



Research on the Relationship Between Perceived AI Substitution Crisis and Employees' Negative Work Behavior: From the Perspective of Job Insecurity

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Abstract. With the rapid advancement of intelligent technology, “Artificial Intelligence+ ” not only improves production efficiency and quality of life, but it also brings new challenges for employees. This research analyzes the alterations in the work attitudes and conduct of employees as a result of the reform of digital intelligence in corporations. This research concludes by analyzing the data from 413 questionnaires that: employees would perceive AI substitution crisis throughout the digital intelligence transformation process, and this potential crisis perception will enhance employees' job insecurity. Employees with job insecurity will engage in negative work behavior such as silence behavior and workplace incivility. Job insecurity plays a partial intermediary role in perceived AI substitution crisis and silence behavior, and a similar role in perceived AI substitution crisis and workplace incivility.

Keywords: Perceived AI substitution crisis · Job insecurity · Silence behavior · Workplace incivility · Regulatory focus

1 Introduction

Artificial Intelligence is rapidly and iteratively evolving. It has progressed from the simple imitation of human mechanical operation to the exploration of human emotions and even thoughts, and its influence on society is significant (Wang Jun & Yang Wei, 2017; Naastepad & Mulder, 2018). Increasing numbers of academics are beginning to recognize the danger that robots pose to employment (Lee et al., 2018). In the next 20 years, experts predict that robots will replace humans in 47 percent of occupations, particularly manual labor (Frey and Osborne, 2017). AI-supported solutions for automation and enhancement are contradictory and interdependent, resulting in inherent tension between them. AI will be even more complicated if we assume that human behavior and AI solutions will not occur in separate worlds, but will coexist. Consequently, any internal tension not only involves different types of AI, but also inevitably involves humans. Raisch and Krakowski (2021) suggested that organizational members must learn to coexist with AI, either by adapting to the situation or by resolving the tension, in order

for AI to be successfully implemented in the workplace. Understanding the experience of various organization members regarding this coexistence is crucial, particularly for organizations that undertake long-term strategic AI projects involving multiple interdependent solutions. Currently, few studies focus on employees' work-related psychology and behavior in the context of enterprises' ongoing digital intelligence transformation.

This research will investigate how individuals have responded to the rise of robots in the workplace. Perceived AI substitution crisis refers to the alternative risk perception caused by artificial intelligence products/equipment (AIS). This is a novel term inspired by artificial intelligence medical diagnosis support system (Featherman and Pavlou, 2003). With the rapid growth of AI-supported applications in various business processes, such as supply chain, marketing, procurement, human resource management and R&D, some professionals are concerned that AIS may threaten their expertise and authority. AI-supported jobs may provide more efficient services and lower workload hours. Employees may underestimate the benefits of AI-supported occupations and exaggerate the risks of AI-supported jobs due to their fear of being replaced. According to the stress cognitive evaluation theory, even if people's work is not actually threatened by robots, the prevalence of people's acceptance of pessimistic social remarks based on the obvious advantages of robots in narrow task areas may cause people to view robots as a threat to their own employment, thereby increasing job insecurity. There will be an increase in negative work behavior, such as silence behavior and workplace incivility, as a result of job insecurity brought on by robots.

Considering these negative effects, this research will also discuss the regulatory role of regulatory focus. According to the important behavioral and cognitive differences existing in the process of people avoiding pain and pursuing happiness, Higgins put forward two completely different self-regulation systems of enjoyment, one of which is the promotion focus and the other is the prevention focus. The adaptive response to potential threats is generally represented by job insecurity, and the strength of its response may be strongly influenced by personal promotion focus or prevention focus. When perceived AI substitution crisis, employees with different types of regulatory focus will have different expected goals, and then they need to adopt corresponding goal realization strategies. Therefore, employees with different types of regulatory focus may make different behaviors when perceiving AI substitution crisis.

This research is to examine the influence of products/equipment with artificial intelligence on the organization following the digital intelligence transition, as well as the possible cost of the digital intelligence transformation as a result of employee behavior. In addition, management recommendations are provided to prevent recurrences of similar adverse occurrences.

2 Literature Review, Research Framework, and Hypotheses

2.1 The Relationship Between Perceived AI Substitution Crisis and Job Insecurity

Featherman and Pavlou (2003), based on their investigation of artificial intelligence medical support systems, identified the potential substitution risk produced by people's encounters with artificial intelligence products/devices and defined it the perceived AI

substitution crisis (PSC). Based on this description, Verma & Singh (2022) investigated the effect of the perceived AI substitution crisis in regulating the innovative behavior of employees. The findings indicate that a high level of perceived AI substitution crisis will encourage innovative action among employees.

According to the theory of stress cognitive assessment (Lazarus & Folkman, 1984), cognitive evaluation is widely assumed to be based on an individual's evaluation of the degree of correlation between oneself and external stimuli. When a person believes that external stimuli are conflicting with his aims and that he cannot manage them, he will have a negative reaction. When a person believes that the stimulation of the external world is congruent with his aim, he will respond positively. The specific connotation of job insecurity is the perceived threat to the continuity and stability of an individual's existing position. (Shoss, 2017). With the proliferation of artificial intelligence products/equipment in businesses through a digital intelligence revolution, the employment insecurity of individuals may increase. The data demonstrate that robots are more productive than humans. For instance, robots execute manual labor better than humans (Frey & Osborne, 2017; Murray et al., 2021). A robot surgeon performed intestinal surgery on pigs, and the results showed that the outcome was superior to that of surgeons (Greenemeier, 2016). As a result of the rapid evolution of artificial intelligence, the intelligent transformation of businesses may cause individuals to perceive artificial intelligence products and technology as a threat to their work, resulting in job insecurity.

According to studies, the prevalence of robots would not only result in work insecurity for employees but will also result in job insecurity (Lee et al., 2018; Lu et al., 2020). Analysis of data derived from a variety of study methodologies, such as archival research, experimental research, etc., indicates that the job insecurity of employees who interact with robots will increase (Yam et al., 2021). Consequently, the hypothesis for Proposition H1: There is a significant positive correlation between the perceived AI substitution crisis and job insecurity.

2.2 Job Insecurity, Perceived AI Substitution Crisis and Negative Work Behavior

Empirical research has demonstrated that job uncertainty has a variety of negative effects (Cheng & Chan, 2008; Lee et al., 2018; Shoss, 2017). Specifically, employees will adopt approach strategies or avoidance strategies, when they feel job insecurity. When employees perceive the risk of AI substitution, they sense insecurity at work and adopt avoidance strategies. In attempting to retake control, they may protest invisibly through silence behavior and workplace incivility (Lazarus, 1993).

When employees sense that their job is threatened and they are unable to deal with it, they will decrease their risks and attempts for self-protection, choose for safe and practical solutions, and remain silent. Silence is the act of employees in an organization reserving their comments intentionally (Monzani et al., 2016). Empirical research demonstrated that job insecurity plays a mediation role in the psychological contract breach and employees' silence behavior (Natalie et al., 2017). Moreover, job insecurity may also lead to workplace incivility. Specifically, when employees feel job insecurity, they tend to think, "I'm only here for the paycheck." Therefore, employees may make some workplace incivility such as indifference and arrogance. Scholars define workplace incivility as low-intensity deviant behavior that breaches the interpersonal standards of

mutual respect in the workplace and has an ambiguous intention of harm. (Anderson & Pearson, 1999). Empirical studies conducted by Qin et al. (2018) and Huang et al. (2017) revealed that when under pressure, employees with job insecurity engage in greater deviant behavior to reclaim control of their jobs. Therefore, the hypothesis for Proposition H2: Job insecurity mediates the relationship between perceived AI substitution crisis and silence behavior. H3: Job insecurity mediates the relationship between perceived AI substitution crisis and workplace incivility.

2.3 Potential Moderating Role of Regulatory Focus

Individuals' perceptions of stress are influenced by their characteristics. Therefore, when discussing the perceived AI substitution crisis and negative behaviors in the workplace, it is vital to take into account the influence of personal characteristics. Job insecurity is the adaptive response of workers to a potentially dangerous environment. Personal characteristics play a significant role in determining whether employees would choose approach strategies or avoidance strategies when they perceived AI substitution crisis. This research focuses mostly on the impact of regulatory focus. Higgins et al. (1997) noted that when people choose to pursue happiness and avoid suffering, they will have two distinctly different self-regulation systems: the promotion focus and the prevention focus. When individuals perceive AI substitution crisis, employees with promoting focus will view it as a type of demanding pressure, hoping to overcome it via their own continuous efforts, thereby pushing individuals to use aggressive measures, i.e., when promoting focus dominates, the positive influence of perceived AI substitution crisis on job insecurity would be diminished. However, when individuals perceive AI substitution crisis, those with a prevention focus will have more unpleasant psychological experiences and view this risk as an impediment. Individuals use more evasive methods, such as silence and uncivilized behavior in the workplace, as a result of job insecurity; that is, when prevention focus predominates, the effect of perceived AI substitution crisis on job insecurity will be amplified. Therefore, the hypothesis for Proposition H4: Promotional focus moderates the relationship between perceived AI substitution crisis and job insecurity. When the level of promotional focus is high, the positive impact of perceived AI substitution crisis on job insecurity will be weakened. H5: Prevention focus moderates the relationship between perceived AI substitution crisis and job insecurity. When the level of prevention focus is high, the positive impact of perceived AI substitution crisis on job insecurity will be enhanced.

To sum up, the basic model adopted in this study is shown in Fig. 1.

3 Methodology

3.1 Sampling and Data Collection

Questionnaires were used to collect data for this investigation. With the consent of the respondents, 650 questionnaires were sent out and 485 were returned. After deleting invalid questionnaires such as those with a single answer option, a total of 413 valid questionnaires were retrieved, representing a recovery percentage of 63.54% (Table 1).

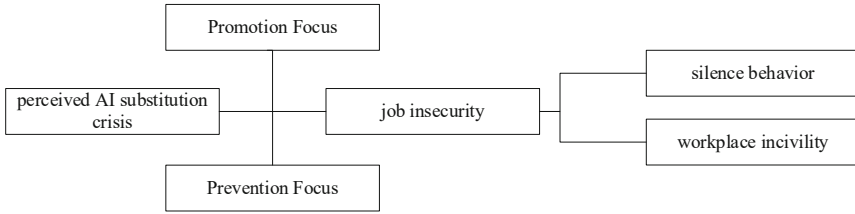


Fig. 1. Research model Image: Original by the author.

Table 1. The samples profile (n = 413)

variable	option	frequency	percentage
gender	male	113	27.4
	female	300	72.6
Respondents' age	Under 25	355	86
	26–30	31	7.5
	31–35	10	2.4
	30–40	six	1.5
	45–45	four	one
	Over 45	seven	1.7
Education	High school	51	12.3
	Graduation	343	83.1
	master	11	2.7
	doctor	eight	1.9
Seniority	Less than 2 years	342	82.8
	2–5 years	40	9.7
	6–9 years	13	3.1
	10–13 years	six	1.5
	14–17 years	six	1.5
	More than 17 years	six	1.5

Source of table: original by the author

3.2 Measures

The scale utilized in this study was picked among the relevant maturity measures created by a large number of domestic and international researchers, and reasonable translation and back-translation have been performed. In order to ensure that all the questions may be reasonably adapted to the scope of this research, the author picked a group of 15 individuals at random to conduct a pre-test on all the questions listed (this group was not included in the formal survey sequence), modified the questionnaire based on the

questions raised by the test group members, and ultimately developed the questionnaire use. All measures in this research questionnaire are 5-point Likert scales.

Perceived AI substitution crisis (PSC). We adapted Verma & Singh (2022) measure, which referring to the questionnaire designed by Fan et al. (2018). There are 3 items in total. The Cronbach's α was 0.803.

Job insecurity. We adapted the scale developed by Hellgren et al., which consists of 7 items. The Cronbach's α was 0.762.

Silence behavior. We adapted the scale developed by Tangirala et al. (2008), there are 5 items. The Cronbach's α was 0.879.

Workplace incivility. We adapted a 4-item scale developed by Lim et al. The Cronbach's α was 0.856.

Regulatory focus. We adapted the scale developed by Shin, which is adapted from the Work Regulatory Focus Scale (WRF) of Neubert et al. (2008). It involves two aspects: Promotion Focus and Prevention Focus. The Cronbach's α was 0.887.

4 Empirical Analysis

4.1 Verification of Common Method Bias

Considering the perceived AI substitution crisis, job insecurity, silence behavior, workplace incivility and regulatory focus are all depend on employee self-report, these may be affected by common method bias. In this study, firstly, Harman single factor test was carried out, and exploratory factor analyses were carried out on six main variables. The results showed that the first factor only explained 33.557% variance variation, which was lower than 40% recommended value. In addition, we added a common method factor to the benchmark model, and its fitting index ($\chi^2/df = 2.622$, TLI = 0.927, CFI = 0.940, RMSEA = 0.063) was not significantly improved compared with the benchmark model.

4.2 Confirmatory Factor Analysis

The fitting results of the six-factor model and the other five competitive models are shown in Table 2. It can be seen from the table that the fitting effect of six factors is the best ($\chi^2/df = 2.7054$, CFI = 0.935, GFI = 0.923, RMSEA = 0.064).

4.3 Correlation Analysis

The results of descriptive statistics and correlation analysis among variables are shown in Table 3. Perceived AI substitution crisis is significantly positively correlated with job insecurity ($r = 0.412$, $p < 0.001$), with silence behavior ($r = 0.233$, $p < 0.001$), and with workplace incivility ($r = 0.334$, $p < 0.001$). Job insecurity is positively correlated with silence behavior ($r = 0.331$, $p < 0.001$), and with workplace incivility ($r = 0.393$, $p < 0.001$). The analysis above provides preliminary evidence for hypothesis testing and lays the foundation for subsequent regression analysis.

Table 2 Confirmatory factor analysis

Measurement model	factor	χ^2	df	RMSEA	SRMR	CFI	GFI
Six-factor model	M1; M2; M3; M4; M5; M6	581.664	215	0.064	0.057	0.935	0.923
Five-factor model a	M1; M2; M3; M4; M5 + M6	636.085	220	0.068	0.060	0.926	0.915
Four-factor model b	M1 + M2; M3; M4; M5 + M6	993.773	224	0.091	0.089	0.863	0.845
Three-factor model c	M1 + M2 + M3; M4; M5 + M6	1907.80	227	0.134	0.132	0.7	0.666
Two factor model d	M1 + M2 + M3 + M4; M5 + M6	2311.29	229	0.148	0.115	0.628	0.590
Single factor model e	M1 + M2 + M3 + M4 + M5 + M6	3117.81	230	0.174	0.136	0.485	0.433

Note: N = 410, the same below; a means combining the promotion regulation with prevention regulation; b means combining perceived AI substitution crisis with job insecurity; c means combining perceived AI substitution crisis with job insecurity and silence behavior; d means combining perceived AI substitution crisis with job insecurity, silence behavior and workplace incivility; e means to merge all variables

Source of table: original by the author

Table 3. Descriptive statistics and correlation analysis results of each variable

	A	B	C	D	E	F	G	H	I	J	K
A	1										
B	-0.092	1									
C	-0.018	-0.075	1								
D	-0.132**	0.785***	-0.03	1							
E	0.026	-0.031	-0.08	0.016	1						
F	0.06	0.028	0.057	-0.02	-0.05	1					
G	0.067	-0.02	0.01	-0.06	0.041	0.41***	1				
H	-0.073	-0.019	0.021	-0.08	-0.04	0.23***	0.33***	1			
I	-0.048	0.061	-0.02	0.00	0.016	0.33***	0.39***	0.62***	1		
J	0.15***	0.046	-0.02	-0.03	0.028	0.42***	0.22***	0.21***	0.310***	1	
K	0.099*	-0.016	-0.01	-0.1*	-0.03	0.45***	0.28***	0.28***	0.358***	0.715***	1
mean value	1.73	1.29	1.94	1.33	4.33	3.51	3.14	2.98	3.059	3.654	3.58
standard deviation	0.446	0.894	0.47	0.91	1.70	0.78	0.70	0.78	0.813	0.735	0.74

Ps: A gender; B age; C Education; E nature of unit; F perceived AI substitution crisis; G job insecurity; H silence behavior; I workplace incivility; J promoting focus; K prevention focus.

Source of table: original by the author.

4.4 Hypothesis Test

In this study, the hypothesis was tested by hierarchical regression method, and the related results are shown in Table 4. Firstly, the perceived AI substitution crisis, job insecurity and control variables are substituted into the regression equation to establish model 1. There is a significant positive correlation between perceived AI substitution crisis and job insecurity ($\beta = 0.411, p < 0.001$), and hypothesis 1 is verified.

At the same time, model 5 and model 8 can verify that there is a significant positive correlation between perceived AI substitution crisis and silence behavior ($\beta = 0.231, p < 0.001$) and workplace uncivilized behavior ($\beta = 0.337, p < 0.001$). Furtherly, the mediating effect of job insecurity was examined. According to model 7, the positive influence of perceived AI substitution crisis on silence behavior ($\beta = 0.114, p < 0.05$) decreased after the intermediary variable (job insecurity) was added. According to model 10, after adding intermediary variable (job insecurity), the positive impact of perceived AI substitution crisis on workplace incivility ($\beta = 0.209, p < 0.001$) decreased. Therefore, it is assumed that H2 and H3 have been preliminarily verified.

However, when verifying the regulating effect of promoting focus and prevention focus, the results show that the interaction between perceived AI substitution crisis and promoting focus has no significant impact on job insecurity (M3, $\beta = -0.266, p > 0.05$), and the interaction between perceived AI substitution crisis and prevention focus has also no significant impact on job insecurity (M4, $\beta = -0.17, p > 0.05$). Therefore, it is assumed that H4 \ H5 does not pass.

Table 4. Hierarchical regression results

	job insecurity				silence behavior			workplace incivility		
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
A	0.034	0.028	0.024	0.024	-0.099	-0.104	-0.108	-0.071	-0.074	-0.082
B	0.032	0.026	0.020	0.014	0.089	0.090	0.080	0.112	0.120	0.102
C	-0.007	-0.006	-0.001	0.000	0.006	0.015	0.009	-0.039	-0.026	-0.037
D	-0.075	-0.070	-0.057	-0.049	-0.157	-0.143	-0.136	-0.088	-0.077	-0.064
E	0.064	0.061	0.059	0.062	-0.017	-0.042	-0.035	0.037	0.004	0.018
F	0.411***	0.392***	0.562***	0.461**	0.231***		0.114*	0.337***		0.209***
G						0.333***	0.286***		0.396***	0.310***
H										
I										
J		0.048	0.186							
K				0.211						
J × F			-0.266							
K × F				-0.170						
F	14.696	12.72	11.296	13.507	5.309	10.065	9.422	9.575	13.595	14.747
R ²	0.178	0.180	0.183	0.189	0.073	0.129	0.140	0.124	0.167	0.203
ΔR ²	0.166	0.166	0.167	0.175	0.59	0.117	0.125	0.111	0.155	0.189

Ps: A-K are similar to Table 3

Source of table: original by the author.

Table 5. Bootstrap analysis results of intermediary effect

variable	effect value	S.E	confidence interval	
			upper limit	lower limit
intermediary variable-silence behavior	0.1174	0.0271	0.652	0.1741
intermediary variable-workplace incivility	0.1321	0.0266	0.1877	0.0834

Source of table: original by the author

The intermediary effect was tested ulteriorly. The intermediary effect program test was adopted by Bootstrap method. The estimated parameters in the model were re-sampled and confidence interval was estimated by self-sampling method. Based on the 5000-time repeated sampling model, the intermediary effect was tested by the Process program of SPSS software. The condition that the intermediary effect is significant is that the test results of intermediary effect show that the confidence interval of deviation correction does not include 0.

Model 4 is selected, with the sample size 5000 times, the confidence interval 95%, and the Bootstrap sampling method selected nonparametric percentile method with deviation correction. The intermediary effect analysis results of job insecurity are shown in Table 5. The intermediary effect of job insecurity on perceived AI substitution crisis and silence behavior is 0.1174, and the 95% confidence interval is [0.1741, 0.652], excluding 0, which indicates that job insecurity plays a partial intermediary role in perceived AI substitution crisis and silence behavior. Assuming H2 is supported. The intermediary effect of job insecurity on perceived AI substitution crisis and workplace incivility is 0.1321, and the 95% confidence interval is [0.0843, 0.1877], excluding 0, which indicates that job insecurity plays a partial intermediary role in perceived AI substitution crisis and workplace incivility behavior. Assuming H3 is supported.

5 Research Conclusion and Discussion

This paper discusses the impact of adding artificial intelligence products and equipment to enterprises after the digital intelligence transformation of enterprises. The main conclusions of this paper are as follows: in the process of digital intelligence transformation, employees will perceive AI substitution crisis, and this potential substitution crisis perception will increase employees' job insecurity, that is, there is a significant positive correlation between perceived AI substitution crisis and job insecurity. When employees have job insecurity, they will make some negative behaviors, such as silent behavior and workplace incivility. The research shows that job insecurity plays a partial intermediary role in the relationship between perceived AI substitution crisis and silence behavior, and job insecurity plays a partial intermediary role in the relationship between perceived AI substitution crisis and workplace incivility.

However, the regulatory effects of the promotion focus and the prevention focus proposed in this paper are not significant. The possible reason is that scholars Wallace and Cheney (2006) put forward that although the regulatory focus is divided into two dimensions in the theory of idiosyncratic regulation, the actual situation is that these two

dimensions do not exist in individuals alone, that is, the promotion focus and the prevention focus are not completely independent of each other. Therefore, when individuals perceive AI substitution crisis, they may also adopt a relatively fixed strategy to evaluate state, and then turn external threats into internal motives. In conclusion, regulatory focus has no adjustment effect on perceived AI substitution crisis affecting job insecurity.

Through research, this paper finds that in the process of intelligent change in enterprises, employees' psychological perception may lead to some negative work behaviors, thus increasing the potential cost of management. Therefore, in the process of enterprise digital intelligence transformation, managers need to consider employees' tolerance for increasing AI and other technical skills requirements, especially the resistance that employees may have. In addition, managers should choose the right time to provide change support resources (such as training). However, based on the prospect theory, it is difficult for managers to eliminate employees' perceived AI substitution crisis level and reduce employees' job insecurity caused by enterprises' digital intelligence transformation. Therefore, managers can focus on how to effectively achieve organizational goals and ultimately create organizational value when digital intelligence transformation takes place.

The limitation of this study is that all the data in this study come from employee self-evaluation. Future research can try to measure variables in a more objective way, such as combining employee self-evaluation with others' evaluation. The research variables of this paper are only limited to the individual level. In the future, we can try cross-level research, such as incorporating organizational or team level factors into the model.

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