

## Article

# Exploring the Factors of Employee Subjective Well-Being in the Midst of Health Threat: An Evidence from the U.S. Federal Government during the COVID-19

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**Abstract:** The recent COVID-19 pandemic posed a challenge to employee well-being and will have a lasting impact on how safe employees feel about their work environment. This study aims at examining: (1) the impact of safety perception of employees on their job attitudes; and (2) what factors affect their expectations that their organizations will effectively protect them from potential health threats. Using data from the U.S. Federal Government, this study divided organizational responses to COVID-19 aimed at protecting their employees into the following three types: protecting the employees while working on site, reducing the number of employees working on-site, and providing mental and health assistance. The effects of these organizational responses were analysed separately, and regression analysis was performed with these factors with regards to employees' safety perception. The results showed that the first group of measures, protecting the employees while they are in the workplace, had generally the most significant influences on employees' feeling of safety. The attempt to protect those in vulnerable medical conditions was also seen as significant. These findings show that organizations need to protect their employees in the workplaces during a health crisis.

**Keywords:** employee well-being; the COVID-19; safety perception; federal employees; workplace health promotion; social distancing; flexible work schedule; telework; job satisfaction; employee protection



**Citation:** Lee, H.-W.; Rhee, D.-Y. Exploring the Factors of Employee Subjective Well-Being in the Midst of Health Threat: An Evidence from the U.S. Federal Government during the COVID-19. *Sustainability* **2022**, *14*, 408. <https://doi.org/10.3390/su14010408>

## Academic Editors:

Horacio Molina-Sánchez,  
Gabriele Giorgi, Dante  
Castillo Guajardo and  
Antonio Ariza-Montes

Received: 23 November 2021

Accepted: 28 December 2021

Published: 31 December 2021

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## 1. Introduction

There have been remarkable changes in management theories over the last century. Traditional organization theories had not paid much attention to individuals working in an organization. Individuals were largely conceived of as economic beings induced to act like a part of the machinery of an organization. The human factor in organizations was not garnered scholarly attention until the Hawthorne study of the late 1920s found that it plays a significant role in enhancing organizational performance [1]. At a similar time, Marry Parker Follett initiated the argument that scholars should take the morale and motivation of employees into the equation of organizational productivity [2]. Following her footsteps, later scholars began to suggest a new management perspective, which later formed the human relation theory [3].

The human factor has recently begun to be re-appreciated by a couple of new streams of thought. One of them is what we would call the human rights perspective. Unlike the previous human relation theory based on a utilitarian point of view, the human rights perspective was predicated on the notion that individuals in organizations should be respected and protected for their own sake. These management thinkers developed issues such as organizational justice [4], diversity [5], and affirmative action [6]. Another stream emphasizing the human factor is rooted in the sustainability perspective. Scholars have begun to combine the concept of human resources and the concept of sustainability to bring a new topic into the field of management studies. These scholars view individuals in

organizations as the resources that an organization utilizes to achieve its goals and argued that the energy of individuals as organizational resources should not be drained or depleted just like other types of resources such as funds and raw materials. In this vein, the concepts of sustainability leadership [7] and sustainable management [8] have been suggested as the keys to the long-term sustainability of organizational performance.

Employee well-being is particularly underscored in this context and perceived as an indication of how well the intangible resources of an organization are preserved. It has an important managerial implication not only because it helps achieve better performance in the long run [9], but also because it helps organizations continue to operate even in the midst of a crisis [10].

The physical and mental health of employees in particular are two of the most significant factors in employee well-being. Workplace health is significantly associated with employee well-being and has a positive influence on their loyalty toward organizations [11]. The health and safety issues of employees are emphasized from the sustainability perspective. In 2015, the United Nations ranked “good health” third on a list of 17 sustainable development goals. It is also emphasized from the human rights perspective. In compliance with ISO 45001, most organizations today are implementing the management assistance system aimed at protecting their employees from health and safety hazards in the workplaces [12].

In 2020, COVID-19 started to spread throughout the globe such that the World Health Organization (WHO) declared a worldwide pandemic. There is no doubt that the pandemic has drastically changed not only the way of citizens’ daily living but also the way people work in organizations. Given that people spend most of their time in a day in their workplaces, working collectively in the same place itself may put them in danger of even possible death.

The aftermath of the pandemic is likely to have a lasting influence on managerial practices as well as on the way people work in organizations. It seems clear at least that the pandemic imposed significant challenges to employee well-being and hence to organizational sustainability. This led to a growing awareness that organizations should pay a greater and more persistent attention to the safety and protection of their workers from possible threats and hazards.

Against this background, this study deals with the following two research questions associated with the health and safety perception of employees. First, is health and safety perception important for employees? If so, how important is it? After COVID-19, have people become more aware of the importance of workplace health than before? Secondly, what can organizations do to protect their employees from health threats at work, and hence, to improve their safety perceptions?

We sought to answer the above questions by analyzing a large dataset obtained from employees in the U.S. Federal Government. We expect that the results from this study will contribute to an understanding of how organizations should respond to health threats like COVID-19.

## 2. Theory and Hypotheses

### 2.1. Research Question 1 (RQ1): Does It Matter? How Much?

Warr and Nielsen [13] found that employee well-being has a small-to-moderate effect on work performance. However, the significance of this effect cannot be discounted because subjective wellbeing of employees may have a lagged influence on the performance of an organization. The real consequence of poor well-being for organizational performance may not manifest itself immediately.

The impacts of employee well-being on performance often appear at a time lag because these are largely indirect. For instance, the psychological well-being of an employee influences his/her decision to quit [14], which by the way is confirmed in the research conducted in other cultural contexts [15], and in other industries [16] as well. Thus, although

organizations can continue to operate by replacing those who have left, it eventually poses a significant cost to an organization and undermines their productivity in the long run.

The classical theory of human motivation by Abraham Maslow divided human needs into five hierarchical categories [17]. These five categories can also be largely grouped into the two following categories: the lower-level needs vs. the higher-level needs. The lower-level needs involve the physiological needs and safety needs in Maslow's term, and the higher-level ones involve the esteem needs and self-actualization needs. Herzberg believed that the former contributes only to the (positive and negative) 'feelings,' namely, 'dissatisfaction,' while the latter contributes to their 'happiness,' namely, 'satisfaction' [18], and went on to argue that the latter has greater impact on job performance.

In this context, the employee's need for safety, one of the lower-level needs, has been perceived as relatively less important until the recent outbreak of COVID-19. Thus, although employee safety has a significant impact on their subjective well-being, and hence, on their work motivation and performance, little research has been devoted to examining the impacts of employee safety.

To reveal the significance of the gratification of safety need, this study will first examine whether the feeling of employees that their organization protects them from workplace hazards actually influence their job satisfaction. What is important is not only the significance of the regression coefficient but also its magnitude. This study compares the effect of the feelings of safety on job satisfaction to other factors in job satisfaction. This will allow us to have a sense of how important the feeling of safety is.

**Hypothesis 1 (H1).** *The feeling that employees are protected from the health and other safety hazards significantly increases their job satisfaction.*

We will also examine whether the effects of safety perception on job satisfaction has increased over the last couple of years when the COVID-19 pandemic has reached its peak.

**Hypothesis 2 (H2).** *The effect of the safety feeling has increased over the last couple of years of the COVID-19 pandemic.*

## 2.2. Research Question 2 (RQ2): What Can Organizations Do?

The first two hypotheses above examine whether the safety perception of employees is important. Then, the next question to ask is how to enhance the safety perception of employees. To address this question, we will investigate what influence the expectation that employees will be protected from threats similar to COVID-19 if it happens again in the future.

Theories suggest that expectations about the future depends largely on one's past experience of similar or related events. One's past experience creates in the mind of an actor a generalization of what is likely to happen in similar situations. Scholars have empirically confirmed the effect of disturbing past experiences on people's current perceptions and attitudes. For instance, Sun and Xue [19] found a positive effect of earthquake experiences on public perception of risk associated with the probability of earthquake. Lo and Cheung [20] conducted similar research to find a comparable effect. It also affects people's perception in other situations as well. Cohen, Etner, and Jeleva [21] suggested that people's past experiences influence their decision to purchase insurance policy. Similarly, we predict that employees' prospective safety perception, namely, the expectations of how effectively their organizations will handle the emergency situations in the future is dependent on their retrospective assessment of organizational responses to COVID-19.

To measure the quality of employee's experience of the COVID-19, we will ask employees several questions about their organization's response to the pandemic and will examine what types of organizational responses during the pandemic have the most significant effect on employees' future expectations. From this investigation, we will draw some conclusions as to which measures are more effective than others in helping employees maintain their subjective well-being in the midst of trying times.

The first type of organizational response to COVID-19 was to give employees flexibility as to their working conditions. Organizations have provided employees with the options of working from home or rescheduling their work hours in response to the pandemic. Another example was to expand leave policies such that employees can take a leave whenever they do not feel physically good or keep them updated on their leave availability. The purpose of all these responses was to reduce the risk of spreading the disease by limiting the amount of the time employee are staying in the same places. Those employees whose organizations provided these options are likely to think their organizations will respond effectively to similar future emergencies.

**Hypothesis 3 (H3).** *Employees who were given an expanded opportunity for telework are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 4 (H4).** *Employees who were given an expanded opportunity for flexible work schedule are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 5 (H5).** *Employees who were given an expanded opportunity for leave are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

The second type of organizational response to COVID-19 focused on protecting their employees from the disease while they were present in the office. Organizations have strived to limit the physical contacts among employees in the workplaces. Examples of this measure included: providing information on whether there are any confirmed cases of COVID-19 at the workplace; limiting the entry of external visitors into the facilities; rearranging workplaces to maximize social distancing; and cleaning the facilities regularly or providing sanitizing supplies. Employees provided with these measures will perceive that their organizations will effectively protect their employees from similar threats in the future.

**Hypothesis 6 (H6).** *Employees who were updated on the confirmed case in the workplace are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 7 (H7).** *Employees in organizations with limited access from outsiders are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 8 (H8).** *Employees in organizations where social distancing is implemented are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 9 (H9).** *Employees in organizations where their workspaces are rearranged to maximize social distancing are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 10 (H10).** *Employees who were given cleaning and sanitizing supplies are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

Organizations have provided health assistance for their employees, an important type of assistance for employees during COVID-19. Examples of this medical assistance include: regular temperature checks or COVID-19 illness testing; organizations expanding mental health programs to deal with the heightened stress due to COVID-19. Workers in these organizations should believe that their organizations were effective in dealing with the threat.

**Hypothesis 11 (H11).** *Employees who were given medical assistance are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

**Hypothesis 12 (H12).** *Employees in organizations with expanded mental health programs are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

There are some people who are particularly vulnerable to health threats. COVID-19 posed an uneven danger for those with pre-existing medical conditions or older populations. Organizations have paid special attention to those individuals. They were a priority for leave or telework opportunities. Although this may be perceived as favoritism in normal situations, in an emergency like COVID-19 it is seen as a sign that organizations care about their employees. This measure must help employees perceive that their organizations strive to protect their employees.

**Hypothesis 13 (H13).** *Employees in organizations in which a special care is given to those vulnerable to the COVID-19 are likely to perceive that their organizations will protect their employees effectively from the emergency similar to COVID-19.*

### 3. Methods

#### 3.1. Data and Sample

This study used the data from the U.S. Federal Government. The Office of Personnel Management in the U.S. Federal Government have annually collected survey data from their employees since 2010, called the Federal Employee Viewpoint Survey (FEVS). This survey includes questions about the federal employee's perceptions about their work environment and leadership as well as their job attitudes. Particularly in 2020, the survey included questions about their experiences during the COVID-19 pandemic. The variables for this study were measured using the questionnaire items from the pool of the FEVS 2020 administered from September to November 2020.

In the 2020 FEVS, a total of 1,410,610 employees were surveyed and 624,800 responded to yield the response rate of 44.3 percent. The participants were affiliated with the 32 different departments with the greatest number of participants being from the Department of the Army (13.1 percent of the total).

Given that the U.S. Federal Government has various departments and branch offices, the sample is comprised of organizations that have diverse characteristics. This may serve as an advantage by enhancing the generalizability of our findings. However, the effects of the proposed factors may be strong in some agencies while weak, or possibly negative, in other agencies, such that they cancel each other off. To prevent this problem, we attempted to ensure the maximum heterogeneity of the sample. We only selected employees from the cabinet departments, those at the top in the government hierarchy. We excluded those from the military departments, namely, the Department of the Army, the Air Forces, the Navy and other affiliated defense agencies. This is because the level of workplace hazards to which employees are exposed will be greater in those military agencies.

The select sample was only used to investigate RQ2 and not used for RQ1. This is because examining RQ1 compared the results across the multiple years, which needs a consistency across the datasets collected at different years. The final sample size used for RQ2 was 341,426. A total of 13 cabinet departments were included. The departments included in our analysis and the number of participants from each department is presented in Table 1.

**Table 1.** The departments included in the analysis.

Department Name	Frequency	Percentage	Department Name	Frequency	Percentage
Department of Agriculture	33,399	9.8	Department of Homeland Security	84,704	24.8
Department of Commerce	21,310	6.2	Department of Housing and Urban Development	4509	1.3
Department of Justice	29,013	8.5	Department of the Interior	26,114	7.6
Department of Labor	7187	2.1	Department of State	10,933	3.2
Department of Energy	8904	2.6	Department of Transportation	22,246	6.5
Department of Education	2367	0.7	Department of Treasury	40,347	11.8
Department of Health and Human Services	50,393	14.8	Total	341,426	100

Among the participants, 12 percent were black, 61.9 percent white, 5.4 percent Asian, and 6.1 others. Twenty-two percent of the participants were under the age of 40, and 23 percent were those in supervisory positions. 47.2 percent were male, 43 percent female, and 9.8 percent refused to identify their gender.

### 3.2. Analysis

The first research question (RQ1) addresses whether the safety perception in general affects the job satisfaction of employees, which is examined by a regression model on job satisfaction with a number of explanatory variables including their general safety perception. Among the explanatory variables are intrinsic motivation, interpersonal relationships, and pay satisfaction.

The reason why other explanatory variables are included in the model along with the feeling of safety, which is the main focus of this study, is to compare the magnitude of the effect of feeling safe on job satisfaction with the effects of other factors known to affect job attitudes.

We also examined whether the effect size of safety perception had increased during the COVID-19 pandemic. This was examined by comparing the coefficients of the safety perception variable in the regression of job satisfaction from the FEVS 2020 against the coefficients of the same variable obtained from the equivalent analysis using the FEVS of the last five years.

The second research question (RQ2) addressed what influences an employee's prospective safety perception, namely, the expectation as to their agencies' readiness for a similar emergency that might happen in the future. Given the dependent variable is measured with the five-point scale, the OLS regression may not be suitable for examining the unbiased estimates. Thus, the ordinal and multinomial regressions were also run to cross-validate the results. As discussed in the previous section, we categorized the factors into three groups: minimizing the time working together, protecting employees from the infection in the office, and providing health (or mental) assistance. These factors were included as independent variables to test their effects on the dependent variable (i.e., expectation about the agencies' readiness).

### 3.3. Measures

The dependent variables are job satisfaction for RQ1, and prospective feeling of safety, namely, the expectation of the agencies' effectiveness in protecting their employee from hazards for RQ2. The first dependent variable, job satisfaction, was measured using the following three questionnaire items: "I recommend my organization as a good place to work", "Considering everything, how satisfied with your work?" "Considering everything, how satisfied with your organization?" The reliability was 0.907. The second dependent variable was measured by the single item: "Based on my organization's handling of the COVID-19 pandemic, I believe my organization will respond effectively to future emergencies".

The independent variables related to RQ1 are the following: The first independent variable is intrinsic motivation meaning the enjoyment that comes from task achievements, which is well known as the most influential factor of job attitudes [22]. This is measured by the following three questionnaire items: "I am given a real opportunity to improve my skills in my organization", "My work gives me a feeling of personal accomplishment", "My talents are used well in the workplace". Cronbach alpha was 0.849.

The second independent variable is the quality of cooperative working relationship, which is found to have a significant influence on job satisfaction [23,24]. This variable is measured by the single item: "The people I work with cooperate to get the job done".

The third independent variable is leadership satisfaction found in the literature to affect job satisfaction [25,26]. This is measured by the following six questions: "My supervisor supports my need to balance work and other life issues", "My supervisor is committed to a workforce representative of all segments of society", "Supervisors in my work unit support employee development", "My supervisor listens to what I have to say," "My supervisor treats me with respect", "I have trust and confidence in my supervisor". The reliability was 0.949.

The fourth independent variable was the quality of performance recognition which is known to be important for job satisfaction [27–29]. This is measured by the following items: "In my work unit, steps are taken to deal with a poor performer who cannot or will not improve", "In work unit, differences in performance are recognized in a meaningful way", "Employees are recognized for providing high quality products and services". Cronbach alpha for this variable was 0.811.

The fifth independent variable was employee's general safety perception which is related to the hypothesis 1 and 2. This is measured by the single item: "Employees are protected from health and safety hazards on the job".

The questionnaire items for the above-listed independent variables are repeated annually in the FEVS from 2014 to 2020 such that we can compare the regression coefficients across the years. The above-listed questionnaire items used the five-point Likert scale.

For the independent variable for RQ2, respondents were asked the following general questions and the related nine specific ones. The general question asked was "How has your organization supported your well-being needs during the COVID-19 pandemic?" The related nine specific questions asked about the particular aspects of organizational supports asked about in the general question. The first (H3) asked whether employees were able to participate in telework, measured by the single item: "expanded telework". The second (H4) asked whether they were given "expanded work schedule flexibilities". The third (H5) asked whether they were given "expanded leave policies". These first three questions are about the first category of the organizational support given in response to COVID-19: minimizing the time in which people work in the same place.

The fourth question (H6) asked whether they were provided with "timely communication about possible COVID-19 illness at my agency worksite". The fifth independent variable (H7) asked about "limited access to my agency worksite building/facilities (e.g., closures, limits on activities with external visitors/groups)". The sixth question (H8) asked about "social distancing (e.g., limits on group size, reduces access to common areas) in my agency worksite". The seventh question (H9) asked whether their organizations "rearranged workplaces to maximize social distancing". The eighth question (H10) asked about whether their organizations provided "cleaning and sanitizing supplies available to reduce risk of illness in my agency worksite". The above five independent variable involves how the organizations protected their employees working on site.

The ninth question (H11) asked about "expanded mental health resources (e.g., assistance with stress of COVID-19)". The tenth question (H12) asked whether they were provided with "expanded physical resources (e.g., temperature checks, COVID-19 illness testing) at my agency worksite". The last question (H13) asked whether their organizations provided "protection of employees at higher risk for severe illness from COVID-19 exposure".

For the above-listed independent variables for the second research question (i.e., from H3 to H13), the respondents were asked to choose among the following options: (1) needed and available to me, (2) needed, but not available to me, and (3) not needed by me now. We coded the second choice as 1 and all the others as 0. The rationale for this was that negative experience in the past will have a stronger effect on their future expectation than neutral or positive events [30].

Table 2 indicates the measures of each variable for this research.

**Table 2.** Variables and Measures.

Variables	Measures
Job Satisfaction	I recommend my organization as a good place to work.
	Considering everything, how satisfied with your work?
	Considering everything, how satisfied with your organization?
Intrinsic Motivation	I am given a real opportunity to improve my skills in my organization.
	My work gives me a feeling of personal accomplishment.
	My talents are used well in the workplace.
Leadership Satisfaction	My supervisor supports my need to balance work and other life issues.
	My supervisor is committed to a workforce representative of all segments of society.
	Supervisors in my work unit support employee development.
	My supervisor listens to what I have to say.
	My supervisor treats me with respect.
Performance Recognition	I have trust and confidence in my supervisor.
	In my work unit, steps are taken to deal with a poor performer who cannot or will not improve.
	In work unit, differences in performance are recognized in a meaningful way.
Coworker Relationship	Employees are recognized for providing high quality products and services.
	The people I work with cooperate to get the job done.
Safety Perception	Employees are protected from health and safety hazards on the job.

## 4. Results

### 4.1. RQ1: Descriptive Statistics and Correlation Matrix

As a preliminary step, we examined the descriptive statistics and correlation matrix among the variables used in this study, the results of which are presented in Table 3 below. The variable with the greatest mean value was coworker relationship (4.19) while the lowest mean was found for performance recognition (3.37), which indicates that people tend to cooperate well with their coworkers whereas the federal employees are relatively less likely to perceive that their organizations provide sufficient rewards for good performance. Some of the independent variables showed slightly high correlation coefficients. However, the highest value was actually not so high as to undermine the validity of regression analysis (0.775), and most of the correlations were below the rule of thumb standard (0.700). Also noticeable is the slight increase in the mean of safety perception in 2020 (4.00). This may indicate that employees appreciate the federal government agencies' efforts to respond to COVID-19 in 2020.



**Table 3.** Descriptive Statistics and Correlation Matrix.

Variables	Mean	Std. Dev.	Job Satisfaction	Intrinsic Motivation	Coworker Relationship	Leadership Satisfaction	Performance Recognition
Job satisfaction	3.81	0.96					
Intrinsic Motivation	3.81	0.95	0.775 **				
Coworker relationship	4.19	0.91	0.506 **	0.493 **			
Leadership satisfaction	4.22	0.88	0.626 **	0.632 **	0.547 **		
Performance recognition	3.37	0.99	0.675 **	0.665 **	0.576 **	0.647 **	
Safety perception	4.00	1.03	0.529 **	0.491 **	0.363 **	0.467 **	0.507 **

\*\*  $p < 0.01$ .

Table 4 indicates the yearly change in the mean values of safety perception. It indicates that the mean values have gradually increased over time.

**Table 4.** The Yearly Changes in the Mean Values of Safety Perception.

Year	2014	2015	2016	2017	2018	2019	2020
Safety Perception	3.89	3.90	3.92	3.95	3.93	3.92	4.00

The numbers indicate the mean values of safety perception calculated from the data collected from 2014 to 2020.

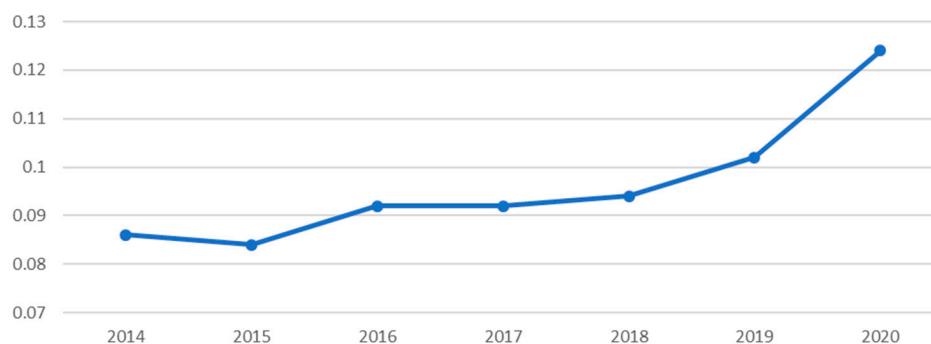
#### 4.2. RQ1: Regression Analyses from 2014 to 2020

We ran the regressions on job satisfaction with multiple independent variables including safety perception. These regressions were run with the multiple datasets collected in the different years. The result is summarized in Table 5. We only presented the full result of the regression using the 2020 data and only the regression coefficients of safety perception using the data collected in other times were presented in Figure 1 to keep the presentation simple. It is important to note that all the coefficients were statistically significant at the alpha of 0.01, which is probably due to the large sample size. Thus, comparing the effect size indicated by the standardized coefficient will be more important than the significance testing.

**Table 5.** OLS Regression on Job Satisfaction with the FEVS 2020.

Independent Variable	Standardized Coefficient (Standard Error)
Intrinsic Motivation	0.502 ** (0.001)
Safety Perception (H1 & H2)	0.124 ** (0.001)
Coworker Relationship	0.055 ** (0.001)
Leadership Satisfaction	0.110 ** (0.001)
Performance Recognition	0.173 ** (0.001)
Adjusted-R <sup>2</sup>	0.671
F-test	187,451 **
<i>n</i>	320,338

\*\*  $p < 0.01$ .



**Figure 1.** Yearly Changes in the Regression Coefficient of Safety Perception.

In the analysis of FEVS 2020, we found that the proposed model explained 67.1 percent of the total variance in job satisfaction. The independent variable with the greatest standardized coefficient was found to be intrinsic motivation (0.502), while the independent variable of coworker relationship showed the least coefficient (0.055). The variable of safety perception, which is related to H1 and H2, had a significant effect on job satisfaction, the size of which is also considerable (0.124).

Figure 1 presents the yearly change in the regression coefficient of safety perception. The effect of safety perception on job satisfaction has noticeably increased in 2020. The difference ranged from 19.23 percent (when compared to 2019) to 47.62 percent (compared to 2015).

#### 4.3. RQ2: Descriptive Statistics and Correlation Matrix

The second research question examines what affects an employee's expectation as to their agency's readiness for emergency. The preliminary analysis of descriptive statistics and correlation matrix is presented in Table 6. The mean value of the expectation of future readiness was 4.01, indicating that U.S. federal employees tend to perceive that their organizations will protect them from the threats of emergency (about 4 points on average out of the five-point scale). The mean values of the independent variables indicate the percentage of the employees who needed the assistance but were not provided with it. During the COVID-19 pandemic, about 17 percent of respondents were not informed about confirmed cases of the disease in their worksites, while 18 percent were not able to receive the health assistance when they needed it. To the contrary, the percentage of employees who were not able to telework when they needed to was relatively lower, which was about 7 percent. The percentage of those who were not satisfied with the social distancing policy or with the limited entry policy from outsiders was also 7 to 8 percent. The correlation matrix shows that the correlations among the independent variables were not very high, ranging from 0.190 to 550. This indicates that the multi-collinearity was not an issue that invalidates the regression analyses that follow.

**Table 6.** Descriptive statistics and correlation matrix.

Variables.	Mean (Std. Dev)	1	2	3	4	5	6	7	8	9	10	11
1. Expectation of Future Readiness	3.94 (1.10)											
2. Telework	0.07 (0.25)	-0.276 **										
3. Work Schedule Flexibility	0.09 (0.28)	-0.312 **	0.541 **									
4. Expanded Leave Policies	0.09 (0.29)	-0.309 **	0.386 **	0.533 **								
5. Update on COVID-19 cases	0.17 (0.37)	-0.424 **	0.263 **	0.302 **	0.311 **							
6. Protection of the Vulnerable	0.11 (0.31)	-0.402 **	0.326 **	0.367 **	0.373 **	0.485 **						
7. Limiting the Access to the Building	0.07 (0.25)	-0.337 **	0.356 **	0.368 **	0.347 **	0.366 **	0.461 **					
8. Social Distancing	0.08 (0.27)	-0.381 **	0.341 **	0.362 **	0.336 **	0.387 **	0.468 **	0.550 **				
9. Rearranging Office Spaces	0.11 (0.31)	-0.359 **	0.289 **	0.316 **	0.306 **	0.372 **	0.426 **	0.437 **	0.631 **			
10. Cleaning & Sanitizing	0.08 (0.26)	-0.297 **	0.190 **	0.222 **	0.238 **	0.320 **	0.358 **	0.316 **	0.377 **	0.391 **		
11. Mental Assistance	0.08 (0.28)	-0.293 **	0.261 **	0.325 **	0.384 **	0.324 **	0.364 **	0.323 **	0.304 **	0.291 **	0.255 **	
12. Health Assistance	0.18 (0.38)	-0.346 **	0.271 **	0.296 **	0.300 **	0.428 **	0.411 **	0.354 **	0.371 **	0.379 **	0.302 **	0.374 **

\*\*  $p < 0.01$ .

#### 4.4. RQ2: OLS Regression

Table 7 presents the results of ordinary least square (OLS) regression on job satisfaction. As discussed previously, the independent variables were grouped into the following three groups. Group 1 involved the factors focusing on limiting the time that employees stayed together in the worksite (from H3 to H5). Group 2 involved the independent variables related to protecting employees while they were working in the same place (from H6 to H10). Group 3 involved the variables regarding the provision of mental and health assistance (from H11 to H13). We focused on the magnitudes of the effects rather than their statistical significance.

**Table 7.** OLS Regression on the expectation for readiness.

IV Groups	Independent Variable	Standardized Coefficient (Standard Error)
Group 1	Telework (H3)	-0.039 ** (0.008)
	Work Schedule Flexibility (H4)	-0.052 ** (0.008)
	Expanded Leave Policies (H5)	-0.053 ** (0.007)
Group 2	Update on COVID-10 Cases (H6)	-0.196 ** (0.005)
	Limiting the Access from Outsiders (H7)	-0.030 ** (0.008)
	Social Distancing (H8)	-0.081 ** (0.009)
	Rearranging the Office Spaces (H9)	-0.067 ** (0.007)
Group 3	Cleaning and Sanitizing (H10)	-0.066 ** (0.007)
	Mental Assistance (H11)	-0.046 ** (0.007)
	Health Assistance (H12)	-0.076 ** (0.005)
Model Fit	Adjusted R-squared	0.293
	F-test	12,066.714 **
<i>n</i>		320,338

\*\*  $p < 0.01$ .

The proposed model explains a significant portion of the total variance in the dependent variable. The R-squared indicates that it explains about 29.3 percent of the variance of employee’s expectation. It is important to note that negative coefficients indicate that the effects are just as expected. In other words, given that independent variables measured the ‘negative’ experiences related to the relevant factor, the negative signs of the coefficients

show that the negative experiences undermined employee's expectation for their agency's future readiness. The factor of the greatest effect was whether their organization gave timely updates to their employees on confirmed COVID-19 cases in their worksites ( $-0.196$ : H6). The least important factor was limiting access from external visitors ( $-0.030$ : H7). On average, the factors in Group 2 were more significant than other groups, and Group 3 was the next. The average effect size (the mean of the coefficients for each group) was  $-0.048$  (Group 1),  $-0.088$  (Group 2), and  $-0.075$  (Group 3), respectively.

#### 4.5. RQ2: Ordinal Regression

Given that the dependent variable was measured using the ordinal scale, the OLS regression may have produced biased results. Thus, we examined the model using the ordinal regression method. Table 8 presents the result of running the ordinal regression. Pseudo-R-square index indicated that the proposed model explained a considerable portion of the dependent variable, ranging from 0.104 to 0.261. Examining the independent variables individually, the results were not significantly different from those obtained from the OLS regression. The factor which showed the greatest effect size was whether to update on COVID-19 cases happening in the worksite ( $-1.049$ : H6). The least important factor was whether to limit outsiders on the worksite ( $-0.223$ : H7). The factors in Group 1 showed the average effect size of  $-0.351$ , those in Group 2 had the effect size of  $-0.558$  on average, and those in Group 3 were  $-0.433$  on average.

**Table 8.** Ordinal Regression on the Expectation for Readiness.

IV Groups	Independent Variable	Estimate (Standard Error)
Group 1	Telework (H3)	$-0.322^{**}$ (0.016)
	Work Schedule Flexibility (H4)	$-0.369^{**}$ (0.015)
	Expanded Leave Policies (H5)	$-0.363^{**}$ (0.014)
Group 2	Update on COVID-10 Cases (H6)	$-1.049^{**}$ (0.011)
	Limiting the Access from Outsiders (H7)	$-0.223^{**}$ (0.016)
	Social Distancing (H8)	$-0.550^{**}$ (0.017)
	Rearranging the Office Spaces (H9)	$-0.447^{**}$ (0.014)
	Cleaning and Sanitizing (H10)	$-0.519^{**}$ (0.014)
Group 3	Mental Assistance (H11)	$-0.338^{**}$ (0.014)
	Health Assistance (H12)	$-0.443^{**}$ (0.010)
	Protection of the Vulnerable (H13)	$-0.632^{**}$ (0.014)
Model Fit	$-2$ Log Likelihood	27,167.995
	Chi-square	89,277.015 <sup>**</sup>
	Cox & Snell	0.243
	Nagelkerke	0.261
	McFadden	0.104
Linearity Assumption	$-2$ Log likelihood	26,768.853
	Chi-square	399.141 <sup>**</sup>

<sup>\*\*</sup>  $p < 0.01$ .

However, examining the linearity assumption, the Chi-square shows that the effects of the independent variable are not consistent across the different categories of the dependent variable. Thus, we needed to test the model using the multinomial regression method to examine the effects separately for the thresholds between each category.

#### 4.6. RQ2: Multinomial Regression

We previously showed that the linearity assumption was violated, meaning that the effects of independent variables were not consistent across different categories of the dependent variable. Hence, we supplemented the analysis by conducting the multinomial regression testing. Table 9 below shows the result of running the multinomial regression analysis. Given that it is not simple to interpret the results of multinomial regression, we reviewed this result for reference to see if there was a considerable difference between OLS or ordinal regression and the multinomial regression analysis.

**Table 9.** Multinomial regression on the expectation for readiness.

Hypothesis		Strongly Disagree (1)	Disagree (2)	neither Disagree nor Agree (3)	Agree (4)
Group 1	H3	0.744 ** (0.038)	0.677 ** (0.036)	0.559 ** (0.031)	0.385 ** (0.029)
	H4	0.804 ** (0.036)	0.661 ** (0.034)	0.551 ** (0.029)	0.355 ** (0.026)
	H5	0.796 ** (0.032)	0.632 ** (0.031)	0.535 ** (0.026)	0.308 ** (0.023)
Group 2	H6	1.987 ** (0.026)	1.715 ** (0.023)	1.285 ** (0.019)	0.684 ** (0.017)
	H7	0.598 ** (0.039)	0.422 ** (0.038)	0.348 ** (0.034)	0.198 ** (0.032)
	H8	1.201 ** (0.042)	0.905 ** (0.040)	0.736 ** (0.036)	0.325 ** (0.035)
	H9	0.832 ** (0.033)	0.855 ** (0.030)	0.657 ** (0.026)	0.449 ** (0.023)
	H10	1.118 ** (0.032)	0.866 ** (0.031)	0.683 ** (0.028)	0.416 ** (0.025)
Group 3	H11	0.783 ** (0.031)	0.559 ** (0.030)	0.497 ** (0.026)	0.293 ** (0.023)
	H12	0.712 ** (0.026)	0.808 ** (0.022)	0.609 ** (0.018)	0.433 ** (0.015)
	H13	1.299 ** (0.033)	1.085 ** (0.031)	0.857 ** (.027)	0.475 ** (0.026)
		−2 Log Likelihood			26,588.159
		Chi-square			89,856.850 **
Model Fit	Cox & Snell			0.245	
	Nagelkerke			0.263	
	McFadden			0.105	
	<i>n</i>		320,338		

\*\*  $p < 0.01$ . The reference category is “Strongly Agree (5)”.

The reference point for the multinomial analysis we did was the highest score (5) of the dependent variable, meaning that the coefficients in Table 9 indicate whether the independent variable shows a significant effect of making respondents to choose the given answer (1–4) vs. the highest score (5). Hence, the positive signs of the coefficients show that the independent variables have the effect of decreasing the dependent variable, the expectation for future readiness.

After reviewing the results in Table 9, we concluded that the results of multinomial analysis are not significantly different from the previous results obtained from the OLS and ordinal regressions. For instance, the most significant effect was consistently shown for COVID-19 case updates (H6), while the least important factor was limiting outsiders on the worksite (H7).

## 5. Discussion and Conclusions

### 5.1. Discussion

There are some noteworthy findings that need to be further explained and/or interpreted. First, the effects of the organizational responses aimed at protecting employees while working together in the same place were the greatest, while those designed to reduce the amount of time staying together in the worksite were the least important. Given that

there is no way to allow most employees to telework or take leave, a majority of people should work on-site. For this reason, employees seem to perceive that the measures to limit the number of people in the same place or the amount of time people are in the same place should only have a limited effect. What is perceived to be important is to reduce the risk of COVID-19 while they are working in the same offices, for instance, by alerting employees when a confirmed COVID-19 case occurs in the workplace, by maximizing social distance in the workplace, or by providing cleaning and sanitizing supplies.

Secondly, the most important response to COVID-19 was to update employees on the occurrence of COVID-19 cases in the workplace. When there is a confirmed case in an office, employees working in and near the office or even in the same building will be exposed to a heightened risk of the disease. Employees believe that organizations should inform them of this risk and take steps to reduce the risk. Also important was to give pay special attention to those vulnerable to COVID-19. Some people with a pre-existing medical condition should have a higher possibility of severe illness. Organizations should give these people a priority when selecting who will telework and/or take a leave.

Third, the policy of limiting access into facilities had the least important effect on employees' perception of organizational readiness to protect employees from a health emergency. Employees seem to believe that allowing outsiders into facilities does not particularly increase the risk of COVID-19, probably because there is no clear evidence that individuals from outside are more likely to spread the disease than coworkers.

## 5.2. Conclusions

In relation to the first research question (RQ1), this study examined whether safety perception matters for enhancing the subjective well-being of employees and whether its effect has increased during a period of medical emergency, such as COVID-19. The results confirmed both of the hypotheses as to the effects of safety perception on job satisfaction, which is compatible with the findings from prior research [11]. This implies that organizations should pay attention to protecting their employees from safety and health hazards, although this may have been considered less important before COVID-19.

In fact, the importance of workplace health and safety has been acknowledged in the management literature. For instance, Wright and Cropanzano [31] found that employee's psychological well-being positively influences job performance. However, the current study has an additional value in that it compared the relative importance of safety perception on job satisfaction against other important job factors such as the quality of interpersonal relationships in the workplace, the likability of work, and the degree of recognition for their performance. The effect of safety perception was shown to be more important than the quality of interpersonal relationships with colleagues or supervisors, whereas it was less important than the effect of intrinsic motivation or performance recognition. This indicates that the effect of safety perception is by no means negligible.

In addition, the effect size of safety perception on job satisfaction has increased over the last couple of years during the peak of COVID-19. Since the experience of an emergency is likely to have a lasting effect on people's perceptions and behaviors, the impacts of employee safety perception on job satisfaction and other important job attitudes are likely to last over time. Thus, managers in organizations, particularly those in government organizations, should pay attention to ensuring the health and safety of their employees.

In relation to the second research question (RQ2), this study examined the relative importance of organizational responses to COVID-19. Although there has been a significant body of research examining the impacts of organizational measures to improve workplace health and safety, few studies have examined the effect of each of the actual programs separately, with only a few exceptions [11]. For instance, studies have examined the effect of employee involvement in workplace health promotion programs [32] or their perception of the management's commitment to employee health and safety [33]. On the contrary, this study investigated the effect of the actual programs adopted during the COVID-19

on job satisfaction. Hence, the findings from this study can provide managers with more detailed descriptions.

A more effective measure to reduce the risk of a medical emergency is to take actions to reduce the actual risk of getting infected, rather than to focus on those that have only indirect impacts. For instance, informing their employees on whether there is a confirmed COVID-19 case in the work site will make them more careful and take the necessary measures to protect themselves (e.g., wearing masks or carrying sanitizers) if necessary, thereby having the direct effect of reducing the risk. However, although employees want to know whether they are exposed to the heightened risk by getting informed of confirmed COVID-19 cases, releasing such information may encroach on the human rights of those infected by the COVID-19. If people can identify those who got the COVID-19, they can blame them or spread a rumor that may harm their reputations. Thus, those in charge of this matter should make prudent decisions.

Another noteworthy finding relates to the protection of vulnerable groups. We found that the job satisfaction of those in need of special care (e.g., the elderly or the disabled) who did not receive the necessary health services was the most significantly decreased. As stipulated by the International Labor Organization, vulnerable workers should be more protected than ordinary employees. Applying the same criteria in a time of health crisis can pose a greater risk to them.

This study provides meaningful implications for organizational managers on how to maintain employee vitality in case of an emergency, but there are also some limitations that future researchers need to consider. The effectiveness of organizational measures to enhance employee health and safety may vary depending on the nature of the works and the organizational environment. One speculation is that it is more common to telework in private firms, and hence private sector employees feel more protected during the COVID-19 pandemic or the effect of telework than the findings of this study. In addition, the findings from this study may not be applicable to particular types of organizations. For instance, the soldiers deployed in the battlefield may have different needs than those of the public employees who participated in this study. Also, examining employees working in a private firm would have produced different results. We hope that future researchers conduct similar analyses in various research contexts to confirm what we have found in this study or propose a different perspective.

**Author Contributions:** H.-W.L. planned this study and drafted a manuscript. D.-Y.R. helped analyze the data and revised the manuscript. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was supported by the Hallym University Research Fund, HRF-202003-004.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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