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Original Article

The relationship between performance feedback from supervisors and subordinates' work engagement among employees in elderly care facilities: structural equation modeling

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Abstract: Despite the increasing need for nursing care services, the turnover rate of care workers is high in Japan. Since the most common reason for quitting nursing care jobs was problems with interpersonal relationships at work, creating psychosocially safe working environments is urgent. This study aimed to investigate the mediating effects of trust in supervisors (TS) on the association between positive feedback (PF)/negative feedback (NF) and work engagement (WE) based on the job demands–resources theory and conservation of resources theory. We conducted anonymous cross-sectional surveys of 469 employees at elderly care facilities in Japan. Structural equation modeling was used to investigate the causal relationships between the variables. The results showed that PF had significant positive effects on WE, directly and indirectly through TS. By contrast, NF had a nonsignificant positive effect on TS or WE. Tucker–Lewis Index [TLI] was 0.917, Comparative Fit Index [CFI] was 0.927, Root Mean Squared Error of Approximation [RMSEA] was 0.096, and Standardized Root Mean squared Residual [SRMR] was 0.042. The study results indicate that sufficient PF is needed to improve subordinates' WE through TS in elderly care facilities.

Key words: Interpersonal relationships, Negative feedback, Performance feedback, Positive feedback, Trust, Turnover intention, Work engagement

Introduction

Staff shortage in elderly care facilities is one of the serious concerns in Japan. As of November 2021, the population of elderly people aged 65 years and over was 36.4 million in Japan[1)], and the current aging rate (28.9%) is expected to still increase until 2065[2)]. Although the number of people requiring nursing care services are increasing[3, 4)], the shortage rate of care workers as of 2019 was high at 65.3%. The turnover rate for care workers was also relatively high at 15.4%[5)], which is one of the reasons for the staff shortage. Care workers who work in care facilities for less than one year accounted for approximately 40% and less than three years for more than 60% of the total turnover[5)].

The most common reason for quitting nursing care jobs was problems with interpersonal relationships at work[5)]. A Japanese study reported that care workers with low turnover rate had good relationships with coworkers and supervisors compared with those with high turnover rate[6)].

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A systematic review on nurses reported that supervisor support, praise, recognition, and trust in managers were positively related to the intention to stay[7]. Thus, interpersonal relationships at work, especially with supervisors or managers, had positive relationships with the low turnover rate or the intention to stay in the healthcare field. Moreover, interpersonal relationships at work including performance feedback were reported to have positive effects on work engagement (WE), which has negative effects on turnover intention[8–11]. However, few studies have focused on performance feedback to improve WE in elderly care facilities[12–14].

Performance feedback can be divided into positive feedback (PF) and negative feedback (NF), and each feedback has different roles[15]. Moreover, trust in supervisors (TS) is a key in the relationship between PF/NF and outcomes[13, 14]. However, to our knowledge, no study has investigated the relationship between performance feedback and WE by dividing PF and NF. Investigating the kinds of performance feedback to be associated with WE and the mediating role of TS in its association among care workers would contribute to improving working environments in care facilities. Therefore, this study aimed to investigate the mediating effects of TS on the association between PF/NF and WE among workers in elderly care facilities in Japan.

WE

WE is defined as a positive and fulfilling work-related state of mind characterized by vigor, dedication, and absorption[16] and is negatively correlated with turnover intention[11, 12, 17]. The relationships between WE and turnover intention can be explained by the job demands–resources theory (JD-R theory)[8]. In the JD-R theory, all types of job characteristics can be classified into job demands (physical, social, or organizational aspects of the job that require sustained physical or mental effort, which are associated with certain physiological and psychological costs) and job resources (physical, psychological, social, or organizational aspects of the job that may do any of the following: be functional in achieving work goals; reduce job demands at the associated physiological and psychological costs; stimulate personal growth and development)[10]. These categories (job demands and job resources) are related to a health-impairment process and a motivational process, respectively[8]. In the health-impairment process, poorly designed jobs or chronic job demands exhaust employees' mental and physical resources and may lead to energy depletion and health problems[9]. On the contrary, the motivational process involves the assumption that job resources have motivational potential and lead to high WE, low cynicism, and excellent performance[9]. Through this motivational process, job resources can contribute to the improvement of WE and reduction of turnover intention.

However, there is another discussion regarding the JD-R theory. Schaufeli and Taris[18] argued that the JD-R theory provides limited insight into the psychological mechanisms because the JD-R theory specifies what kind of job and personal characteristics lead to what kind of psychological states and outcomes but does not tell why this would be so. Instead, the conservation of resources (COR) theory can be used to explain the process. The COR theory posits that people seek to obtain, retain, and protect resources and that stress occurs when resources are threatened with loss or lost or when individuals fail to gain resources after substantive resource investment, and the potential or actual resource loss is threatening to them and central to the stress experience[19, 20]. By utilizing the concept of the COR theory, Borst *et al.*[17] conducted a meta-analysis regarding the effects of WE on attitudinal, behavioral, and performance outcomes in the semipublic and public sector[17]. Charoensukmongkol[21] also reported a negative association between *guanxi* and emotional exhaustion. The Chinese word *guanxi* refers to the concept of drawing on connections to secure favors in personal relations[22]. Exhaustion is the subscale of burnout, which is negatively correlated with engagement[16].

Given the above explanation regarding the JD-R theory and COR theory, job resources contribute to WE improvement. Although performance feedback is a part of job resources[16], to our knowledge, no study has reported on what type of performance feedback contributes to improving WE. Thus, this study aimed to analyze the effect of performance feedback on WE in more detail.

Supervisors' performance feedback

Supervisors' performance feedback can be divided into PF (point out good points for desirable or expected performance) and NF (point out bad points for undesirable or below expected performance)[13, 15]. PF tends to be more easily and accurately perceived than NF because NF can be perceived as a denial of oneself, whereas PF tends to enhance the self-image of recipients[15]. The correlation coefficient between PF and NF was reported to be positive in a system company, consulting company, or research institutes[13]. However, the difference in job types may affect the correlations of each variable. In a systematic review[14], the correlations between contingent reward behavior (i.e.,

PF) and contingent punishment behavior (i.e., NF) were significantly positive, whereas the correlations between contingent reward behavior and noncontingent punishment behavior were significantly negative. Contingent feedback is to give feedback according to the performance, whereas noncontingent feedback is to give feedback regardless of the performance[23]. Therefore, how we define PF and NF may also affect the correlations between them. In this study, since we did not set specific conditions (contingent or noncontingent) in the definitions of PF and NF, we predicted a positive relationship between PF and NF even in elderly care facilities.

H1: PF has a positive relationship with NF.

PF/NF and WE

Although previous studies have reported positive relationships between performance feedback and WE[11, 12, 24], there were no clear divisions of PF/NF regarding the question items of performance feedback.

PF may contribute to obtaining resources in the context of the COR theory[19, 20]. Since PF provides encouragement to employees, giving sufficient PF may play a similar role to engaging leadership, which has a positive effect on WE[25]. Engaging leadership is defined as a leadership behavior that facilitates, strengthens, connects, and inspires employees to increase their WE[25]. Engaging leaders reduce job demands, increase job resources, and promote WE by satisfying their employees' psychological needs for autonomy, competence, relatedness, and meaning[25]. Thus, giving sufficient PF to encourage team members may be effective in improving their WE because the measurement of engaging leadership includes some question items regarding the encouragement for team members[25].

On the contrary, NF may not contribute to obtaining resources because giving NF does not always encourage team members. Podsakoff *et al.*[14] reported that reward behavior had a stronger relationship with job satisfaction than punishment behavior, and punishment behavior had a positive relationship with job satisfaction only when the feedback is contingent upon subordinates' task behavior. Thus, the effect of NF to improve WE may be limited.

Shigemasu[13] also reported that only PF (not NF) had a direct positive effect on employee satisfaction. While the positive relationship between performance feedback and WE was reported[12], the relationship between PF/NF and WE in elderly care facilities was not investigated. Based on these previous studies, we proposed:

H2: PF has a direct positive relationship with WE, but NF has no direct positive relationship with WE.

TS

Trust can affect the causal relationship between performance feedback and WE. Some definitions of trust were discussed in previous studies[26]. For example, Mayer *et al.*[27] proposed that the definition of trust is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party. Rousseau *et al.*[28] cited their definition in the paper, and insisted that the frequently cited definition of trust is the "willingness to be vulnerable". Moreover, since more recent studies[13, 29, 30] have focused on the same definition of trust, utilizing it could be reasonable. Mayer *et al.*[27] also stated that cooperation is a different concept from trust, but the distinction tends to be unclear. While cooperation does not necessarily put a party at risk, trust is not a necessary condition for cooperation to occur (even if vulnerability is minimal or absent, you can cooperate with someone). According to Schoorman *et al.*[29], perceptions about an individual's ability, benevolence, and integrity will influence trust. These three trustworthiness dimensions are regarded as the antecedents of trust[29].

Moreover, some issues were discussed regarding the measurement of trust. For instance, cultural background can affect the role of trust. More action-oriented, competitive, and performance-oriented cultures tend to value the ability variable of trustworthiness, whereas more collaborative and being-oriented cultures tend to put more emphasis on the benevolence variable of trustworthiness[29]. Therefore, we should focus on the cultural aspects of the society when measuring the effect of trust on outcomes.

PF/NF and TS

The relationships between performance feedback (PF/NF) and TS have been discussed in previous studies. First, in a systematic review, Dirks and Ferrin[31] reported the positive relationships between leader actions/practices (including perceived organizational support) and trust in leader. Since performance feedback can be regarded as a part of leader actions/practices, positive relationships between performance feedback and TS can be predicted. Second, Podsakoff *et al.*[14] reported that reward behavior had a stronger relationship with TS than punishment behavior, but even punishment behavior had a positive relationship with TS when the feedback is contingent upon subordinates' task behavior. Thus, both PF and NF may have positive effects on TS, and the effect of TS may be different. Third, Shigemasu[13] reported that both PF and

NF had positive effects on TS, and the positive effect of PF was stronger than that of NF. The relationships should be investigated even in care facilities because differences in job types may affect the result. Based on these three previous studies, we proposed:

H3: Both PF and NF have a positive relationship with TS, but PF has a stronger positive relationship than NF.

TS and WE

In a systematic review[31], trust in leader showed positive relationships with job attitudes (job satisfaction and organizational commitment) and negative relationships with turnover intentions. Subordinates tend to feel safer when the leader is trustworthy[31]. Although the systematic review[31] did not investigate causal relationships between trust in leader and outcomes, positive relationships between TS and WE can be predicted. Moreover, based on the JD-R theory[8–10] and COR theory[19, 20], the resources from supervisors such as trust can be considered to enhance subordinates' WE. These theories enhance the causal relationships between TS and WE. Okello and Gilson[32] also reported that positive trust relationships with supervisors and managers were associated with the motivation of health workers. All these studies supported the positive relationships between TS and WE. Based on these previous studies, we proposed:

H4: TS has a positive relationship with WE.

Mediating effect of TS between PF/NF and WE

As abovementioned, the relationships between PF and NF, PF/NF and WE, PF/NF and TS, and TS and WE can be predicted. According to Ilgen *et al.*[15], the more the recipient believes in the source's credibility, the more likely it is that the recipient of the information will accept the feedback. Moreover, Earley[33] revealed that PF and NF predict performance and that trust mediates the effect of feedback on performance. The author also stated that an important determinant of feedback acceptance is an individual's trust in the feedback source[33]. The mediating effects of TS were also found in previous studies regarding leadership. Goodwin *et al.*[34] reported that trust was not a moderator but a mediator in the relationships between transformational leadership behavior and the outcomes of follower organizational citizenship behavior, affective commitment, and performance. Transformational leadership refers to the leader moving the follower beyond immediate self-interests through idealized influence (charisma), inspiration, intellectual stimulation, or individualized consideration[35]. Furthermore, some studies have reported a significant indirect effect of authentic leadership on WE through TS[36, 37]. Gardner *et al.*[38] summarized the three components of leadership authenticity: acceptance of personal and organizational responsibility for actions, outcomes and mistakes; non-manipulation of subordinates; and salience of the self over role requirements. These three studies[34, 36, 37] supported the mediating effect of TS in the relationships between leadership and employees' outcomes.

Moreover, regarding performance feedback, TS was a mediator between PF/NF frequency from supervisors and organizational commitment or employee satisfaction, and NF had positive effects on subordinates' outcomes only in the mediating process of TS[13]. Thus, one of the possible reasons why even NF improves the outcomes is whether subordinates trust their supervisors or not. TS was predicted to function as a mediator even in the relationships between PF/NF and WE, and the relationships should be investigated even in care facilities. Based on these previous studies, we proposed:

H5: Both PF and NF have a positive relationship with WE through TS as a mediating variable.

These five hypotheses, as described in Fig. 1, were tested to investigate the mediating effects of TS. The main hypothesis was *H5*, but *H1* through *H4*, which are more subdivided, were tested to verify *H5*.

Subjects and Methods

Procedures and participants

We conducted cross-sectional surveys at ten elderly care facilities (one public and nine private) in Kanagawa,

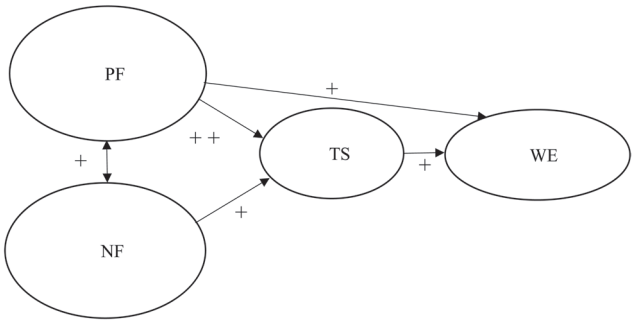

Fig. 1. Hypotheses and research model.
"+" shows positive relationships between variables. "++" shows strong positive relationships between variables. "→" shows path coefficients. "↔" shows a correlation coefficient. We predicted that a path coefficient from NF to WE is not significantly positive.
PF: positive feedback; NF: negative feedback; TS: trust in supervisors; WE: work engagement.

Japan, from October to December 2021. We contacted 13 directors of elderly care facilities in Kanagawa, and ten of them have approved this study. All employees (N=469) at ten elderly care facilities were recruited to the study, except those who were on maternity or sick leave during the survey (N=6). The employees were informed of the purpose of the survey in writing, notified that cooperation in this study is voluntary, that the results will be statistically processed and individuals or facilities will not be identified, and that survey results will be published in an academic journal. Participants who agreed filled out the anonymous questionnaires, sealed the envelope, and submitted it in the locked collection box. Only the author (MS) had the keys to open the boxes and collected the questionnaires with the boxes in approximately two weeks at each facility. The study procedure was approved by the research ethics review committee of School of Health Innovation, Kanagawa University of Human Services (SHI No. 12).

Measures

The exposure variables were PF and NF assessed with a scale of PF/NF frequency from supervisors that was developed by Shigemasu[13], with six items scored on a five-point scale ranging from 1 ("never") to 5 ("always"). An example of the questions about PF (three items) is as follows: "Point out the good points about your skills in identifying problems and coming up with the solution"[13]. An example of the questions about NF (three items) is as follows: "Point out the bad points about your skills in identifying problems and coming up with the solution"[13]. The Cronbach's alpha coefficients were 0.96 for PF and for NF in this study, and the mean scores of each three items of PF and NF were used.

The mediating variable was TS assessed with a scale that was developed by Fujiwara[30], with five items scored on a four-point scale ranging from 1 ("disagree") to 4 ("agree"). Examples of the questions are as follows: "My supervisor is always trying to understand the contents and the status of subordinates' work" and "My supervisor gives me appropriate advice daily"[30]. Fujiwara[30] confirmed the internal consistency with Cronbach's alpha coefficient. The Cronbach's alpha coefficient was 0.91 in this study, and the mean score of five items was used.

The outcome variable was WE assessed with the Japanese version of the nine-item Utrecht Work Engagement Scale (UWES) scored on a seven-point scale ranging from 0 ("never") to 6 ("always")[39]. Examples of the questions were as follows: "At my work, I feel bursting with energy," "I am enthusiastic about my job," and "I feel happy when I am working intensely"[39]. The reliability (internal consistency and stability), factorial invariance, and construct validity were confirmed[39]. The Cronbach's alpha coefficient was 0.95 in this study, and the mean score of nine items of UWES was used.

The following demographic variables were collected to examine the confounding effects: gender (men, women, and others); age (≤29, 30–39, 40–49, 50–59, and ≥60 yr old); marital status (unmarried, married, and divorced or widowed); years of education (≤12, 13–15, and ≥16); job title (doctor or nurse, caregiver, administrative officer, repair or cleaning staff, and others); employment status (full-time and part-time); position (none, leader, and others); years of continuous service in the workplace (≤4, 5–9, and ≥10); and total years of experience for the job title (≤4, 5–9, 10–14, 15–19, and ≥20).

Moreover, other data regarding job stressors and job resources were collected to examine the reliability of our data by comparing it with the national average in Japan. We utilized a part of the New Brief Job Stress Questionnaire[40, 41] and measured interpersonal conflict (three items), supervisor support (three items), coworker support (three items), support from family and friends (three items), leadership (three items), interactional justice (three items), workplace where people compliment each other (three items), and workplace where mistakes are acceptable (two items). The Cronbach's alpha coefficients in this study were 0.61 (interpersonal conflict), 0.88 (supervisor support), 0.84 (coworker support), 0.92 (support from family and friends), 0.93 (leadership), 0.92 (interactional justice), 0.94 (workplace where people compliment each other), and 0.85 (workplace where mistakes are acceptable). The mean scores of each scale were used in this study.

Statistical analyses

We conducted a list-wise case deletion about the sample including any missing values. First, we compared the scores of job stressors and job resources between our sample and the national average in Japan[41] to investigate the reliability of our sample data. Second, we investigated the confounding effects of demographic variables. The Kruskal–Wallis test with post-hoc tests by the Dann–Bonferroni and Mann–Whitney U test was used to compare the mean ranks of the main variables (PF, NF, TS, and WE) among the categories of demographic variables. Third, Spearman's rank correlation coefficients between the main variables were used to verify the relationships between them. Finally, structural equation modeling was used to

investigate the causal relationships between main variables (Fig. 1). Additional structural equation modeling analyses were conducted after classifying the TS into subscales (each item of the TS scale) to check the path coefficients from NF to each subscale of TS. Another structural equation modeling analyses were conducted separately for men and women. We checked whether the indices of the goodness of fit met the standard values (Tucker–Lewis Index [TLI] and Comparative Fit Index [CFI]: more than 0.95, Root Mean Squared Error of Approximation [RMSEA]: less than 0.06, and Standardized Root Mean squared Residual [SRMR]: less than 0.08)[42]. Murakami *et al.*[43] insisted that 200 or more samples should be collected for uncomplicated models and ten times more samples than the number of free parameters for complicated models with many parameters. Thus, the minimum sample size was set as 200. IBM Amos version 28 (IBM Corporation, Armonk, NY, USA) and IBM SPSS version 28 (IBM Corporation) were used to analyze the data.

Results

Characteristics of respondents

We distributed 469 questionnaires to the employees and collected 396 questionnaires (response rate, 84.4%). The final sample size without missing values was 297. The details of participant characteristics are shown in Table 1. Most of the respondents were women, in their 30s, and the most common occupation was a caregiver.

Data comparison with national averages in Japan

Table 2 shows the score comparison of job stressors and job resources between our sample and the national average in Japan[41]. Compared with the national average in Japan[41], leadership and interactional justice scores in this study were approximately 0.30 higher, but other scores were similar.

Differences of values by categories

Table 3 shows the results of the Kruskal–Wallis test with post-hoc tests by Dann–Bonferroni and Mann–Whitney U test. According to the results of multiple comparisons, the PF values were significantly different between men and women; ≤29 and ≥60 yr old; ≤4 and ≥20 total years of experience for the job title; full-time and part-time. The NF values were significantly different between men and women; ≤29 and ≥60 yr old; unmarried and married.

Correlations of variables

Table 4 shows Spearman's rank correlation coefficients between the main variables. Significant positive correlations were observed between all variables. The correlation coefficients between PF and TS or WE (r=0.64, 0.45, p<0.01) was stronger than between NF and TS or WE (r=0.38, 0.30, p<0.01).

Hypothesized model with standardized coefficients

Figure 2 shows the results of the structural equation modeling. TLI was 0.917; CFI, 0.927; RMSEA, 0.096; and SRMR, 0.042. The coefficients between PF and NF, PF to TS, PF to WE, and TS to WE were significantly positive (standardized coefficients = 0.66, 0.69, 0.28, and 0.28, respectively, all p<0.001). PF had a positive effect on WE mediated by TS (0.69 × 0.28 = 0.19), but the path coefficients from NF to TS or WE were not significantly positive.

When stratifying men and women, the correlation coefficient between PF and NF was 0.72 (standardized coefficient, p<0.001) in men and 0.65 (standardized coefficient, p<0.001) in women. When using all the TS subscales, the path coefficients from NF to all TS subscales were not significant for all samples nor when stratifying men and women.

Discussion

We surveyed employees in elderly care facilities and analyzed how PF and NF affect WE, directly and indirectly, considering the mediating effects of TS, by structural equation modeling. The results showed that PF had significant positive effects on WE both directly and indirectly through TS, whereas NF had nonsignificant positive effects on WE, either directly or indirectly, which confirmed *H1*, *H2*, and *H4*. By contrast, the results of the nonsignificant path coefficient from NF to TS partially denied *H3* and *H5.* The study results indicate that sufficient PF is needed to improve subordinates' WE through TS in elderly care facilities.

H1 was supported. The correlation between PF and NF was significantly positive and strong (standardized coefficient=0.66, p<0.001). The correlation between PF and NF indicates that employees who received more PF received more NF and vice versa. Moreover, the correlation coefficient between PF and NF in this study was stronger than that of the study (standardized coefficient=0.26, p<0.001) by Shigemasu[13]. This might be explained by the differences in the demographic characteristics of the samples. In

Table 1. Descriptive statistics (N=297)

Variables	Total		PF		NF		TS		WE	
	n	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Gender										
Men	101	34.0	3.04	0.94	2.79	0.94	2.91	0.81	2.87	1.30
Women	189	63.6	2.76	1.03	2.4	0.99	2.80	0.80	2.98	1.43
Others	7	2.4	2.71	1.21	2.57	1.13	2.60	0.62	2.05	1.39
Age (yr)										
≤29	55	18.5	3.16	1.00	2.80	1.06	2.98	0.79	2.83	1.27
30–39	71	23.9	2.92	0.97	2.65	1.01	2.70	0.85	2.60	1.49
40–49	58	19.5	2.84	1.07	2.59	1.05	2.84	0.87	3.02	1.49
50–59	70	23.6	2.76	0.99	2.39	0.88	2.84	0.73	3.03	1.28
≥60	43	14.5	2.52	0.96	2.18	0.83	2.84	0.73	3.26	1.33
Marital status										
Unmarried	117	39.4	3.03	0.97	2.76	1.02	2.84	0.87	2.80	1.33
Married	145	48.8	2.74	1.02	2.37	0.91	2.83	0.77	2.92	1.42
Divorced or widowed	35	11.8	2.73	1.05	2.46	1.05	2.84	0.68	3.37	1.41
Years of education										
≤12	68	22.9	2.89	1.08	2.60	1.13	2.86	0.82	3.01	1.47
13–15	137	46.1	2.75	1.00	2.40	0.90	2.81	0.83	2.98	1.39
≥16	92	31.0	2.99	0.97	2.68	0.99	2.85	0.75	2.76	1.32
Job title										
Doctor or nurse	33	11.1	2.57	1.08	2.26	1.01	2.56	0.90	3.32	1.49
Caregiver	197	66.3	2.93	0.98	2.65	0.99	2.82	0.76	2.82	1.35
Administrative officer	12	4.0	2.81	0.78	2.53	0.81	3.13	0.88	3.08	1.65
Repair or cleaning staff	15	5.1	2.49	0.89	2.53	0.92	2.89	0.76	2.82	1.02
Others	40	13.5	2.85	1.16	2.21	0.96	3.05	0.77	3.08	1.50
Employment status										
Full-time	229	77.1	2.92	0.99	2.58	1.00	2.82	0.81	2.91	1.41
Part-time	68	22.9	2.64	1.05	2.38	0.95	2.87	0.75	2.96	1.33
Position										
None	261	87.9	2.83	1.00	2.51	0.98	2.81	0.82	2.90	1.37
Leader	20	6.7	3.08	0.96	2.62	0.97	2.98	0.54	2.98	1.59
Others	16	5.4	3.00	1.20	2.88	1.11	2.99	0.79	3.21	1.51
Years of continuous service in the workplace										
≤4	185	62.3	2.90	1.03	2.56	1.02	2.92	0.79	2.98	1.36
5–9	84	28.3	2.78	0.94	2.52	0.92	2.70	0.79	2.87	1.33
≥10	28	9.4	2.74	1.07	2.46	0.99	2.70	0.85	2.71	1.73
Total years of experience for the job title										
≤4	105	35.4	3.01	1.01	2.70	0.99	2.99	0.75	3.11	1.30
5–9	96	32.3	2.91	1.04	2.62	1.02	2.76	0.81	2.79	1.38
10–14	53	17.8	2.76	1.05	2.36	1.09	2.85	0.84	2.98	1.55
15–19	27	9.1	2.58	0.74	2.20	0.60	2.56	0.80	2.58	1.32
≥20	16	5.4	2.29	0.86	2.10	0.69	2.66	0.75	2.83	1.56

Most of the respondents were women, in their 30s, and the most common occupation was a caregiver.

PF: positive feedback; NF: negative feedback; TS: trust in supervisors; WE: work engagement; SD: standard deviation.

the previous study[13], 72.4% of the participants were men who work at a system company, consulting company, or research institutes. By contrast, 63.6% of the participants were women who work at elderly care facilities in this study. Differences in the gender of participants might also affect the mean values of PF and NF. Compared with the results of the previous study[13], the mean PF value was high (2.85 in this study vs. 2.62 in the previous study) and

Table 2. Score comparison of job stressors and job resources between our sample and the national average in Japan

Variables	This survey			National average in Japan		
	Mean	SD	N	Mean	SD	N
Interpersonal conflict	2.70	0.75	297	2.88	0.66	1,610
Supervisor support	2.53	0.78		2.37	0.75	1,612
Coworker support	2.74	0.69		2.68	0.70	1,615
Support from family and friends	3.25	0.73		3.31	0.68	1,619
Leadership	2.49	0.92		2.18	0.77	1,607
Interactional justice	2.84	0.80		2.55	0.80	1,616
Workplace where people compliment each other	2.64	0.90		2.42	0.82	1,624
Workplace where mistakes are acceptable	2.44	0.86		2.26	0.78	1,619

SD: standard deviation.

the mean NF value was low (2.54 vs. 2.75, respectively). When stratified by gender, the mean PF value was 3.04 in men and 2.76 in women, whereas the mean NF value was 2.78 in men and 2.40 in women in this study. However, the correlation coefficients between PF and NF for both men (standardized coefficient=0.72) and women (standardized coefficient=0.65) were greater than those of the previous study[13]. Therefore, other demographic variables such as occupation or working environments might have affected the magnitude of coefficients between PF and NF. With a close relationship between supervisors and subordinates, the frequency of both PF and NF may be high.

H2 was supported by the results of the significant path coefficient from PF to WE (standardized coefficient=0.28, $p<0.001$) and the nonsignificant path coefficient from NF to WE. The significant path coefficient from PF to WE was generally consistent with the results of previous studies[11–14, 24]. Since PF can be classified into job resources in the JD-R theory[8–10], the significant path coefficient from PF to WE is reasonable. Through a motivational process, PF might contribute to improving subordinates' WE, and receiving PF means obtaining resources, which is essential in reducing stress experiences in the context of the COR theory[19, 20]. Furthermore, providing sufficient PF might play a similar role to engaging leadership[25] as we predicted. The nonsignificant path coefficient from NF to WE was generally consistent with the result of a previous study[13] even in care facilities. Moreover, Podsakoff *et al.*[14] reported that punishment behavior had a positive relationship with job satisfaction only when feedback was given based on subordinates' task performance. Thus, NF might not always increase subordinates' positive outcomes including WE. Supervisors should carefully observe subordinates' task behaviors or performance to make NF effective on subordinates' motivation or satisfaction, as Ilgen *et al.*[15] insisted.

H4 was supported. The path coefficient from TS to WE was significantly positive (standardized coefficient=0.28, $p<0.001$). This result was generally consistent with the results of previous studies[13, 31, 32, 36, 37]. The results of the present study are reasonable because TS can be classified into job resources of the JD-R theory[8–10], and this mechanism can be explained by the COR theory[19, 20] as we mentioned. Job resources may foster employees' growth, learning, and development, and may be instrumental in achieving work goals[16]; thus, TS might contribute to improving subordinates' WE through a motivational process of the JD-R theory[8–10].

We predicted in *H3* and *H5* that both PF and NF would have positive effects on WE through TS and the effect of PF would be greater than that of NF. In this study, the path coefficient from PF to TS was significantly positive and strong (standardized coefficient=0.69, $p<0.001$), and PF had a positive effect on WE through TS ($0.69 \times 0.28 = 0.19$); however, NF did not have a significant effect on WE through TS. Therefore, *H3* and *H5* were partially denied.

An indirect effect of PF on WE through TS was consistent with the results of previous studies[13, 14]. According to Shigemasu[13], PF showed positive effects on employee satisfaction through TS, and the positive effects of PF were stronger than those of NF in previous studies[14, 15]. Moreover, having the willingness to be vulnerable[27–29] might facilitate the effect of PF, and TS functioned as a mediator between PF and WE as abovementioned[34, 36, 37]. Moreover, even indirectly, PF might have served as a job resource, and PF possibly contributed to improving WE through a motivational process, which can be explained by the JD-R theory[8–10] and COR theory[19, 20]. Study results suggest that increasing PF may be useful in enhancing employees' WE through TS.

Table 3. Results of Kruskal–Wallis test/Mann–Whitney U test

Variables	PF				NF				TS				WE			
	MR	χ^2	df	*p*	MR	χ^2	df	*p*	MR	χ^2	df	*p*	MR	χ^2	df	*p*
Gender		6.00	2	0.0498		13.43	2	0.001		2.76	2	0.251		2.77	2	0.251
Men	165.65*				173.68*				157.59				148.37			
Women	140.15*				135.91*				145.87				151.29			
Others	147.79				146.36				109.57				96.43			
Age (yr)		12.02	4	0.017		12.27	4	0.015		3.36	4	0.500		6.53	4	0.163
≤29	175.85*				171.18*				163.73				142.25			
30–39	155.99				161.09				135.83				130.87			
40–49	149.35				149.56				150.93				156.19			
50–59	137.76				137.29				149.74				154.45			
≥60	120.93*				118.97*				148.09				169.00			
Marital status		6.52	2	0.038		10.21	2	0.006		0.07	2	0.964		4.68	2	0.096
Unmarried	164.50				168.17*				150.65				141.91			
Married	139.50				135.68*				147.85				147.84			
Divorced or widowed	136.57				140.13				148.26				177.49			
Years of education		2.74	2	0.254		4.23	2	0.121		0.08	2	0.960				
≤12	149.92				150.50				151.55				150.98			
13–15	141.16				139.27				148.02				155.04			
≥16	159.99				162.38				148.57				138.54			
Job title		6.14	4	0.189		12.51	4	0.014		8.39	4	0.078		4.01	4	0.404
Doctor or nurse	121.20				119.48				122.39				171.44			
Caregiver	155.15				159.41				146.48				143.03			
Administrative officer	152.71				152.54				183.92				164.67			
Repair or cleaning staff	122.37				155.17				150.10				143.93			
Others	150.54				118.70				172.49				157.08			
Position		1.70	2	0.428		2.23	2	0.327		1.42	2	0.491		1.67	2	0.433
None	146.67				146.88				146.81				147.27			
Leader	168.95				152.88				163.30				150.05			
Others	162.09				178.75				166.78				175.84			
Years of continuous service in the workplace		1.58	2	0.453		0.25	2	0.882		5.29	2	0.071		1.33	2	0.515
≤4	153.74				150.56				157.84				153.32			
5–9	142.10				147.70				133.42				143.23			
≥10	138.38				142.57				137.32				137.79			
Total years of experience		13.00	4	0.011		13.18	4	0.010		7.92	4	0.094		4.82	4	0.307
≤4	164.41*				164.89				164.78				160.92			
5–9	154.25				155.61				140.82				140.52			
10–14	137.57				131.44				151.78				150.85			
15–19	121.89				121.50				121.96				126.85			
≥20	99.97*				109.63				130.94				152.88			
		U	Z	*p*		U	Z	*p*		U	Z	*p*		U	Z	*p*
Employment status		6,540.00	–2.04	0.042		6,844.00	–1.56	0.120		7,593.50	–0.31	0.756		7,753.00	–0.05	0.958
Full-time	154.44*				153.11				153.11				148.86			
Part-time	130.68*				135.15				151.83				149.49			

* shows $p<0.05$ from post-hoc tests by Dann–Bonferroni.

MR: mean rank; χ^2: chi square; df: degrees of freedom; *p*: *p*-value.

The PF values were significantly different between men and women; ≤29 and ≥60 yr old; ≤4 and ≥20 total years of experience for the job title; full-time and part-time. The NF values were significantly different between men and women; ≤29 and ≥60 yr old; unmarried and married.

Table 4. Spearman's rank correlation coefficients between variables

Variables	Range	Mean (SD)	1	2	3	4
1 PF	1–5	2.85 (1.01)	1.00			
2 NF	1–5	2.54 (0.99)	0.59**	1.00		
3 TS	1–4	2.83 (0.80)	0.64**	0.38**	1.00	
4 WE	0–6	2.92 (1.39)	0.45**	0.30**	0.44**	1.00

**$p<0.01$. Significant positive correlations were observed between all variables. The correlation coefficients between PF and TS or WE were stronger than between NF and TS or WE.
PF: positive feedback; NF negative feedback; TS: trust in supervisors; WE: work engagement; SD: standard deviation.

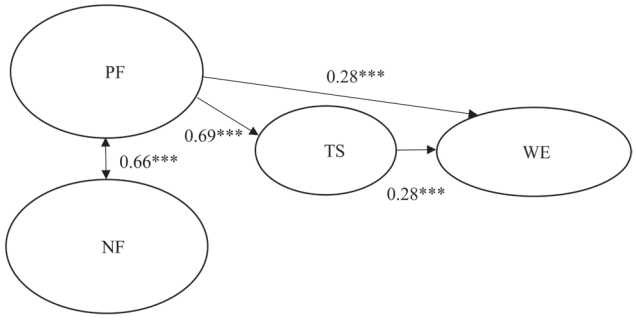

Fig. 2. Results of structural equation modeling.
"→" shows path coefficients. "↔" shows a correlation coefficient. All figures show standardized estimates.
PF: positive feedback; NF: negative feedback; TS: trust in supervisors; WE: work engagement.

On the contrary, the path coefficient from NF to TS was not significant. This result was not consistent with the results of previous studies[13, 14]. Podsakoff *et al.*[14] reported that even punishment behavior had a positive relationship with employee outcomes when the feedback is contingent upon subordinates' task behaviors. However, in this study, TS might not be comparable with the contingency of feedback because TS can be considered a more extensive concept than the contingency of feedback. Shigemasu[13] also revealed that NF had an indirect (through TS) positive effect on outcomes, such as employee satisfaction, and a path coefficient from NF to the trustworthiness of ability, which is the antecedent condition of trust[29], was significantly positive. Shigemasu[13] used four questions to measure the trustworthiness of ability. By contrast, the TS scale used in this study included items not only about expertise and ability but also altruism, sincerity of language and attitude, and accuracy of instructions, guidance, and advice[30]. Although this difference in the questions might affect the results of the path coefficients from NF to TS, the results of additional structural equation modeling analyses showed that the path coefficients from NF to all the TS subscales, including expertise and ability, were not significant for either all samples or when stratifying the gender. Shigemasu[13] surveyed a system company, consulting company, or research institutes. This difference in job types might also affect the relationships between NF and TS. In addition, the nonsignificant path coefficient from NF to TS may be because NF was not only an antecedent but also an outcome of TS. While the path coefficient from NF to TS was not significant, the results in Table 4 showed a significant positive correlation between NF and TS. This indicates that employees with favorable relationships with their supervisors may be given more NF.

The structural equation modeling results showed the following goodness of fit indices (TLI, 0.917; CFI, 0.927; RMSEA, 0.096; and SRMR, 0.042). TLI and CFI did not meet the standard values of more than 0.95[42]; however, these two values were within the acceptable level because both were more than 0.90[44]. By contrast, SRMR met the standard value of less than 0.08, whereas RMSEA did not meet the standard value of less than 0.06[42]. Since RMSEA can be excessively high with small degrees of freedom and sample size[43], increasing the sample size would contribute to RMSEA improvement.

The results in Table 3 showed significant differences in the PF values between men and women; ≤29 and ≥60 yr old; ≤4 and ≥20 yr of experience for the job title; full-time and part-time. The numerical difference in the mean rank of PF between ≤4 and ≥20 yr of experience for the job title was large. PF was low in the case of well-experienced employees. PF may be actively provided to inexperienced employees with less knowledge and skills. Contrarily, experienced employees might have acquired enough knowledge and skills through their experience and may not receive much PF. This suggests that providing sufficient PF to the experienced employees is important because low PF may result in low WE in the future.

This study has some limitations. First, the sample data including missing values were excluded. The small

sample size would reduce the statistical power. Additionally, employees with some missing values might not trust their supervisors well; thus, TS scores might have been overestimated. Second, the target facilities were all in a specific region of Kanagawa, Japan. Therefore, the generalizability of the results was limited. Table 2 shows that leadership and interactional justice scores in this sample were approximately 0.30 higher than the national average. Leadership includes question items about feedback from supervisors about job performance, and interactional justice includes question items about the sincerity of the supervisor's attitude[41], which are related to PF/NF and TS, respectively. Thus, our sample might have higher scores on PF, NF, and TS than the national average in Japan. Third, the survey was conducted only at facilities whose willingness to cooperate was confirmed. The directors of the facilities who agreed to participate in this study may be interested in improving the working environment of employees. They may provide enough feedback to employees regularly, and supervisors may be trusted well, which may cause higher scores on PF, NF, and TS. Lastly, this is a cross-sectional survey; thus, causal relationships between PF/NF and WE cannot be determined. Murakami *et al.*[43] insisted that verifying the temporal precedence of the independent variables is necessary when conducting structural equation modeling in a cross-sectional study. According to some longitudinal studies[14, 24], performance feedback can be regarded as the antecedent factor. However, the relationships between PF/NF and WE should be tested in a longitudinal or interventional study.

The study findings suggest that supervisors' PF is a key to improving both subordinates' TS and WE among care workers. As a practical implication, we think there are two ways to increase supervisors' PF. First, since most employees in elderly care facilities are caregivers and much of their working time is allocated to patient care, working time for direct verbal communication among caregivers may be limited. Therefore, introducing methods of communicating PF in writing may be effective, such as the "Like!" seal[45]. Second, the perceptions of PF, NF, and TS might differ between supervisors and subordinates. Burke *et al.*[26] reported the issue regarding trust perceptions between the trustor and the trustee. They[26] argued that asking the supervisor how much he/she trusts a subordinate and asking the subordinate how much the supervisor trusts him/her may result in little overlap. Therefore, keeping in mind the difference in the perceptions is needed in measuring trust between supervisors and subordinates. We assume that similar issues may arise concerning PF and NF. To resolve the differences in PF, NF, or TS perceptions between subordinates and supervisors, an introduction of 360-degree evaluations may be helpful, as Atwater and Brett[46] insisted. In sum, introducing the method of communicating supervisors' PF in writing and 360-degree evaluations could improve employees' WE and reduce turnover in elderly care facilities.

Conclusions

PF had positive effects on WE both directly and indirectly through TS, but NF did not have a positive effect on WE. The study results indicate that giving sufficient PF from supervisors is effective in improving subordinates' WE among employees in elderly care facilities.

Conflict of Interest

None declared.

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