative Behavior**

According to Janssen (2000), innovative work behaviors (INs) are considered voluntary actions that typically fall outside of employees' formal job descriptions or explicitly defined roles. This thesis will focus on measuring IN as an employee's behavioral preference of innovation. Self-leadership has already been found to positively influence innovative behavior at work (Carmeli et al., 2006, DiLiello & Houghton, 2006; Kalyar, 2011; Kang et al., 2022). Based on these findings, it can be argued that innovative work behavior is not prescribed behavior, thus, SL gives an employee room to lead themselves in exercising IN. Therefore, the first hypothesis can be created:

*H1: The more employees have a preference for self-leadership behavior, the more innovative behavior they can exercise in the workplace.*

## **Self-Leadership and Self-Efficacy**

Chen and colleagues (2001) define general self-efficacy as an individual's belief in their ability to successfully carry out the necessary actions to achieve their desired outcomes. This belief can have a significant influence on events that affect one's life. Self-efficacy is supposed to operate in three distinct ways: it shapes the goals employees set for themselves, it influences the level of effort and learning employees put into their work, and it impacts the persistence with which employees tackle new and challenging tasks (Bandura, 1982).

Self-efficacy can be conceptualized in two ways: as a trait or a state. Trait self-efficacy refers to a stable and generalized belief in one's capability across various situations (Luszczynska et al., 2005). In contrast, state self-efficacy is more context-specific and can change depending on a particular circumstance (Bandura, 1997). In this study, self-efficacy will be used as a trait, the degree to which individuals indicate to have a belief in their ability to reach behavioral goals.

Bandura's social cognitive theory (SCT) proposes that an individual's psychosocial functioning is determined by the interplay of behavior, cognitive and personal factors, and environmental events (1986). For this study, this could mean that a preference for self-leadership behavior may enhance the employees' self-efficacy beliefs by influencing their perception of their ability to engage in innovative behavior. Self-leadership encourages employees to find intrinsic motivation and personal satisfaction in their tasks, rather than relying solely on external rewards like monetary incentives or promotions (Kusdinar & Haholongan, 2019). This aspect of self-leadership, known as *natural rewards strategy*, can boost self-efficacy by making employees feel more competent and in control of their own

work. Furthermore, Prussia and colleagues (1998) found evidence that self-leadership behaviors might positively influence self-efficacy perceptions in students ( $r = .50$ ).

*H2: The more employees have a preference for self-leadership behavior, the more competent they believe they are.*

### **Self-Efficacy and Innovative Behavior**

According to Bandura (1997), self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments. People's capabilities influence the goals they set for themselves. The more competent people believe they are, the higher the goals they set for themselves and the stronger their commitment to them (Bandura, 1991).

Based on the proposed connection between self-efficacy and performance in the SCT, it might be argued that employees who believe that they are more competent will be more likely to engage in innovative work behavior. This might be because employees with a higher belief in their ability to perform a task are more likely to challenge themselves with harder tasks, while they perform more successfully and persist longer. Whereas self-leadership could be seen as a cognitive-behavioral attribute of the individual, and job autonomy would act as an environmental factor, influencing an individual's behavior (here: innovative work behavior), and perceptions of their work environment. In a meta-analysis, SE has been shown to have a significant positive relationship with work-related performance, with a weighted average correlation of  $r = .38$ , which can be transformed in a 28% increase in performance through self-efficacy (Stajkovic & Luthans, 1998).

Self-efficacy may influence how individuals think about their ability to be innovative and how they behave to get to an innovative end result. As employees might feel more capable and in control of their work, they may be better equipped to engage in innovative behavior, suggested Kusdinar and Haholongan (2019). A positive relationship between self-efficacy and innovative work behavior has already been found in a meta-analysis, with a moderate effect of  $r = .47$  (Dasmo et al., 2022). The effect of SE on IN seems to be even stronger than on work-related performance in general, as shown above, therefore it looks like SE could be a relevant booster for IN. To show innovative work behavior, employees need to trust that they can do their jobs well and efficiently. By believing they can be innovative, they are more likely to act that way (Dasmo et al., 2022). Therefore, the following hypothesis will be:

*H3: The more competent employees believe they are, the more innovative work behavior they show.*

Additionally, self-efficacy has already been shown to be a mediator between self-leadership strategies and performance (Konradt et al., 2009; Prussia et al., 1998). Following the argumentation above, the next hypothesis states:

*H4: The relationship between the tendency to exercise self-leadership behavior and innovative work behavior is mediated by an employee's belief in their competence.*

### **Self-Leadership, Self-Efficacy, and Job Autonomy**

Job autonomy (JA) is referred to as the degree to which a job provides independence and freedom to an employee when it comes to organizing their work and selecting the most suitable procedures to accomplish their tasks (Hackman & Oldham, 1976). Hackman and Oldham see the concept of job autonomy as one of the core job dimensions of their job characteristics model (JCM) that contribute to an employee's work motivation, satisfaction with the work, work performance, and low absenteeism (Hackman & Oldham, 1976). The framework of the JCM underlines that enhancing job autonomy can potentially enhance job satisfaction and overall effectiveness, meaning that it would also boost organizational productivity. Such autonomy in the job offers employees an environment to cultivate self-leadership behavior. Therefore, it could be argued that in a job with high autonomy the interplay between SL and SE could be more pronounced. While SL intrinsically boosts SE, both are likely influenced by the level of control employees are given through their job while working on their tasks.

Intrinsic motivation is often fueled by tasks that are autonomously regulated (Deci et al., 2017). This suggests that an employee's internal drive is related to the freedom they experience in their tasks. Furthermore, job autonomy can increase the possibilities for self-regulation (Taris & Kompier, 2005), a weaker form of self-influence than self-leadership (Houghton et al., 2003). This underlines that job autonomy has already been found to lay the groundwork for nurturing behaviors related to self-leadership. Autonomy can foster feelings of competence and belief in one's ability to work on tasks effectively, which is part of the self-efficacy concept (Bandura, 1977). This aligns with the work of Langfred & Moye (2004), who found that job autonomy can improve performance by fostering employees' perception of their capability and confidence in doing their work. It could be proposed that when job autonomy is high, the relationship between self-leadership and self-efficacy is amplified. This



is because employees, feeling more competent due to their autonomy, may better leverage self-leadership behaviors to bolster their self-efficacy. Therefore:

*H5: The relationship between self-leadership and self-efficacy is stronger for higher levels of job autonomy.*

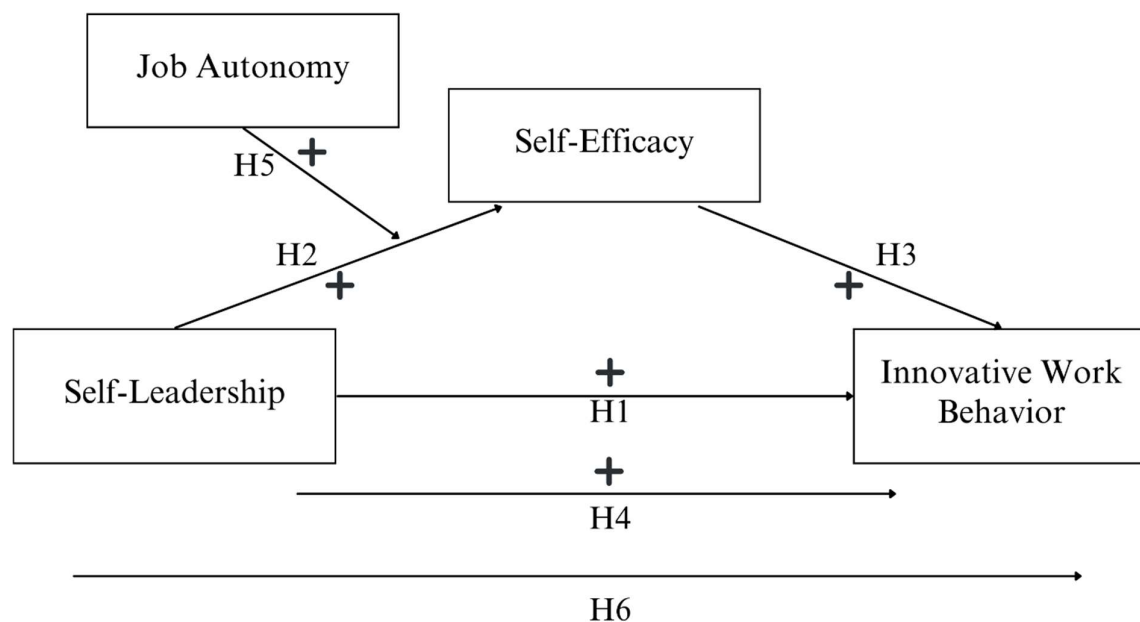
Saragih's (2011) study revealed a partial mediation of self-efficacy between job autonomy and job performance. This may indicate a positive influence of job autonomy on self-efficacy, which then affects job performance. Dhar (2016) found that job autonomy might act as a moderator, strengthening the relationship between leadership and innovative behavior. For this study, it could be proposed that higher levels of JA might enhance the positive effect of SL on SE, which in turn affects innovative work behavior.

*H6: Self-leadership influences innovative behavior directly, as well as indirectly through its impact on self-efficacy. This indirect effect is stronger when individuals perceive high levels of job autonomy.*

No control variables that might affect the relationships in the model were found in the literature. Therefore, the study focuses on the hypotheses as shown in Figure 1.

**Figure 1**

*Conceptual Model*



## Method

### Data Collection

The conceptual model in this study will be tested as quantitative research conducted through a survey study. To efficiently gather extensive information about participants' behavior and perspectives in a short time, a survey format was chosen (Fink, 2003), for which the online survey tool Qualtrics was used (Copyright © 2023 Qualtrics). This study was first submitted to and approved by the Ethical Review Board of the Faculty of Social and Behavioral Sciences of Utrecht University (file number: 22-2240).

Two master's students collaborated on a self-leadership research questionnaire, distributed as an online survey. Each student investigated three predictors, with two predictors being the same for both students. In this study, two distinct questionnaires were utilized, distributed to a convenient sample: one was distributed to all employees of Advantech Europe by email with the dear request to join the study, while the other was shared through social media platforms, snowballed further online. Given the minor differences between the two samples, it was deemed suitable to consolidate them into a single dataset for data analysis. The data collection stage took two months. The constructs in this study are measured using quantitative, cross-sectional, and single-source data. The whole survey is in Appendix B.

### Participants

This study aims to explore adults (18 years and older) who are active in the labor market. The sample size was calculated with G\*Power (version 3.1.9.7), indicating the estimated sample size with 119 respondents. This is based on a medium effect size of  $f^2 = .15$ , a significance level of  $\alpha = .05$ , power of 0.95 and three predictor variables (Faul et al., 2007). This effect size is chosen because of the moderate strengths of the relationships observed in the literature relating to the research question (Carmeli et al., 2006, Prussia et al., 1998, Dasmo et al., 2022, van Dorssen-Boog et al., 2022). In total, 149 participants completed the questionnaire. One participant did not give consent and was therefore excluded. Two extreme outliers, both from the same participant, were determined by histograms and boxplots. This participant was excluded, resulting in 147 valid participants.

The 147 participants showed a balanced gender distribution: 73 females (49.7%) and 74 males (50.2%). The ages of the participants ranged from 20 to 64 years with an average age of 35 years. As for employment status, 70% of the participants were employed full-time, while 23.1% worked part-time. Three participants (2.1%) were self-employed, and seven participants (4.8%) fell into other categories of employment. The participants were of diverse

nationalities, with the majority being Dutch (42%), followed by German (11%), Italian (7%), and American (7%). Participants from other countries each represented 4% or less of the sample, and seven participants (5%) did not disclose their nationality. Table 1 (Appendix C) shows the sociodemographic characteristics of the sample group. See Appendix E for further elaboration on inclusion of participants.

### ***Participants from Advantech***

Advantech is an Internet of Things (IoT) technology company that works mainly business to business, providing a variety of industry 4.0 products that help real-time data transmission, connecting several machines to each other over routers and offering programs that support in supervising and analyzing the workflow. The products are mainly customized, making it possible to serve customers with their ideas for very specific and specialized products. The slogan of Advantech is *empowering an innovative future*. Innovation is seen as the key to the future, which made the company very interested in this thesis' topic. Advantech is an international organization, with over 8.000 employees from more than 35 countries worldwide.

### **Measures**

Measurement scales will be used to operationalize the definitions stated in the conceptual model and hypotheses. Those scales are appropriate for the target population and have shown adequate reliability and validity in previous studies. All four scales mentioned below make use of a 5-point Likert scale ranging from 1= *strongly disagree*, to 5= *strongly agree*.

The reliability measure Cronbach's  $\alpha$  value is seen as "good" if it is around .8 or higher (Field, 2009). Because the overall Cronbach's  $\alpha$  is affected by the number of items being analyzed, more indicative seems the average inter-item correlation. The inter-item correlation value should be above .3 to indicate a good overall correlation between the items (Field, 2009). Both measures will be reported.

A Principal Component Analysis (PCA) was run to evaluate whether each scale with its corresponding items measure the identified variables (Field, 2009). This was done for each scale, and their PCAs will also be mentioned in every questionnaire description below separately. For further details on the PCA, see Appendix D.

### ***Self-Leadership.***

The Abbreviated Self-Leadership Questionnaire (Houghton et al., 2012) will be used to assess SL as a behavioral preference. It is a more elaborated version of the Revised Self-Leadership Questionnaire by Houghton and Neck (2002). The three factors Houghton and colleagues (2012) identified using an explanatory factor analysis come with three questions per dimension. Over all three factors, a Cronbach's  $\alpha$  of .81 was reported (Houghton et al., 2012). This is a fair result given the diversity of the construct that is covered by only nine items. Items include "*Sometimes I picture in my mind a successful performance before I actually do a task (visualizing performance)*" and "*Sometimes I talk to myself (out loud or in my head) to work through difficult situations (evaluating beliefs and assumptions)*".

To check whether the three factors can be identified within this study, a PCA has been conducted. The assumptions were given by a Kaiser-Maier-Olkin (KMO) value of .74, and a significant Bartlett's Test of Sphericity (BTS) ( $X^2(36, N = 147) = 537.8, p < .001$ ). The PCA identified three factors (Table 2, Appendix D). For this study, a one factor solution will be used according to the original definition and use of the scale, whereas the loadings can also be found in Appendix D (Table 3). Cronbach's alpha has been measured with  $\alpha = .81$ . The average inter-item correlation for SL resulted in .33.

### ***Self-Efficacy.***

The New General Self-Efficacy (NGSE) scale by Chen et al. (2001) with 8 items was used to measure the personal characteristic *Self-Efficacy*. This questionnaire has been used in several studies to measure self-efficacy of employees, with the internal consistency reported ranging from Cronbach's  $\alpha$  .81 to .92 (Chen et al., 2001; Azizli et al., 2015; Crane et al., 2017; Uppathampracha & Liu, 2022). A reliability analysis of the scale within the current study showed a Cronbach's  $\alpha$  of 0.86. The average inter-item correlation for SE was .35.

Example items are "*I believe I can succeed at most any endeavor to which I set my mind*" and "*I am confident that I can perform effectively on many different tasks*". Chen and colleagues (2001) found their questionnaire to be factorial unidimensional, which means that self-efficacy is measured as one construct. This assumption is checked by conducting a PCA. The dataset showed a KMO measure of Sampling Adequacy of .83, and a significant BTS ( $X^2(28, N = 147) = 352.14, p < .001$ ). The correlation between items were sufficiently large for PCA. The PCA revealed the presence of two components, whereas a further investigation showed that the second component only describes an additional 13% of the variance, with an

Eigenvalue of 1.04. The decision was made, using the scree test, to only use one component, explaining 44.2% of the variance in total (Appendix D, Table 13).

### ***Job Autonomy.***

To measure job autonomy, the work autonomy scale of Breugh (1985) was used in this study. The survey comprises of nine questions. In previous research, the Cronbach's alpha was  $\alpha = 0.78$ , whereas in this study, it demonstrates good internal consistency, with a Cronbach's alpha of  $\alpha = .85$ . The average inter-item correlation for JA was .38.

Sample items are *I am free to choose the method(s) to use in carrying out my work* and *My job is such that I can decide when to do particular work activities*. The dataset was deemed suitable with a KMO value of .82, and a significant BTS ( $X^2(36, N = 147) = 478.96, p < .001$ ). The PCA showed two components, whereas the second component only describes an additional 13% of the variance, with an Eigenvalue of 1.18. Using the scree test, only one component has been found, explaining 45.1% of the variance in total (Appendix D, Table 14).

### ***Innovative Work Behavior***

The five innovativeness items of Stull and Sigh's (2005) questionnaire were used. The items originate from a 15-item measurement for the dimensions of entrepreneurial orientation (risk taking, innovativeness, and proactiveness). This scale was chosen, because the questionnaire was already used in the Netherlands in previous studies (Wakkee et al., 2010).

In this study, for innovative work behavior, Cronbach's  $\alpha$  of .85 was found, which indicates a good internal consistency. The average inter-item correlation for IN was .55.

Sample items of innovativeness include "*I develop new processes, services or products*", and "*I find new ways to do things*". The correlation between the items was found to be adequate with KMO (= .83) and BTS ( $X^2(10, N = 147) = 317.64, p < .001$ ). The PCA results in one component, which explains 64% of the variance (Appendix D, Table 15).

### ***Control Variables.***

No control variables were used in this research. Previous literature has not shown consistency in the results of control variables for these relations. This study concentrates on the most important relationships between the different variables instead of the influence of control variables. The demographic questions included in the survey, such as age, gender, employment status, were solely used to describe the sample population.

## Data Analysis

Statistical analyses were conducted using the Statistical Program for Social Sciences (SPSS, Version 29). For every case, each means of the four questionnaires were computed. First, missing values and outliers were controlled, and the sample was analyzed (Appendix C). Descriptive statistics were used to estimate reliability, means and standard deviation of the scales (Table 6). Then, the assumptions for regression were tested. Finally, linear regression analysis was used to test hypotheses 1, 2, and 3. The PROCESS macro for SPSS (version 4.3; Hayes, 2022) Model 4 was used for the simple mediation analysis (H4), Model 1 for the simple moderation, and Model 7 for the moderated mediation analysis (H6). To test the hypotheses, results are considered significant using a 95% confidence level ( $\alpha = .05$ ). The Johnson-Neyman technique will be used as bootstrapping method.

The variables are checked for the assumptions of homoscedasticity, normal distribution of residuals, multicollinearity, as well as of linearity. All necessary assumptions to perform the testing of hypotheses are met, as shown in Appendix F.

## Results

### Descriptive Statistics and Correlations

Table 4 shows the means (M), standard deviations (SD), Cronbach's Alpha ( $\alpha$ ), average inter-item correlation, and Pearson's correlations of the variables in this study, as well as the variables age and gender. The present study included 147 respondents, with measures for Self-Leadership Behavior (SL), Job Autonomy (JA), Self-Efficacy (SE), and Innovative Work Behavior (IN). The mean scores for these measures were relatively high, ranging from 3.67 (IN) to 4.11 (SE) on a 5-point Likert scale, indicating overall agreement with the statements in these scales, in which 1 is low and 5 is high (with 1= *strongly disagree*, to 5= *strongly agree*). Considering Cronbach's alpha to be .80 or better (Cortina, 1993), this study's scales showed acceptable reliability with Cronbach's alpha ranging from .81-.85, as well as a good inter-item correlation ranging from .33-.55. The standard deviations ranged from 0.49 (SE) to 0.75 (IN), demonstrating some variability in the responses, but not extremely so. This level of standard deviation is typical and expected in such surveys, it shows that the data are neither too uniform nor too spread. SE showed moderately strong positive relationships with all the variables. It had the highest correlation with SL ( $r = .43, p < .05$ ), followed by IN ( $r = .41, p < .05$ ), and JA ( $r = .31, p < .05$ ). SL was positively associated with IN ( $r = .24, p < .05$ ). The correlation between SL and JA was not significant ( $r = -.02, p = .43$ ), suggesting no

relationship between these variables. The gender variable (1= male, 2 = female) showed an equal distribution with a mean score of 1.5. The mean age was 35 years, ranging from 20-64 years ( $SD = 10.6$ ,  $Mdn = 32$ ).

**Table 4**

*Means, Standard Deviations, and Correlations*

	<i>n</i>	<i>M</i>	<i>SD</i>	$\alpha$	<i>Av. inter-</i> <i>item corr.</i>	<i>Bivariate correlations</i>					
						<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
1. Self-Leadership Behavior	147	3.68	.64	.81	.33	-					
2. Job Autonomy	147	3.80	.67	.85	.38	-.015	-				
3. Self-Efficacy	147	4.11	.49	.81	.35	.432*	.309*	-			
4. Innovative Work Behavior	147	3.67	.75	.85	.55	.235*	.432*	.407*	-		
5. Gender	147	1.5	.5			.129	.005	.093	.565	-	
6. Age	147	35	10.6			.02	.287*	.073	.18*	-.286*	-

*Note.* *n* = number of respondents, *M* = Mean, *SD* = Standard Deviation,  $\alpha$  = Cronbach's Alpha.

\*Correlation is significant at the .05 level (2-tailed,  $p < .05$ ).

*Gender* (1 = Male, 2 = Female). *Age* in years.

*Range of all four scales: 1-5, with 1= strongly disagree, to 5= strongly agree.*

## Testing of Hypotheses

As described in the analysis section, hypotheses 1, 2, and 3 (direct relationships) are tested using linear regression analyses, while hypotheses 4, 5 and 6 are tested using the PROCESS macro of Hayes (2022), model 4 for the mediation (H4), model 1 for the moderation (H5), and model 7 for the moderated mediation (H6). This section will go through the hypotheses in the order they were stated. Table 5 shows the linear regression outputs of hypotheses 1, 2, and 3, while Table 6 presents the mediation, Table 7 the moderation, and Table 8 the moderated mediation testing the whole model. Whenever applicable, the standardized regression (or: beta,  $\beta$ -) coefficients will be reported, as they allow us to compare the variables directly: the bigger the absolute value, the more important the predictor (Field, 2009). The standardized beta values report the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor. These beta

coefficients are analyzed in a similar manner to correlations, where a beta value less than 0.20 is seen as a weak effect, between 0.2 and 0.5 is regarded as a moderate effect, and a beta value greater than 0.5 signifies a strong effect (Acock, 2014).

Hypothesis 1 states that employees who have high levels of self-leadership behavior will show more innovative work behavior. The direct effect between SL and IN was found to be significant, positive and moderate ( $\beta = .24, p = .004$ ). Self-leadership behavior significantly predicts innovative work behavior. Therefore, hypothesis 1 is supported. Furthermore, the  $R^2$  of the relationship is .055, which means that 5.5 % of the variance in innovative work behavior is explained by self-leadership behavior.

Hypothesis 2 states that the more employees show a preference in self-leadership behavior, the more they believe in their capability to work on their goals successfully. SL significantly predicts SE ( $\beta = .41, t(145) = 5.77, p < .001$ ), explaining 18.7% of the variance in SE ( $R^2 = .187$ ). H2 can therefore be accepted.

Hypothesis 3 states that the more employees believe in their capabilities to successfully perform a task, the more they are involved in innovative work behavior. The positive relationship between those concepts is found to be significant in this study ( $\beta = .41, t(145) = 5.37, p < .001$ ), SE explaining 16.6% of the variance in IN. H3 is therefore supported.

**Table 5**

*Linear Regression Analyses Output of Hypotheses 1, 2, and 3*

Variable	$\beta$	SE	$R^2$	$t$	sig. ( $p$ )
<i>Dependent variable Innovative Work Behavior (H1, H3)</i>					
Self-Leadership	.24	.09	.06	2.91	.004
Self-Efficacy	.41	.12	.17	5.37	< .001
<i>Dependent variable Self-Efficacy (H2)</i>					
Self-Leadership	.43	.06	.19	5.77	< .001

*Note.*  $\beta$  = standardized coefficient, SE = standard error,  $R^2$  = R-squared. Results significant at the .05 level.



Hypothesis 4 states that an employee's belief in their capabilities to successfully perform a task mediates the relationship between self-leadership behavior and involvement in innovative work behavior. In this mediation model, SE is shown to be a significant predictor of IN ( $\beta = .38, t(144) = 4.46, p < .001$ ). SL, on the other side, was not a significant direct predictor of IN ( $\beta = .07, t(144) = .86, p = .392$ ). The indirect effect of SL on IN through SE is significant, as shown by the absence of zero in the bootstrapped 95% confidence interval, using 5,000 bootstrap samples ( $\beta = .16, 95\% \text{ CI } [.09, .24]$ ) (Table 6). This indicates the difference between the total effect and the direct effect, which shows the additional effect SE can uncover on IN. This means that when SE is introduced in the model, a significant portion of the original relationship between SL and IN (H1) is explained. Consequently, when SE as a mediator is considered, SL does not show any significant effect on IN. These results reflect a full mediation effect of self-efficacy in this model ( $F(2, 144) = 14.74, p < .001$ ), explaining 17% of the variance in IN. Therefore, the findings do support hypothesis 4. The conceptual display of the tested mediation's results is shown in Figure 2.

**Table 6**

*Simple Mediation Analyses Output of Hypothesis 4, PROCESS Model 4*

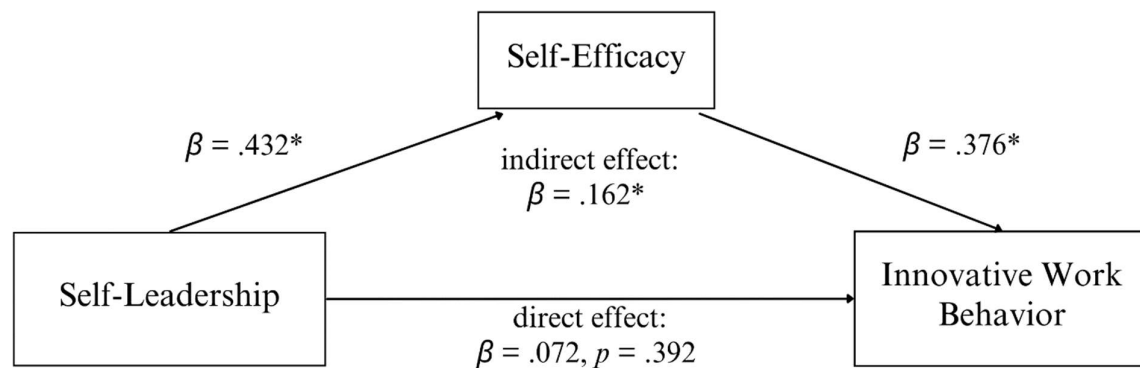
Variable	Effect	(Boot)SE	(Boot)LLCI	(Boot)ULCI
<i>Indirect standardized effect</i>				
SL on IN through SE	.162	.037	.093	.238
<i>Direct unstandardized effect</i>				
SL on IN	.084	.098	-.110	.279

*Note: BootSE = bootstrap standard error, BootLLCI = bootstrap lower limit confidence*

*interval, BootULCI = bootstrap upper limit confidence interval. These bootstrap measures apply only to the indirect effect. For the direct (unstandardized) effect, the measures used are SE, LLCI, ULCI. If the confidence interval does not contain zero, the effect is considered significant at the .05 level.*

**Figure 2**

*Conceptual Display of the Standardized  $\beta$ -Coefficients as Result of Testing Mediation H4.*



*Note.* \* = Effect is significant at the .05 level.

Hypothesis 5 proposes that job autonomy moderates the relationship between self-leadership and self-efficacy. Specifically, the strength of this relationship is expected to be greater for individuals who perceive high levels of job autonomy compared to those who perceive low levels of job autonomy. A moderated regression analysis was conducted using PROCESS Model 1. The overall model was statistically significant ( $R^2 = .29$ ,  $F(3, 143) = 19.2$ ,  $p < .001$ ), with the predictors explaining 28.7% % of variance in SE. However, the moderation analysis showed that SL ( $b = .35$ ,  $p = .242$ ), JA ( $b = .25$ ,  $p = .383$ ), and their interaction SL x JA ( $b = -.00$ , 95% CI  $[-.15, .14]$ ,  $t = -.06$ ,  $p = .952$ ) had no significant relationship to SE (Table 7). This indicates that JA does not have any significant moderation effect on the relationship between SL and SE. Therefore, hypothesis 5 is not supported.

**Table 7**

*Simple Moderation Analysis on Self-Efficacy, with PROCESS Model 1*

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>CI (95%)</i>
(constant)	1.96	1.11	1.76	.080	[-.24, 4.16]
SL	.35	.30	1.17	.242	[-.24, .93]
JA	.25	.28	.88	.383	[-.31, .80]
Interaction (SL x JA)	-.01	.08	-.06	.952	[-.15, .14]

*Note.* *b* = unstandardized coefficient, *SE* = standard error

Hypothesis 6 proposes that an employee's job autonomy influences the indirect relationship between self-leadership behavior and innovative work behavior, mediated by their self-efficacy. The moderated mediation regression analysis with PROCESS Model 7 did not find a significant effect on IN from SL and SE (Table 8). The conditional indirect effects of SL on IN through SE at various levels of JA were not significant ( $b = .08, p = .392$ ). The index showed no significant indirect effect moderated by JA, which uses the multiplication of the regression weight of the interaction SL x JA on SE (a-path), with the regression weight of SE on IN (b-path) (Index =  $-.003$ , BootSE =  $.06$ , 95% CI  $[-.12, .12]$ ). Hypothesis 6 was therefore rejected. Table 9 in Appendix G shows the indirect effect of SL on IN through SE, with different levels of JA. Table 10 presents an overview of all six hypotheses and their results.

**Table 8**

*Moderated Mediation Analysis on Innovative Work Behavior, with PROCESS Model 7*

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>CI (95%)</i>
(constant)	0.97	.50	1.92	.057	[-.03, 1.96]
SL	0.08	.10	.86	.392	[-.11, .28]
SE	0.58	.13	4.46	<.001	[.32, .84]

*Note. b = unstandardized coefficient, SE = standard error*

**Table 10***Findings regarding hypotheses*

Hypothesis	Result
1. Self-leadership is positively related to innovative behavior in employees.	Supported
2. The more employees have a preference for self-leadership behavior, the more competent they believe they are.	Supported
3. The more competent employees believe they are, the more innovative work behavior they show.	Supported
4. The relationship between the tendency to exercise self-leadership behavior and innovative work behavior is mediated by an employee's belief in their competence.	Supported
5. The relationship between self-leadership and self-efficacy is stronger for higher levels of job autonomy.	Not supported
6. Self-leadership influences innovative behavior directly, as well as indirectly through its impact on self-efficacy. This indirect effect is stronger when individuals perceive high levels of job autonomy.	Not supported

**Post-Hoc Analyses**

The analysis showed that self-leadership behavior does not correlate with job autonomy,  $r = -.02$ ,  $p = .86$ . As indicated in the correlation matrix, job autonomy correlates with self-efficacy ( $r = .31$ ) and innovative work behavior ( $r = .43$ ), but not with self-leadership behavior ( $r = -.15$ ), while self-leadership behavior correlates as well with self-efficacy ( $r = .43$ ) and innovative work behavior ( $r = .24$ ). This post-hoc analysis delves into the relationship between JA and IN. It posits that, instead of being a conditional factor that affects the relationship between SL and SE as initially hypothesized, JA may directly influence IN. This raises the questions: Could job autonomy potentially act as a predictor of innovative work behavior, rather than a moderator as initially assumed? And would JA be

able to explain more variance in IN than SE? The post-hoc analysis addresses these interesting questions through a stepwise multiple regression.

### ***Individual Predictors – Stepwise Regression***

With a stepwise multiple regression, the variables join the regression stepwise, from most to least predictive, while the least predictive variables are excluded (Field, 2009). The results show that in step 1, job autonomy was entered, which explains 18,7% of the variance in innovative work behavior ( $F(1, 145) = 33.36, p < .001$ ). In step 2, self-efficacy was added, explaining an additional of 8,3% of the variance in innovative work behavior ( $F_{Change}(1, 145) = 16.27, p < .001$ ). Model 2 was the best predictive model, with the two predictors JA and SE together explaining 27% ( $p < .001$ ) of the variance in IN (Appendix H, Table 12). In this final model, self-leadership was excluded, as it yielded no significant effect on innovative work behavior ( $t(1,145) = 1.74, p = .084$ ). The final conceptual model is in Appendix H, Figure 4.

## **Discussion**

This study attempted to investigate the relationship between self-leadership behavior (SL) and innovative work behavior (IN), and to what extent the mediator self-efficacy (SE) influences this relationship. Also predicted by this study was that job autonomy (JA) would positively moderate the relationship between SL and SE.

The results of this study support the idea that SL stimulates IN. Moreover, the findings show that this relationship is statistically significant to be positively fully mediated by SE. This indicates that when SE is introduced in the model, a significant portion of the original relationship between SL and IN is explained. This suggests that SL of employees can be fostered by their beliefs in their capabilities to successfully work towards their goals, which is strengthened through their self-leadership behavior. The moderation of JA on the relationship between SL and SE could not be proven. This indicates that high levels of autonomy do not strengthen the effects of SL on SE, contrary to the predictions of this study. The whole model, testing if the indirect relationship between SL and IN through SE was moderated by JA, had no significant effect. Additionally, the post-hoc analysis results revealed that the best model to predict IN includes the variables JA and SE, but not SL.

## **Theoretical Contributions**

Given the absence of an overarching theory to support the entire model in this study, different theories and models are used to substantiate the single relationships in the model.

Applying several theories is shown to be useful, since the mediation was statistically significant. The results of this study show that SL has a statistically significant, moderate positive effect on IN (H1) ( $\beta = .23, p = .004$ ). This is in line with the findings from previous research, in which a strong positive effect has been found ( $\beta = .96, p < .001$ ) (Carmeli et al., 2006). This means that when an employee shows a preference in exercising self-leadership behavior, they will show more innovative work behavior. A possible explanation for this relationship could be that innovation often requires employees to set challenging goals, manage resources effectively, and think outside the box to come up with new ideas or solutions (Carmeli et al., 2006).

Furthermore, self-leadership behavior has been found to enhance employees' self-efficacy (H2) ( $\beta = .43, p < .001$ ), with a moderate effect. This is in line with previous studies' research findings, where a moderate positive relationship between self-leadership strategies and self-efficacy perceptions has been found ( $r = .50$ ) (Prussia et al., 1998). The results seem to support the idea that setting personal goals and strategies to achieve them, and meeting those goals, can increase the employees' beliefs in their capabilities, which strengthens their self-efficacy. Also, SL requires self-regulation, with which employees become more aware of their actions as they learn to assess their performance. Intrinsic motivation, fostered by SL, can lead to persistent effort, and could boost the feelings of competence. Both, SL and intrinsic motivation, could strengthen self-efficacy through employees realizing how capable they are.

SE has been found to have a significant moderate positive effect on IN (H3) ( $\beta = .41, p < .001$ ). This is also in line with a previous meta-analysis, which has found a moderate effect ( $r = .47$ ; Dasmo et al., 2022). Bandura's (1986) social cognitive theory (SCT) provides a theoretical foundation for this observation. It suggests that individuals with higher SE tend to perform better due to their belief in their abilities. Applying this to an organizational context, it underscores the observed pattern that employees with higher SE levels might be more likely to show IN. A possible reason could be that employees may be better equipped to engage in innovative work behavior when they feel more capable and in control of their work (Kusdinar & Haholongan, 2019). Employees who believe in their capabilities could be more willing to persist challenges, learn from failures, and approach problems creatively, which might strengthen innovative work behavior.

The indirect effect of the full mediation of self-efficacy on the relationship between self-leadership and innovative work behavior was confirmed (H4) ( $\beta = .16, p < .001$ ). To the best of the author's knowledge, these findings are previously unreported. Building on the

argument of this paper, that adaptive behavior as a performance dimension also integrates innovation (Koopmans et al., 2011), this result enhances Prussia and colleagues' (1998) findings. In their research, SE was found to be a significant full mediator in the relationship between SL and *performance*, with their 95% confidence interval not including zero. In most jobs, innovative work behavior is not only relevant, but also a common job requirement. The results suggest that self-leadership behavior may enhance an employee's belief in their abilities, which might encourage innovative work behavior.

As the full mediation of self-efficacy has been observed, the direct effect between self-leadership and innovative work behavior does not hold statistical significance. If SL has no significant direct effect on IN, but instead works through the mechanism of enhancing SE, then existing models and frameworks centered on SL in organizational settings may need to be re-evaluated, as they might be missing a key component. Furthermore, through the lens of the SCT, this study showed a more nuanced approach within an organizational environment. It emphasizes the importance of self-efficacy between self-leadership behavior and their subsequent actions, in this case, innovative work behavior. The mediation effect also highlights the central role of SE in determining IN. This means that, when implementing self-leadership strategies, the focus should primarily be on strategies that strengthen self-efficacy.

The expected moderation effect of job autonomy on the relationship between self-leadership and self-efficacy (H5), as well as on the indirect relationship between self-leadership and innovative work behavior, mediated by self-efficacy (H6), was not found in this study. Upon initial analysis, these results appear to contradict previous findings where job autonomy was observed to have a significant effect on *self-leadership behavior*, but not on *self-leadership strategies* (van Dorssen-Boog et al., 2022). They used both measurements, because the two were hypothesized to measure different aspects of self-leadership. The level of healthcare workers' autonomy seems to directly affect how they behave, but it does not necessarily influence their internal strategies for self-leadership. They speculate that this might be because healthcare workers may have a clearly defined job, which is rather practical than conceptual, so there is less need for self-leadership strategies. A closer look reveals a methodological divergence. They used the Revised Self-Leadership Questionnaire (RSLQ) of Houghton and Neck (2002) to measure *self-leadership strategies*. This study made use of the abbreviated version thereof, the ASLQ (see Methods section), to measure *self-leadership behavior*. Surprisingly, van Dorssen-Boog and colleagues' *strategies* align with this study's *behavior* concept. The recent findings, showing no significant correlation between SL and JA, resonate with theirs, despite the different terminologies. The findings might be due to the

nature of certain jobs, which are more predefined and task oriented. Such jobs might reduce the perceived need for self-leadership behaviors, as roles and responsibilities are clear and leave less room for personal input. It seems that JA might not directly modify how employees internally strategize for self-leadership, especially in a more structured role. The specific job context and the nature of the role might therefore be worth looking at when examining job autonomy and self-leadership behaviors, as well as work outcomes.

Looking at the correlations between the variables, the study shows that employees who feel confident and display innovative behavior often perceive they have more job autonomy. Additionally, those who demonstrate self-leadership behavior are also more confident and tend to be more innovative. This is surprising, as everything except SL and JA is correlated. The findings might suggest that self-leadership behavior might not necessarily be influenced by the structural freedoms granted by the organization, such as JA. Given the results, while both JA and SL each correlate with IN, the stepwise multiple regression was conducted. In this post-hoc analysis, JA has been found to be the strongest predictor among the three independent variables on IN, with the most predictive model including JA and SE, but not SL. The freedom and independence granted by JA, therefore, can directly foster innovative work behavior without necessarily requiring intermediate self-leadership behaviors. This could mean that personal motivational strategies and structural job characteristics might have distinct ways influencing innovative work behavior. High autonomy jobs seem to support employees, giving them the necessary room to explore innovative ideas. Given the direct impact of job autonomy on innovative work behavior, it could be argued that structural freedom in shaping employees' work outcomes might be a good option for organizations to foster IN.

### **Practical Implications**

The results of this study have several practical implications. First, in the introduction, the question was raised what personal characteristics might exist that foster innovative work behavior in employees. The literature points to self-leadership, contrary to this study that showed that the main function of self-leadership behavior seems to be its ability to strengthen employees' self-efficacy. While SL is correlated with IN, but stronger with SE, it seems more likely that SL is a driver for SE, which in turn promotes innovative work behavior. More research is needed to address this topic, as this has shown to be a relevant personal characteristic in work outcomes like IN. Nevertheless, organizations should already consider using training programs and interventions that not only promote self-leadership behavior, but



also focus on building self-efficacy among employees. This could involve mentorship and feedback programs, to support employees in the belief in their capabilities.

Second, this study's findings, emphasizing the non-existent correlation between SL and JA, indicate that employees' self-leadership behavior is not influenced by their perception of job autonomy. Instead, JA alongside SE might play a more critical role in directly influencing IN than previously recognized, explored with the stepwise multiple regression model. In the broader research landscape, Saragih's study (2011) found a positive relationship between job autonomy and outcomes such as job performance and job satisfaction, as well as self-efficacy. While Saragih further identified self-efficacy as a partial mediator between job autonomy and job performance, this study points towards JA having a more direct relationship with IN, positioning it as a stronger predictor than SE. Another study suggested that job autonomy might be an important job resource for employees, one which could satisfy their basic psychological need for autonomy (van den Broeck et al., 2008). These findings show, in line with this study, that job autonomy may be important for improving work outcomes and building employees' self-efficacy, because it might allow employees to have more control over their work, as well as greater beliefs in their capabilities, to be a direct predictor of innovative work outcomes.

### **Limitations and Future Research**

Besides the contributions, the limitations of this study will also be addressed. One of the limitations that can be mentioned is that every scale of the survey was self-reported. According to research, self-reported measures of innovative performance may be more subjective, reflecting the employees' beliefs and attitudes towards their innovative capabilities, instead of providing an objective measure of their actual innovative contributions (Reiter-Palmon et al., 2012). But, if future researchers assess innovative work behavior by actual contributions, how could this be measured objectively? It seems very difficult to measure those innovative efforts of employees, given that not every work performance could be an innovative one. It therefore is expected that, as a useful measurement, additionally both peer and supervisor ratings of innovative work behavior should be considered (de Jong & den Hartog, 2010). This could be an interesting topic for further investigation.

Another limitation could be the choice of sample within this study. Interestingly, in the sample of this study, age correlated positively with job autonomy, which might have influenced the results. This could be an effect of experience, as it seems possible that older employees would rather have jobs with more tasks that allow them to make their own

decisions. Thinking further, as this study also found JA and SE to be the best predictive model to measure IN, the findings of Miraglia and colleagues' (2017) longitudinal study are interesting. They found a positive relationship between self-efficacy and job performance over time, which is mediated by job crafting. This could mean, adding these findings to the ones of this study, that, even as employees gain more autonomy with age, their innovative work behavior could be increasingly influenced by their self-efficacy and the active role they play in crafting their job roles. Also, employees could use this growing job autonomy more effectively if they have confidence in their abilities and take an active role in defining their jobs, which could lead to more innovative work behavior. Given the anticipated increase in the working age of employees in the coming decades (Kuitto & Helmdag, 2021), understanding this interplay becomes relevant for organizations. Organizations would benefit from fostering an environment where employees, especially older ones, are encouraged to believe in their abilities and take an active role in crafting their job responsibilities. This might lead potentially to more innovative work behavior, and probably also an employee that would like to remain in the organization.

## **Conclusion**

To conclude, this study aimed to investigate the influence of self-efficacy on the relationship between self-leadership behavior and innovative work behavior, and the strength of the relationship between self-leadership behavior and self-efficacy on different levels of job autonomy. The results of this study found a not yet discovered full mediation of self-efficacy on the relationship between self-leadership behavior and innovative work behavior. However, contrary to the hypotheses, job autonomy does not moderate the relationship between self-leadership behavior and self-efficacy, and does not correlate with self-leadership behavior. This implies that the tendency to exercise self-leadership behavior may operate independently of job autonomy. The post-hoc analysis showed that job autonomy works as a direct antecedent of innovative work behavior, being a stronger predictor than self-efficacy. The best predicting model for innovative work behavior has been found to be self-efficacy together with job autonomy. The results of this study show the importance of the job characteristic autonomy in influencing innovative work behavior. Also discussed is the need for future research into the roles of self-efficacy and job autonomy.

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## Appendices

### Appendix A: Self-Leadership Strategies

These strategies include various techniques that individuals use to influence their own feelings, thoughts, and behaviors, towards achieving their goals. Behavior-focused strategies, such as exercising self-awareness, are designed to help individuals take control of their own behavior and motivate themselves to complete tasks that they might otherwise avoid. Natural reward strategies are based on the idea that individuals are more likely to engage in behavior that is enjoyable, thus identifying and incorporating these enjoyable aspects into tasks could boost motivation, which may improve performance. Constructive thought pattern strategies are designed to identify and replace dysfunctional beliefs and assumptions (Goldsby et al., 2021).

These three self-leadership strategies have been empirically linked to specific work outcomes. Firstly, the behavior-focused strategy has been shown to result in positive innovative work behavior (Jensen & Raver, 2012). Secondly, the natural-reward strategy is in line with Deci and Ryan's (1985) self-determination theory, that states that the need for competence and self-determination drives intrinsic motivation to complete a set goal. And thirdly, the constructive thought-pattern strategy can be established in desirable ways, e.g., imagining the successful performance of a task prior to doing it (Neck & Manz, 1996).

## Appendix B: Thesis Survey

---

### Start of Block: Introduction

Q15 Welcome!

The purpose of this thesis research is to measure and gain insight on self-leadership, the ability to lead yourself. The findings of this study we use to encourage self-leadership because it has positive organizational outcomes. Thank you for cooperating.

Your participation in this research study is entirely voluntary. You may withdraw at any time. The survey does not include any information that can be used to personally identify you in order to help safeguard your privacy. Your responses will be kept private, and we won't record identifying details like your name, email address, or IP address. All information and answers are treated confidentially.

The study is conducted in accordance with the guidelines established by the Social and Behavioural Sciences faculty's ethics committee. Researchers of Utrecht University may be given access to the study's findings for academic use only. The process entails completing an online survey, which will take about 10-15 minutes.

The process is as follows: First, you will be asked some general demographic questions. Then, you will answer a few questions on the topic of self-leadership and your work. Do not take too much time to answer questions, the most applicable response is typically the first one you come up with.

If you have any questions about the research study, please contact  
[a.c.vanleersum@students.uu.nl](mailto:a.c.vanleersum@students.uu.nl)

*Deviating welcome message for Advantech survey:*

Q15 Dear valued Advantech employee,

Thank you for taking the time to support this master thesis research! Your input matters! This survey is supported, checked and approved by Roel van der Poort, HR Manager AEU. It aims to improve our workplace and meet the needs of our employees.

The survey will take approximately 10-15 minutes to complete, and will allow you to reflect on your work experiences while providing us with valuable insights.

You are invited to participate in this survey exploring self-leadership, self-efficacy, job autonomy, and innovativeness in the workplace. The aim is to understand how these factors contribute to success at Advantech.

Your participation in this research study is voluntary. You may withdraw at any time. The survey does not include any information that can be used to personally identify you, to help protect your privacy. We will not record identifying details like your name, email address, or IP address. All information and answers are treated confidentially.

The study is conducted in accordance with the guidelines established by the Social and Behavioural Sciences faculty's ethics committee. Researchers of Utrecht University in the Netherlands may only be given access to the study's findings for academic use.

Please answer each question honestly and thoughtfully, to provide us with the most accurate and informative data possible.

Your input is very valuable, and we appreciate you taking the time to share your thoughts with us. Thank you for your participation!

If you have any questions about the research study, please contact [isabelle.kunz@advantech.nl](mailto:isabelle.kunz@advantech.nl)

---

Q1 Electronic consent:

If you wish to participate in the research study, please agree to the participation by clicking on the 'I agree' button. You hereby indicate that:

- You have read the information given above
- You voluntarily agree to participate in this study
- You are 18+ years old

I agree (1)

I disagree (2)

End of Block: Introduction

---

Start of Block: Background information

Q2 What gender do you identify as?

Male (1)

Female (2)

Non-Binary (3)

Other (4)

---

Q3 What is your age? (years)

0 10 20 30 40 50 60 70 80 90 100

Indicate by sliding ()



---

Q4 What is your employment status?

- Employed, full-time (1)
  - Employed, part-time (2)
  - Unemployed (3)
  - Self-employed (4)
  - Other, please specify: (7)
- 

---

Q5 What is your nationality?

- Dutch (1)
  - Other, please specify: (2)
- 

*deviating questions in the survey for Advantech employees:*

Q4 What is your employment status?

- Employed, full-time (1)
  - Employed, part-time (2)
- 



Q5 What is your nationality?

---

Q14 Which country do you work in?

- Czech Republic (13)
- France (11)
- Germany (3)
- Ireland (15)
- Italy (10)
- Netherlands (1)
- Poland (7)
- Spain (12)
- Sweden (14)
- Taiwan (2)
- United Kingdom (16)

End of Block: Background information

---

Start of Block: Job Autonomy

Q6 Below are several statement with regards to your autonomy at work. Please indicate to what extent you agree or disagree for each statement.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Some what agree (4)	Strongly agree (5)
I am allowed to decide how to go about getting my job done (the methods to use). (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to choose the way to go about my job (the procedures to utilize). (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am free to choose the method(s) to use in carrying out my work. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have control over the scheduling of my work. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have some control over the sequencing of my work activities (when I do what). (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job is such that I can decide when to do particular work activities. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My job allows me to modify the normal way we are evaluated so that I can emphasize some aspects of my job and play down others. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to modify what my job objectives are (what I am supposed to accomplish). (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have some control over what I am supposed to accomplish (what my supervisor sees as my job objectives). (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Job Autonomy

Start of Block: Self-efficacy



Q7 The next questions regard how you behave at work. Please indicate to what extent you agree or disagree for each statement.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I will be able to achieve most of the goals that I have set for myself. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When facing difficult tasks, I am certain that I will accomplish them. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I think that I can obtain outcomes that are important to me. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe I can succeed at most any endeavor to which I set my mind. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will be able to successfully overcome many challenges. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that I can perform effectively on many different tasks. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compared to other people, I can do most tasks very well. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Even when things are tough, I can perform quite well. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Self-efficacy

Start of Block: Innovativeness

Q9 The following statements regard how you approach new things at work. Please indicate to what extent you agree or disagree for each statement.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
In the course of my work, I generate useful new ideas. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the course of my work, I develop new processes, services or products. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the course of my work, I approach business tasks in innovative ways. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the course of my work, I find new ways to do things. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the course of my work, I often do things in unique ways. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Innovativeness

Start of Block: Self-leadership

Q10 The last questions of the survey regard self-leadership. Please indicate to what extent you agree or disagree for each statement.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I establish specific goals for my own performance. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I make a point to keep track of how well I'm doing at work. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work toward specific goals I have set for myself. (29)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I visualize myself successfully performing a task before I do it. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I picture in my mind a successful performance before I actually do a task. (31)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I have successfully completed a task, I often reward myself with something I like. (32)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I talk to myself (out loud or in my head) to work through difficult situations. (33)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about my own beliefs and assumptions whenever I encounter a difficult situation. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix C: Sociodemographics

**Table 1**

*Sociodemographic Statistics of Participants*

		<i>n</i>	<i>%</i>	<i>mean</i>	<i>min</i>	<i>max</i>	<i>SD</i>
Gender	female	73	49.7%				
	male	74	50.2%				
	Total	147					
Age				35	20	64	10.6
Employment status	employed, full-time	103	70.0%				
	employed, part-time	34	23.1%				
	self-employed	3	2.1%				
	other	7	4.8%				
Nationality	American	10	7%				
	Brazilian	1	1%				
	British	6	4%				
	Bulgarian	3	2%				
	Chinese	3	2%				
	Dutch	62	42%				
	French	3	2%				
	German	16	11%				
	Greek	1	1%				
	Indian	2	1%				
	Irish	3	2%				
	Italian	11	7%				
	Polish	3	2%				
	Portuguese	1	1%				
	Romanian	3	2%				
	Russian	1	1%				
	Spanish	2	1%				
	Swedish	2	1%				
	Swiss	2	1%				
	Taiwan	4	3%				
Turkish	1	1%					
N/A	7	5%					

## Appendix D: Component Correlation Matrices

**Table 2**

*Structure Matrix: Self-Leadership*

	Component			One Factor Solution	Component Name
					Cronbach's alpha
	1	2	3	1	
I work toward specific goals I have set for myself.	<b>.904</b>	.208	.403	.751	Behavior Awareness & Volition  .86
I make a point to keep track of how well I'm doing at work.	<b>.881</b>	.214	.427	.750	
I establish specific goals for my own performance.	<b>.868</b>	.220	.390	.729	
I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with.	.222	<b>.844</b>	.370	.560	Constructive Cognition  .74
I think about my own beliefs and assumptions whenever I encounter a difficult situation.	.152	<b>.830</b>	.224	.453	
Sometimes I talk to myself (out loud or in my head) to work through difficult situations.	.222	<b>.760</b>	.273	.490	
Sometimes I picture in my mind a successful performance before I actually do a task.	.493	.306	<b>.892</b>	.761	Task Motivation  .72
I visualize myself successfully performing a task before I do it.	.464	.190	<b>.877</b>	.700	
When I have successfully completed a task, I often reward myself with something I like.	.198	.299	<b>.612</b>	.472	

*Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with*

*Kaiser Normalization.*

**Table 3**

*Correlations of the Three Components of Self-Leadership: Behavior Awareness & Volition, Task Motivation, Constructive Cognition*

	SL_BAV	SL_TM	SL_CC	JA	SE	IN
Behavior Awareness & Volition	1					
Task Motivation	.503*	1				
Constructive Cognition	.264*	.345*	1			
Job Autonomy	.078	-.022	-.095	1		
Self-Efficacy	.327*	.397*	.258*	.309*	1	
Innovative Work Behavior	.238*	.200*	.094	.432*	.407*	1

*Note.* Pearson Correlation

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

**Table 13**

*Structure Matrix: Self-Efficacy*

	Component 1
I will be able to achieve most of the goals that I have set for myself	.482
When facing difficult tasks, I am certain that I will accomplish them.	.598
In general, I think that I can obtain outcomes that are important to me	.610
I believe I can succeed at most any endeavor to which I set my mind.	.699
I will be able to successfully overcome many challenges.	.809
I am confident that I can perform effectively on many different tasks.	.762

Compared to other people, I can do most tasks very well.	.470
Even when things are tough, I can perform quite well.	.795

---

*Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. 1 component extracted.*

**Table 14**

*Structure Matrix: Job Autonomy*

	Component 1
I am allowed to decide how to go about getting my job done (the methods to use).	.718
I am able to choose the way to go about my job (the procedures to utilize).	.749
I am free to choose the method(s) to use in carrying out my work.	.747
I have control over the scheduling of my work.	.553
I have some control over the sequencing of my work activities (when I do what).	.626
My job is such that I can decide when to do particular work activities.	.699
My job allows me to modify the normal way we are evaluated so that I can emphasize some aspects of my job and play down others.	.672
I am able to modify what my job objectives are (what I am supposed to accomplish).	.658
I have some control over what I am supposed to accomplish (what my supervisor sees as my job objectives).	.595

---

*Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. 1 component extracted.*

**Table 15***Structure Matrix: Innovative Work Behavior*

	Component 1
In the course of my work, I generate useful new ideas.	.776
In the course of my work, I develop new processes, services or products.	.794
In the course of my work, I approach business tasks in innovative ways.	.866
In the course of my work, I find new ways to do things.	.834
In the course of my work, I often do things in unique ways.	.722

*Note. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.*



## Appendix E: Elaboration on Data Cleaning

### *Participant Inclusion*

Of the fully filled 147 questionnaires, four participants filled the survey within three minutes, so-called *speeding*. Findings from a study showed that speeding does not affect the results significantly (Greszki et al., 2015), it was therefore decided to keep the four speeders in the analysis. In the “*other*” employment status, three students and a person who is part-time self-employed/part-time employed were specified. All were included in the analysis, as students also need to do internships.

Four of the participants identified themselves as currently unemployed. However, their ages ranged from 22 to 36 years, implying that they likely have had some form of employment experience in the past, possibly including internships. Influence diagnostics were conducted to determine if these cases were unduly influencing the model. Results from Cook's distance (range = .00-.008), standardized residuals (range = .006-.67), and Mahalanobis distances (range = .41-3.69) suggested that these cases were not outliers and did not have a significant impact on the model. None of these values exceeded common thresholds of influence (Mahalanobis distances  $> 15$ , Cook's distances  $> 1$ , or absolute standardized residuals  $> 3$ ). Therefore, these cases were retained in the analysis.

### *Outliers*

Two extreme outliers were detected, which both belonged to the same participant, so this participant was excluded, as it was the only one with values bigger than 3 interquartile distances from the Median. In the job autonomy variable, three outliers were identified on the lower end of the scale (range = 1.67-1.89, while overall  $M = 3.80$ ). Considering the subjectivity, the assumption can be made that these scores may accurately reflect employees' experiences of extremely low job autonomy. These points were therefore not flagged as anomalies, but are seen as actual data points. In the variable IN, there were three outliers detected as well (range = 1.20-1.60, while overall  $M = 3.67$ ). Not everyone is innovative in their behavior, so it can be assumed that those are not measure errors, but actual data points. One outlier on the variable Self-efficacy has been detected. It seems like this person is not positively believing in their ability to perform well and achieve goals ( $M = 2.38$ , while overall  $M = 4.11$ ). As this is unlikely to be a measurement error, it is included. Including the outliers

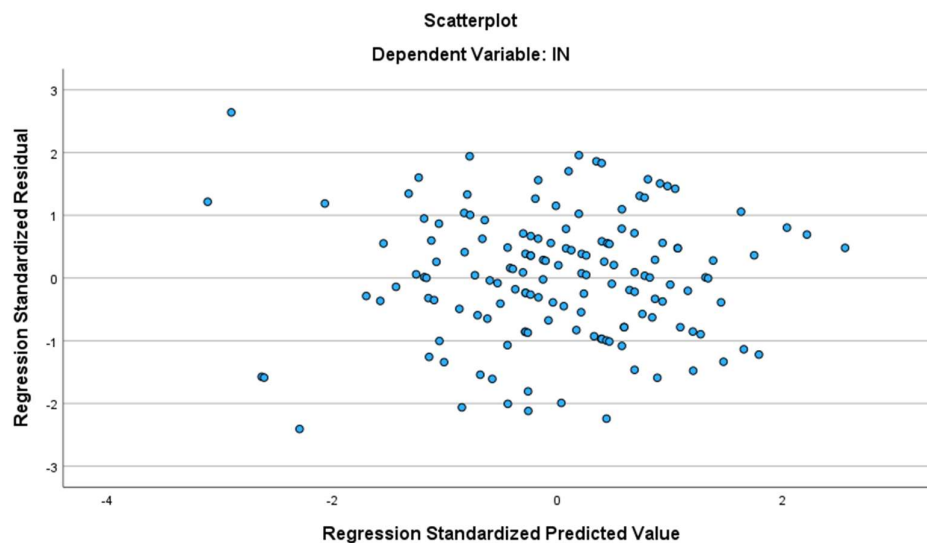
provides a more comprehensive view of the range of job autonomy experiences, as well as of innovative behavior and self-efficacy in our sample.

## Appendix F: Assumption Testing

The assumption of linearity between independent variables and the dependent variable was met as shown by the scatterplots. Multicollinearity was met since the coefficient table showed no VIF higher than 5 (range = 1.1-1.4), and tolerance scores were well above .2 (range = .71-.88). The Durbin-Watson test was .005, which is lower than the generally accepted thresholds that lay between 1.5 and 2.5 to rule out autocorrelation in the residuals. However, this test assumes a time-series or some natural ordering in the data, which may not apply to the survey-based, cross-sectional design of this study. To investigate the assumption of autocorrelation of residuals more appropriately, a scatterplot of the residuals versus predicted values was analyzed visually. The residuals appeared to be randomly distributed around zero with no discernable pattern, suggesting the absence of autocorrelation (Figure 3). Homoscedasticity was met since the standardized residuals versus the standardized predicted values showed no signs of funneling in the plot. Normality of the residuals was met, as observed in the Q-Q plot. Cook's Distance values were well below 1 ( $max = .158$ ), implying that there were no extreme outliers present in the data. Lastly, Cronbach's alpha was found reliable with alpha above .8 for every scale, so no items had to be deleted (see Methods section).

**Figure 3**

*Scatterplot of Regression Standardized Residuals versus Standardized Predicted Values*



*Note: Testing of the assumption of the variables' residuals' independence*

## Appendix G

**Table 9**

*H6: Indirect Effect of SL on IN through SE, with Different Levels of Job Autonomy*

<i>Job Autonomy</i>	<i>b</i>	<i>BootCI</i>
3.13	.194 (.076)	[.061, .357]
3.80	.192 (.052)	[.101, .304]
4.47	.190 (.052)	[.096, .304]

*Note: BootCI indicates the bootstrapped 95% confidence interval for the indirect effect. If the confidence interval does not contain zero, the effect is considered significant at the .05 level.*

*Values for job autonomy are  $\pm$  SD and mean.*

## Appendix H

**Table 12**

*Results of the Stepwise Multiple Regression Analyses on Innovative Work Behavior (N = 147)*

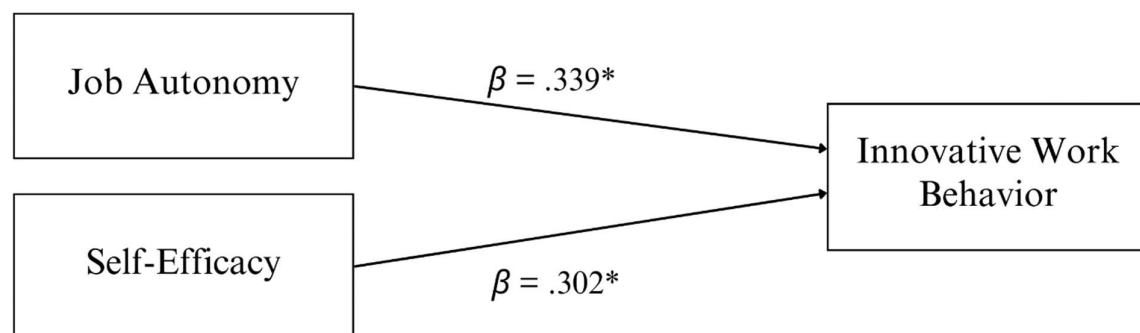
Step / Predictor	Innovative Work Behavior	
	Model 1	Model 2
<b>Step 1</b>		
Job Autonomy	.43*	.34*
<b>Step 2</b>		
Self-Efficacy		.30*
R <sup>2</sup>	.19	.27
ΔR <sup>2</sup>	.19	.08
F	33.36*	26.57*
F <sub>Change</sub>	33.36*	16.27*

*Note. Standardized beta ( $\beta$ -) coefficients are displayed.*

*\* Significant at the .05 level*

**Figure 4**

*Model 2 – Standardized Regression Coefficients for the Direct Effects of the Predictors on Innovative Work Behavior*



*Note. \*  $p < .05$*