buildings

MDPI

Article

Impact of Stressors/Stress on Organizational Commitment of Engineers in the Construction Industry

Mei-Yung Leung [1], Khursheed Ahmed [2,*] and Isabella Y. S. Chan [3]

[1] Department of Architecture and Civil Engineering, City University of Hong Kong, Hong Kong, China; bcmei@cityu.edu.hk
[2] NUST Institute of Civil Engineering, School of Civil and Environmental Engineering, National University of Science and Technology, Islamabad 44000, Pakistan
[3] Department of Real Estate and Construction, The University of Hong Kong, Hong Kong, China; iyschan@hku.hk
* Correspondence: khursheed@nice.nust.edu.pk

Abstract: Engineers often play vital roles in technical planning, designing, and operating projects, as well as implementing standard requirements in the physical sites. Although architectural designs may be similar in a construction project, the technical problems, including soil conditions, loading calculations, team combination, etc., often vary between projects. Although previous studies focus on the stress management of construction professionals, little research has been particularly conducted for the effects of stressors and stress of engineers on their organizational commitment. It is inevitable for engineers to experience different uncertainties, harsh working environments, and serious legal liabilities, while there is often no tolerance when it comes to deadlines and safety requirements. All this definitely puts great pressure on them and may subsequently affect their commitment to their organizations. The present study aimed to investigate the impact of stressors and stress on the commitment of engineers in the construction industry. A total of 146 respondents participated in a questionnaire survey, and various statistical analyses including a reliability test, correlation, and hierarchical multiple regressions were adopted for developing the optimized commitment models. The research results revealed that (1) Type A personality was a key factor, which had a significant positive effect on all the three organizational commitments of professional engineers in the construction industry; (2) poor office environment, job overload, and role ambiguity were positively associated with continuance and normative commitment, whereas poor site environment and lack of job autonomy were negatively linked with affective commitment; and (3) stress had a negative relationship with affective commitment; (4) however, there was no relationship between stress and continuance or normative commitment. In order to establish holistic organizational commitment strategies in the industry well, the current study indicates key stressors to upper management to help them efficiently manage complicated project teams in construction projects. In addition, it contributes the body of knowledge by developing an integrated commitment model for engineers. Finally, numerous recommendations are made, such as encouraging Type A personality behaviors, providing sufficient job autonomy, improving worksite conditions to enhance the organizational commitment of engineers, and reducing the adverse impacts of these stressors and stress.

Keywords: engineers; commitment; stress management; stressors; stress

Citation: Leung, M.-Y.; Ahmed, K.; Chan, I.Y.S. Impact of Stressors/Stress on Organizational Commitment of Engineers in the Construction Industry. *Buildings* **2024**, *14*, 956. https://doi.org/10.3390/buildings14040956

Academic Editor: Jurgita Antucheviciene

Received: 24 February 2024
Revised: 18 March 2024
Accepted: 26 March 2024
Published: 1 April 2024

Correction Statement: This article has been republished with a minor change. The change does not affect the scientific content of the article and further details are available within the backmatter of the website version of this article.

1. Introduction

The construction industry has been known as a challenging, dangerous, and demanding industry involving complex multi-tasking, tight budgets, rigid time frames, and poor working environments [1,2]. Previous studies indicated that construction project managers, estimators, workers, and students often work under high pressure [3–5]. However, little is known about experience of stress for engineers in the construction industry. Each construction project has unique characteristics involving various technical issues with specific solutions according to the actual situations. Engineers have particular responsibilities for technical planning, designing, and operating projects in the physical sites, which consists of various uncertainties in real situations, such as unpredictable soil conditions, dangerous sloping surfaces, extreme weather, possible natural disasters, changing requirements, uncontrollable workmanship, etc. [6]. The technical designs are mainly based on the standard codes of practice, but engineers are still required to ensure that the projects will successfully obtain various approvals from different governmental departments (e.g., building departments for private buildings, railway corporation for projects linking up to trains or subways, civil engineering departments for projects built on top of or close to slopes, electrical and mechanical departments for fire safety certification) [7].

In fact, the standard requirements may change according to the current situations, e.g., new reinforcement codes for earthquakes, high safety factors for retaining walls for slopes, regional regulations regarding central chiller systems, or increased requirements for air circulation in new hospitals [8]. Moreover, they have to coordinate with different parties (e.g., lighting specialists, ventilation subcontractors, fire safety experts, structural engineers, geotechnical engineers, water supplier engineers, security designers) working simultaneously on the site [9], based on the changing architectural designs. Engineers for both civil and building services works are expected to optimize the design to satisfy various end-users' needs, such as buildability, durability, economy, sustainability, and timeliness [10]. This is not only the case during the construction period, but for the whole duration of a building's operational life. All professional engineers and their organizations must indeed take legal liability for the safety issues of the final building products. With the fear of heavy penalties for project delay and costs going over budget, engineers often work under great pressure to complete the work with limited resources in terms of time, cost, and manpower. Hence, it is believed that both civil engineers and building services engineers are working under substantial stress in the construction industry and this may have a harmful effect on the organizational commitment, productivity, and absenteeism of construction workers.

According to the Health and Safety Executive, 17.9 million workdays were lost in 2020 due to work-related stress, anxiety, or depression [11]. The economic losses associated with stress exceed USD 300 billion annually in the USA [12] and HKD 230 million per year in Hong Kong [13]. With the increasing losses associated with stress in the construction industry, there is a growing body of literature on the stress, commitment, and performance of construction professionals [4,14]. Most of these studies emphasize the stress management of construction estimators, workers, and general professionals [4,15]. However, there is a lack of an integrated model on the stressors, stress, and commitment, particularly for engineers in the construction industry. In addition, there is no specific study focusing on the stressors and stress of engineers and the consequent impact on their commitment to their organizations. In order to enable efficient management of project team members involved in complicated construction projects, the present study strives to investigate the effect of stressors and stress on the organizational commitment of engineers with the aim of improving the holistic organizational commitment strategies in the industry.

2. Literature

2.1. Stressors

Stressors are recognized as threatening or difficult situations leading to stress [2]. The degree of stress experienced entirely depends on its causes; stress occurs when psychological or physical demands exceed an individual's abilities [16,17]. During the construction and design processes, engineers often encounter many challenges, particularly in planning, designing, installing, and monitoring the electrical, mechanical, and structural components in construction projects with multiple stakeholders [6].

Based on theories and the literature, some studies categorize engineers' stressors into four groups: personal, task, organizational, and physical stressors [18,19]. Personal stressors refer to stressors associated with people's own personality [20]. It is well known that individuals with a Type A personality are usually impatient, anxious, aggressive, hostile, ambitious, and excessively competitive in behavior, craving tough challenges, goals, and wanting to win every time [21]. They perform tasks quickly, express themselves very fast, are intolerant of slower-acting persons, and feel comfortable with similar personality types [19,22], which may subsequently increase their susceptibility to stress. In the real world, engineers with a Type A personality are often predominantly extroverted and strongly trust their personal values during the decision-making process [23].

Task stressors refer to aspects of the workload, either quantitative or qualitative, where the job demands exceed the abilities of employees within a specific period [24,25]. Engineering jobs involve various technical challenges, including rapid changes in designs, site settings, endless coordination, and (from time to time) rules [26], which may consequently lead to excessive stress and impair performance. Therefore, job overload could be a main stressor for construction engineers, more specifically frequent changes in inflexible schedules (quantitative overload) and insufficient ability to deal with their tasks (qualitative overload).

To ensure the suitability of the designed structures and service systems on actual sites, it is necessary for engineers to visit real site environments for inspections, installations, tests, and supervision. However, their working environments, either in head offices or on construction sites, may be sources of physical stressors, such as an uncomfortable office, burning heat, excessive noise, limited space, foul smells, inappropriate safety equipment, etc.

Organizational stressors include role ambiguity, lack of job autonomy, and role conflict. Role ambiguity is defined as a lack of clear or sufficient information to perform the job and predict the demands of a given position [27]. Lack of job autonomy refers to an organization offering employees insufficient freedom and facilities for organizing their jobs [28]. Engineers are required to advise architects on design implications at various stages, modify the plans where necessary during installation, select the appropriate materials, assess times extensions, and prepare documents for claims based on their professional knowledge. Therefore, lack of job autonomy often becomes a source of stress and reduces an engineer's commitment to their tasks in an organization [29]. On the other hand, role conflict may occur when a person perceives conflicting roles with others, particularly inconsistent expectations and demands in the organization. It is a feeling of being pulled in different directions, which could be stressful and affect individuals' job and organizational outcomes. Thus, it is expected that engineers with higher levels of role ambiguity, lack of job autonomy, and role conflict will generally be less committed to the organization.

2.2. Stress

Stress is an emotional activity generated from perceptions of exterior settings [24], more specifically the physical and emotional responses of an individual to external stimuli [2,30]. Stress arises when there is a misfit between person and environment [24]. A human being responds to an external stressful situation by releasing physiological hormones to support the body [31]. The body attempts to deal with the stressor through physical changes. When the stressor disappears quickly, the body will return to normal. However, if the stressful condition affects an individual for a long time continuously, the physical adjustments may result in stress symptoms [24,25]. Usually, stress symptoms include muscle tension, increased heart rate, headache, body pain, insomnia, etc. [32,33], all of which can lead to further problems. For example, insomnia alone may increase the risk of chronic, cardiovascular, and gastrointestinal diseases, as well as diabetes [34]. In addition, stress may also lead to accidents. Therefore, stress plays a damaging role at the individual and organizational levels.

2.3. Organizational Commitment

Organizational commitment is defined as the emotional and physical attachments between employees and their organizations [35]. Organizational commitment can be divided into three types: affective commitment, normative commitment, and continuance commitment [36]. Affective commitment refers to the willingness of an individual in their attachment to and involvement with their job or organization. Continuance commitment is cost-oriented and depends on how much an individual's economy would be affected if they left their job, while normative commitment concerns employees' obligations to stay in their organizations [37]. Employees with higher commitment may be more capable of handling occupational stress than those with lower commitment. In addition, affective commitment and normative commitment have a positive impact on job performance and job satisfaction [38], whereas continuance commitment is often observed to have negative outcomes.

Stressors and stress have been investigated as an antecedent variable for performance, satisfaction, and commitment [2–4]. For instance, stress was mentioned as a precursor to commitment without considering possible impact of stressors [39], while stressors were reported as a determinant of commitment without involving the influence of stress [40]. At the same time, several studies have looked into the relationships between stressors and stress [2,19]. However, the direct effect of both stressors and stress as independent variables on the commitment of engineers still needs to be investigated. Therefore, it is critical to examine whether stressors and stress have strong relationships with commitment separately in order to reveal their importance in practice for both persons and organizations. In fact, there is no specific study that focuses on the stress and commitment of engineers in the construction industry. In order to understand the holistic stress management required by construction professionals, an integrated Stressors/Stress–Commitment model for professional engineers has to be developed.

3. Conceptual Model

There are various theories that explain the interaction between stressors and stress, including the person–environment (P-E) fit theory and job demand–control theory [17,41]. Firstly, the P-E fit theory mentions that stress arises from imbalance between personal characteristics and environmental factors [42]. This study adopts the relations between people (stress) and their environment (poor office and site environments). Secondly, the experience of stressors and stress may affect the organizational commitment of engineers. A three-component model of commitment for continuance, normative, and affective commitment is employed [36]. Based on the extensive literature on stress management [16,18,19,33], a conceptual Stressors/Stress–Organizational Commitment model (see Figure 1) is proposed to elaborate the relationships between the seven stressors, stress, and the three types of organizational commitment for engineers in the construction industry.

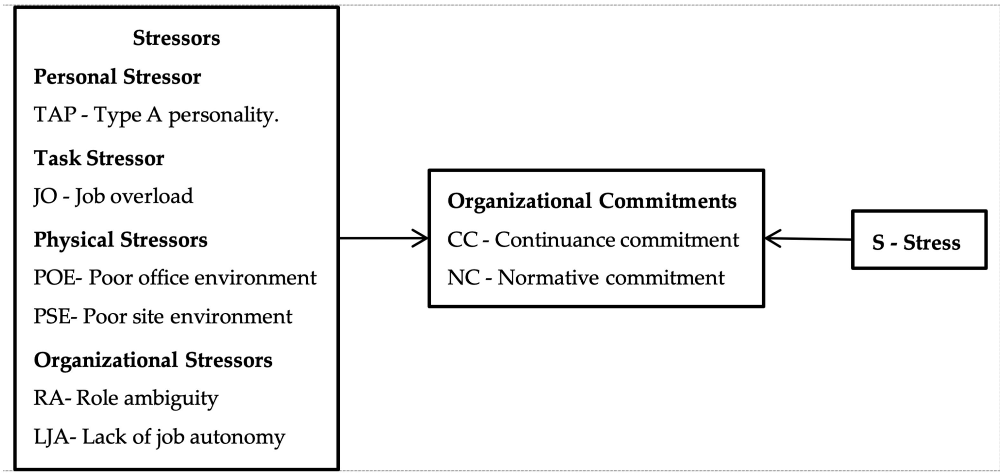

Figure 1. Conceptual model of Stressors/Stress–Organizational Commitments for engineers in the construction industry.

4. Research Methodology

4.1. Survey Design

In order to determine the complicated relationships between stressors/stress and organizational commitments of engineers, a questionnaire survey was employed. It consisted of four parts: (1) personal information such as gender, age, and educational level, and job nature such as job experience, engineering type, and company details; (2) stressors (personal, task, physical, and organizational stressors) [24,32,43]; (3) stress symptoms including insomnia, heartbeat, body pain, fatigue, and muscle pain [24,43,44]; and (4) organizational commitments (namely continuance, normative, and affective) [2,36,45]. All items from parts 2 to 4 were measured using a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The statements used in the survey for measuring the stressors, stress, and commitment of the respondents are shown in Table 1.

Table 1. Cronbach's alpha reliabilities for stressors, stress, and organizational commitment.

Factors		Nature	S/N	Items	Mean	SD	Alpha (α)
Personal Stressor							
TAP	Type A personality	+	TAP1	After entering this career, I feel like I am more aggressive than before	4.140	1.617	0.667
		+	TAP2	I have a strong winning mindset. Failure is prohibited	3.950	1.656	
		+	TAP3	I am relatively more stubborn and become relatively more displeasured than before	4.220	1.497	
Task Stressor							
JO	Job overload	+	JO1	Working overtime is not unusual for me	3.980	1.667	0.620
		+	JO2	The work assigned to me is too unfamiliar and challenging	3.820	1.400	
		+	JO3	I feel work overload, either quantitative or qualitative	4.490	1.371	
Physical Stressors							
POE	Poor office environment	+	POE1	The lighting condition in my office is not favorable	3.320	1.481	0.608
		+	POE2	There is too much noise in my office	2.970	1.464	
		+	POE3	The temperature in my office is not satisfactory for me to concentrate	2.630	1.390	
PSE	Poor site environment	+	PSE1	On-site working conditions are noisy	3.180	1.615	0.609
		+	PSE2	On site working hygiene is bad	2.970	1.726	
		+	PSE3	I always suffer from dynamic weather when I work on site	2.950	1.713	
Organizational Stressors							
RA	Role ambiguity	+	RA1	I experience vagueness regarding what I am supposed to do	3.030	1.436	0.797
		+	RA2	I am not sure what the aims of my duties and the expectations of my superiors are	3.230	1.725	
		+	RA3	I do what my seniors tell me to do blindly without discussing the full picture	2.830	1.551	
LJA	Lack of Job autonomy	+	LJA1	I just undertake the works assigned for me	5.060	1.603	0.647
		+	LJA2	My superiors always constrict my progression and suppress my authority	5.290	1.796	
		+	LJA3	Very few decisions are made by me	5.290	1.682	
RC	Role conflict	+	RC1	Overlapping of tasks often occurs between me and my colleagues	2.350	1.368	0.741
		+	RC2	I reckon my output is a waste because it cannot be fully utilized	2.340	1.425	
		+	RC3	Compromise on task distribution is difficult to achieve	2.360	1.470	
Stress							
S	Stress	+	S1	Insomnia or nightmares are not unfamiliar to me	5.329	1.905	0.699
		+	S2	I find my heart is racing	5.247	1.772	
		+	S3	There are many aches and pains around my body	6.068	1.124	
		+	S4	Even on holiday, I feel exhausted and fatigued	5.452	1.738	
		+	S5	My muscles are in so much tension to an extent I cannot bear	5.945	1.333	

Table 1. *Cont.*

	Factors	Nature	S/N	Items	Mean	SD	Alpha (α)
Organizational Commitment							
CC	Continuance commitment	+	CC1	The reason that I stay with the company is because of the salary	4.470	1.731	0.658
		+	CC2	I put profit as the top priority when working here	3.400	1.667	
		+	CC3	One of the reasons I want to quit is because of the wage margin	4.220	1.431	
NC	Normative commitment	+	NC1	I stay in the company solely because of the obligation from my contract	4.020	1.397	0.669
		+	NC2	I have the intention of quitting immediately	3.490	1.645	
		+	NC3	I am apathetic to the company	3.510	1.440	
AC	Affective commitment	+	AC1	I stay with the company solely because of my own interest in the work	3.650	1.799	0.664
		+	AC2	I enjoy my commitment with the company	4.950	1.539	
		+	AC3	I feel enthusiastic about the work in the firm	4.360	1.726	

Note: S/N = serial number; SD = standard deviation.

The items of stressor, stress, and commitment were tested by previous valid studies related to stress management in the construction industry, such as personal stressor with $\alpha > 0.650$ for estimators, physical stressors with $\alpha > 0.800$ for construction project managers, and organizational and task stressors with $\alpha > 0.800$ for construction workers [26,32]. Additionally, items of stress symptoms were abstracted from the scale developed by Gmelch (1982), while the items of three types of commitment (i.e., affective, continuance, and normative commitment) were also derived from scales with well-reported construct reliability and validity [2,32,45].

4.2. Sampling and Data Collection

The survey was conducted solely with construction engineers working for public and private construction companies. The data collection utilized snowball sampling, alternatively known as purposive and convenience sampling methods [17]. In this approach, the researcher begins from a small sample, referred to as 'the source', and then expands the sample size through linking the participants progressively to make an appropriate sample [46]. The respondents were finalized based on several inclusion criteria: (1) they had the working experience in mainstream construction projects; (2) they had at least 1 year of practical experience in the construction industry; and (3) they were registered engineers. The selection criteria of the samples ensured the quality and reliability of collected data [45]. The questionnaires were distributed to the target respondents via different methods, including in person, by email, and by post. In order to protect privacy and guarantee against ethical issues, participants were informed of the confidentiality and nondisclosure of their personal information.

A total of 500 questionnaires were sent out, and 160 were returned (response rate of 32%). After checking for the missing data and the rejection of 14 incomplete responses, 146 samples (59.6% public, 28.7% private, and 11.6% semi-public) were accepted for further analysis. All data have been given codes instead of the actual names in the following analysis. The sample size was over five times the sixteen observed variables; thus, the cases per parameter were in an acceptable range (i.e., more than 5 cases per parameter) [47].

The majority of the respondent engineers were building service engineers, constituting 74.7%, and the remaining 25.3% were structural engineers. The average age of the respondents was 44 years, while a large number of the engineers were aged 50–59 (39.7%), with 37.7%, 8.9%, 7.5%, and 6.2% being aged 30–39, 40–49, 20–29, and 60+ years, respectively. Around one-third of the respondents had above 20 years of experience in the construction industry (32%), with 27%, 19%, 18%, and 6% having 11–15, 6–10, 1–5, and 16–20 years of experience, respectively. This is in accordance with the real situation that practical building service engineers in the construction industry have 17.3 years working experience on average [48]. Most of the respondents had received higher education with a degree or above (38.4%) or with a higher diploma (34.2%), while 23.3% and 4.1% of respondents had graduated from secondary school and form 3, respectively. This study also reflected the male dominance in the construction industry, including 66.4% males and only 33.6% females.

4.3. Statistical Analysis

In order to check the reliability and validity of the research results, a series of appropriate statistical techniques were adopted to analyze the collected data using SPSS version 26.0. Firstly, the factors were measured using validated scales. Secondly, a reliability test was conducted to ensure internal consistency of each factor. Thirdly, Pearson correlation was adopted to examine the strength between variables. Finally, hierarchical regression analysis was applied to predict the relationship among factors and build an optimized integrated Stressors/Stress–Commitment model for engineers in the construction industry.

5. Results

5.1. Construct Reliability

Apart from the basic statistical results (means and standard deviation), a reliability analysis was also conducted to check the internal consistency of the variables (see Table 1). The Cronbach's alpha values of the stressors were 0.656 for Type A personality (TAP), 0.620 for job overload (JO), 0.608 for poor office environment (POE), 0.609 for poor site environment (PSE), 0.797 for role ambiguity (RA), 0.647 for lack of job autonomy (LJA), and 0.741 for role conflict (RC). Reliability testing on stress and organizational commitment confirmed that all items appropriately allocated into the stress and commitment factors were reliable. The alpha value of the items measuring stress (S) was 0.699, representing sufficient reliability. Furthermore, the Cronbach's alpha values of the three types of commitment, namely, continuance commitment (CC), normative commitment (NC), and affective commitment (AC), were 0.658, 0.669, and 0.664, respectively. All factors with coefficient alpha values higher than 0.6 were considered to be reliable [49].

5.2. Pearson Correlation Analysis

To investigate the associations between the stressors and organizational commitment variables and stress and organizational commitment, a Pearson correlation analysis was performed (see Table 2). It is an appropriate technique to determine the strength and direction of the relationships between two variables with a significant p-value at the 0.05 or 0.01 level [19]. The findings revealed significant interactions among stressors, stress, and commitment variables of the engineers: (1) most of the stressors, including type A personality (TAP), job overload (JO), poor office environment (POE), role ambiguity (RA), and role conflict (RC), had significant positive relationships with all the three types of organizational commitment; (2) lack of job autonomy (LJA) had a positive relationship with continuance (CC) and normative commitment (NC), while having a negative association with affective commitment (AC); (3) similarly, poor site environment (PSE) also had significant negative interactions with affective commitment; and (4) stress (S) was significantly negatively related with only affective commitment (AC), and there were significant associations with continuance and normative commitment.

Table 2. Pearson correlations between stressors, stress, and commitment.

Factors		TAP	JO	POE	PSE	RA	LJA	RC	S	CC	NC	AC
Type A personality	TAP	1										
Job overload	JO	0.222 **	1									
Poor office environment	POE	0.223 **	0.213 **	1								
Poor site environment	PSE	−0.181 *	0.014	−0.036	1							
Role ambiguity	RA	0.250 **	0.434 **	0.352 **	0.055	1						
Lack of job autonomy	LJA	0.154	0.444 **	0.124	−0.146	0.489 **	1					
Role conflict	RC	0.192 *	0.431 **	0.320 **	0.079	0.922 **	0.481 **	1				
Stress	S	0.045	0.181 *	0.040	0.034	0.101	0.153	0.132	1			
Continuance commitment	CC	0.546 **	0.396 **	0.416 **	−0.064	0.578 **	0.301 **	0.539 **	0.049	1		
Normative commitment	NC	0.375 **	0.470 **	0.278 **	−0.033	0.705 **	0.476 **	0.683 **	0.076	0.641 **	1	
Affective commitment	AC	0.670 **	0.201 *	0.286 **	−0.215 **	0.317 **	−0.181 *	0.266 **	−0.211 *	0.610 **	0.386 **	1

Note: ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.3. Hierarchical Multiple Regressions

To predict the effects of stressors and stress factors on three types of dependent commitment, hierarchical multiple regression models were built for each type of commitment (see Table 3). This method allows for entering the independent factors in the equation following conceptualized order and fundamental theories [19]. It also evaluates a large number of independent variables based on their contribution in forecasting dependent variables [50]. In the present study, three commitment models were established on the basis of significant *p*-values and R^2 values. The analyses were performed in a sequential manner.

Table 3. Regression model for stress and coping behaviors of EM-CWs.

Model	Dependent Variable	Independent Variables	B	SE	Sig	VIF	R	AR^2	ΔR^2	ANOVA	
										F	Sig
		Stage 1—Stressors									
1a	Continuance commitment	Constant	−0.067	0.448	0.881		0.740	0.524	0.547	20.787	0.000
		Type A personality	0.398	0.063	0.000	1.163	—	—	—	—	—
		Poor office environment	0.170	0.061	0.006	1.182	—	—	—	—	—
		Stage 2—Stressors + Stress									
1b	Continuance commitment	Constant	0.127	0.550	0.817		0.740	0.522	0.001	20.787	0.000
		Type A personality	0.399	0.063	0.000		—	—	—	—	—
		Poor office environment	0.170	0.061	0.006		—	—	—	—	—
		Stage 1—Stressors									
2a	Normative commitment	Constant	0.508	0.402	0.209		0.763	0.560	0.582	27.407	0.000
		Type A personality	0.188	0.056	0.001	1.163	—	—	—	—	—
		Job overload	0.139	0.067	0.042	1.396	—	—	—	—	—
		Role ambiguity	0.317	0.140	0.025	7.153	—	—	—	—	—
		Stage 2—Stressors + Stress									
2b	Normative commitment	Constant	0.704	0.493	0.156		0.764	0.559	0.001	6.859	0.000
		Type A personality	0.188	0.056	0.001	1.164	—	—	—	—	—
		Job overload	0.144	0.056	0.036	1.413	—	—	—	—	—
		Role ambiguity	0.309	0.141	0.030	7.199	—	—	—	—	—
		Stage 1—Stressors									
3a	Affective commitment	Constant	1.394	0.484	0.005		0.732	0.498	0.522	21.548	0.000
		Type A personality	0.630	0.068	0.000	1.163	—	—	—	—	—
		Poor site environment	−0.184	0.076	0.016	1.101	—	—	—	—	—
		Lack of job autonomy	−0.210	0.074	0.005	1.528	—	—	—	—	—
		Stage 2—Stressors + Stress									
3b	Affective commitment	Constant	2.073	0.586	0.001		0.732	0.509	0.014	19.775	0.000
		Type A personality	0.632	0.067	0.000	1.164	—	—	—	—	—
		Poor site environment	−0.178	0.075	0.019	1.103	—	—	—	—	—
		Lack of job autonomy	−0.198	0.073	0.008	1.538	—	—	—	—	—
		Stress	−0.145	0.072	0.046	1.051	—	—	—	—	—

Note: AR^2 = adjusted R^2; B = unstandardized coefficient; F = F-test value; SE = standard error; Sig = significance; VIF = variance inflation factor.

In the commitment models, one kind of commitment was entered as the dependent variable, while stressors were entered into stage 1 as independent variables and stress was entered in stage 2 as an independent variable. The results of Model 1b identified that continuance commitment (CC) was positively predicted by Type A personality (TAP) and poor office environment (POE), which accounted for 52.2% of the variance. In Model 2b, normative commitment (NC) was significantly positively forecasted by Type A personality (TAP) and negatively forecasted by poor site environment (PSE) and role ambiguity (RA), which explained 49.8% of the variance. Lastly, in Model 3b, affective commitment (AC) was positively predicted by Type A personality (TAP) and negatively predicted by poor site environment (PSE), lack of job autonomy (JA), and stress (S), which accounted for 50.9% of the variance. In sum, R^2 values in all developed models were within the acceptable range of 0.5 to 0.7.

6. Discussion

In this study, the relationships confirmed from regression analysis are included in the final model as shown in Table 3. The complex relationships between stressors (Type A personality, poor office environment, poor site environment, job overload, role ambiguity, and lack of job autonomy) and organizational commitment and between stress and organizational commitment for engineers are illustrated in the Stressors/Stress–Organizational Commitment model (see Figure 2).

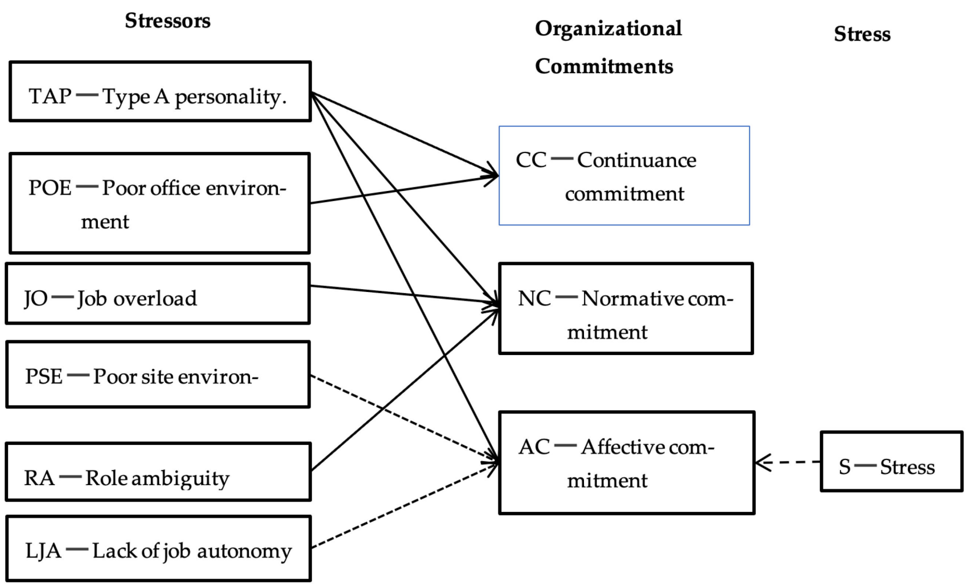

Figure 2. Stressors/Stress–Organizational Commitment model for engineers. ⟶ Refers to the positive relationships shown in multiple regression. - - - -> Refers to the negative relationships shown in multiple regression.

6.1. Relationships between Stressors and Affective Commitment

Affective commitment has a positive relationship with Type A personality, but it is negatively related to poor site environment and lack of job autonomy. Previous studies have reported Type A personality with coronary heart diseases, dissatisfactions, conflicts, and so on [34,51]. However, the Type A personality of engineers in this study surprisingly enhances their emotional attachment, interest, and enthusiasm regarding their organization. In practice, employers in the construction industry normally prefer engineers to finish projects as early as possible in order to gain higher profits. Engineers face competition and struggle to excel in their job career. Those with a Type A personality are highly eager, ambitious, proactive, and enthusiastic in striving for their career development, always seek all possible sources to accomplish their tasks and goals and put all of their effort into their contributions to the organization either on site or at the head office. Therefore, this personal endeavor and behavior regarding the job interestingly increases engineers' emotional attachment towards the organization.

On the other hand, poor site environment is also one of the major influencing factors that hinders the affective commitment of engineers, which is not highlighted in previous studies for other construction professionals. Perhaps, it is particularly difficult for engineers carrying out jobs on construction sites with intense temperatures, extreme noise, huge crowds, inappropriate lighting, and severe accidents. Moreover, the ever-changing nature of jobs on construction sites involves various challenges, including complex technical tasks, strict safety rules, uncooperative employees, and altering designs, drawings, and plans. Hence, poor site environment can disturb engineers' keen attention and devotion to different site activities, which directly reduces the emotional attachment and interest of engineers towards the jobs. Engineers working on sites really require strong dedication, interest, and conscious involvement during their working processes.

Moreover, the autonomy of engineers can enhance belongingness to and interest in the company as work empowerment allows for engineers to be involved in various decisions [52]. During project execution, particularly when dealing with multiple complicated tasks and activities simultaneously, a certain level of autonomy is necessary for the engineer to keep their work under control and remain committed to the company. It is also necessary to take immediate action at various stages, such as designing systems, modifying drawings, selecting materials, changing equipment, operating site activities, etc. It is obvious that restrictions on their tasks and insufficient autonomy can reduce their affective commitment and performance. Hence, lack of job autonomy has a negative impact on the affective commitment of engineers.

6.2. Relationship between Stress and Affective Commitment

Affective commitment is often considered as a positive organizational behavior, but the result of the present study reveals that the affective commitment of engineers is associated with stress. Normally, engineers emotionally attached to their company tend to work more by accepting many tasks even beyond their capabilities in the organization. However, these overwhelming efforts can sometimes be negatively affected by body exhaustion and other stress symptoms such as high heart rate, body pain, fatigue, insomnia, etc. [53]. In consequence, engineers can lose interest in their work and with company activities, diminishing their affiliation with the organization. Additionally, engineering jobs in the construction industry involve many physical activities such as preparing structural or building service designs, installing equipment, checking progress, attending various meetings, etc. These tasks can directly induce stress and affect engineers' belongingness towards their organizations and, consequently, reduce their emotional attachment towards their jobs.

In sum, affective commitment was significantly influenced by stressors (Type A personality, poor site environment, and lack of job autonomy) and stress symptoms (high heartbeat, muscle tension, insomnia, body pain, etc.) of construction engineers. This study develops a novel integrated commitment model using SEM to improve the stress management and commitment strategies of engineers in the construction industry. It is the first time investigating the direct impact of stressors and stress on the commitment of engineers. Previous studies found a negative influence of Type A personality on individual construction professionals [19], but the current study revealed a positive impact of Type A personality on the affective commitment of engineers. In addition, it showed the importance of good site working environment to maintain the emotional attachment of engineers in the organization.

6.3. Relationships between Stressors and Continuance Commitment

Continuance commitment has a positive association with both Type A personality and poor office environment. This means that engineers who have high career ambition, an achievement-oriented mindset, and aggressive attitude do not leave the organization due to high career focus and economic costs. They always stick to the organization to receive benefits in terms of salary, promotions, and authority, which can furthermore increase their commitment to the company and make it difficult to leave that organization. Therefore, this inherent long-term benefit and perceived loss of leaving the organization can enhance engineers' continuance commitment to the job. Interestingly, poor office environment also increases their continuance commitment. Despite the fact that poor office environments characterized by excessive noise, insufficient light, and crowded space, engineers still preferred to stay with the organization. Due to the COVID-19 pandemic, there are very few jobs and opportunities in the market, and it is scary to lose a job both in terms of career and economic instability. Therefore, engineers can compromise the poor office environment, and it does not much affect their attachment to the organization. In other words, engineers are already used to a poor environment because construction sites are much worse compared to office environments. Most of the time, engineers spend time in the field and outside the office.

6.4. Relationships between Stressors and Normative Commitment

Normative commitment also has positive relationships with Type A personality, job overload, and role ambiguity. It is understandable that a Type A personality can lead to normative commitment because engineers can earn career achievements by showing loyalty to their organization. When they are obliged to the rules and regulations of organizations, the chances of career success will be higher for a competitive person than for others. Therefore, Type A personality engineers show high loyalty to their organization to achieve their career ambition. Furthermore, job overload also increases the loyalty of engineers. It is also part of Chinese values to remain loyal to organizations or seniors. These fundamental values can place a moral obligation on engineers to stay with their organization.

7. Recommendations

7.1. Practical Implications

Based on the findings from quantitative research methods, the present research confirmed the impact of numerous stressors and stress on the organizational commitment of engineers. To enhance engineers' commitment towards their organizations, acknowledging all the stressors and stress experienced by engineers is vital. Firstly, construction companies could show their appreciation of engineers with Type A personality by encouraging punctuality, participation, and leadership, in order to build up their affective commitment to the organizations. It is expected that engineers can then participate proactively to fulfil organizations' requirements successfully, ultimately leading to a beneficial situation for both employers and engineers. Apart from project progress, senior managers should also care about their engineers' occupational situations, for example, by creating job assignments based on personality and developing a working environment in which engineers crave achievement. We believe that the proper management of these stressors will secure engineers' organizational commitment, and eventually performance, as well as improve their satisfaction with their organizations.

Poor work environments on construction sites can impair engineers' interest in and emotional attachment to their organizations. It has been shown that comfortable working conditions in a well-organized working environment are necessary for engineers to improve their enthusiasm and reduce their stress [54]. It is therefore suggested to adopt modular integrated construction (MiC) to minimize dust, filth, noise, and safety risks on construction sites. Moreover, it is also recommended to provide facilities on construction sites equivalent to those at head offices (i.e., appropriate lighting, clean space, enough privacy, proper cooling system, hygienic toilet services, etc.) and to take care of the facilities by checking maintenance, cleaning, watering, ensuring safety standards, and providing adequate toilet and shower services with regular cleaning. Furthermore, engineers' office environments should be improved by applying acoustic and thermal insulation to protect engineers from construction noise and harsh weather. Additionally, reasonable sound absorbing measures such as damping mats, metal springs, shear rubber, and air cushions are suggested to minimize construction machinery noise. On the other hand, the introduction of entertainment and recreational activities such as sports games, barbecues, and informal parties may also improve the interest of engineers in construction site tasks and develop a better work environment, which would enrich engineers' affective commitment.

Furthermore, engineers should be given appropriate job autonomy to execute their tasks because job autonomy can reduce the hostile effects of stressors. To ensure engineers have adequate flexibility, job control, and mutual understanding of the organization, construction companies are advised to involve engineers in the decision-making process and allow them to perform their jobs as discussed. The majority of respondents (engineers) have sufficient practical experience in the construction industry (32% and 33% over 20 and 10 years in our study); therefore, they prefer to perform their tasks independently. On the other hand, it would be effective for organizations to trust their senior engineers and give them adequate autonomy to make decisions about job tasks. In order to balance organizational constraints and individual autonomy, companies are suggested to develop a feeling of responsibility among engineers, listen to them, describe their goals and needs, be open-minded regarding different ways of accomplishing tasks, and recognize their contributions to increase their affective commitment [55,56]. This is expected to minimize conflicts between engineers and organizations and develop a sense of obligation and responsibility to put in more effort for the success of the organization, and thus improve affective commitment, job performance, and satisfaction, and reduce staff turnover as well.

7.2. Limitations and Future Implementations

Although this study has yielded some remarkable results, it has some limitations. Firstly, the data were collected from a relatively small sample of construction engineers, which may affect the generalizability of the findings. Further studies are needed to ensure that these findings can be generalized to all construction engineers. Secondly, this study adopted quantitative research methods with a self-reported questionnaire survey, which may influence the reliability of the results and weaken the validity of the data. However, remedial measures were taken to tackle the possible risk of common-method variance in this study: the measurement scales in the self-report questionnaires were developed based on the extensive literature, and the majority of respondents (engineers) had sufficient practical experience in the construction industry. In addition, all of the factors had Cronbach's alpha values within an acceptable degree of freedom from random measurement error, which validates the reliability of the measures used [57].

This study covered two types of engineers, including structural and building service engineers. The impacts of their stressors and stress may be different due to their particular job natures. Thus, it is suggested to investigate the stressors, stress, and commitment of different types of engineers (e.g., structural, geotechnical, electrical, mechanical) separately in future research in order to fully understand the impacts of these variables when the source of stress changes.

In the present study, engineers' stressors and stress were studied independently. In practice, there may be additional factors influencing the affective commitment of engineers, such as emotional stress, coping behaviors, organizational support, and cultural values, which were outside the scope of this study. It is recommended that future research consider the impact of these factors on affective commitment. In particular, the emotional aspect of stress should be explored, and its impact on the affective commitment of engineers investigated. A large-scale survey is strongly recommended to include all potential factors related to organizational commitment and their interrelationships. Furthermore, this study revealed that both continuance and normative commitment were significantly positively influenced by the stressors of engineers. The majority of the respondents were highly experienced (i.e., above 15 years) in the engineering field. This relationship may not be the same for less experienced engineers (i.e., young engineers); therefore, it would be interesting to consider in future research whether young engineers' coping strategies can predict in detail different stressful life events in real adaptation, as well as the impact of stressors and stress on the normative and continuance commitment of less experienced engineers.

Although the current study enhances the existing body of knowledge by revealing the positive impact of Type A personality on the organizational commitment of engineers in Hong Kong, the results cannot be generalized throughout the world without cultural adjustments. In fact, conceptualizations of Type A personality have not yet been cleared for global application; therefore, it is critical to find a better element of Type A personality in future studies [34]. However, the model developed in this study and this study's results will benefit organizations by enabling them to understand the Type A personality of their employees and improve their commitment enhancement strategies.

8. Conclusions

Based on the extensive literature, three types of commitment (continuance, normative, and affective) and seven stressors (Type A personality, job overload, poor office environment, poor site environment, role ambiguity, role conflict, and lack of job autonomy) were identified. Based on sequence of statistical analysis, this study finally developed an integrated model of stressors, stress, and organizational commitment for construction engineers. The findings showed that both stressors and stress had effect on the organizational commitment of construction engineers. Normally, Type A personality is associated with harmful behaviors (e.g., aggression, intolerance, urgency), whereas this study interestingly revealed beneficial aspects of Type A personality on organizational commitment including continuance, normative, and affective commitments of engineers in the construction industry. Nevertheless, both the poor site environment and lack of job autonomy diminished their emotional attachment in the company, while stress also negatively induced the affective commitment of engineers. In addition, poor office environment, job overload, and role ambiguity positively influenced continuance and normative commitment, but these were not affected by stress.

To reduce stressors and stress and improve the organizational commitment of engineers in the construction industry, several recommendations have been proposed, including assigning tasks based on engineers' personalities, showing appreciation of engineers with Type A personality, ensuring senior managers care about their engineers' occupational situation, adopting advance construction techniques (e.g., 3D printing and modular integrated construction), improving working conditions on construction sites, providing adequate job autonomy, listening to engineers, describing their goals and needs, revising their workload regularly, recognizing the value of their work contributions, etc. Finally, it is suggested to further confirm the findings by means of longitudinal studies of various types of engineers in real construction projects. In order to manage project team members in complicated construction projects well, the current study contributes to the knowledge and insights on stress management for improving organizational commitment, which definitely supports holistic construction management in the industry for managing professional engineers and improving overall project performance.

Author Contributions: Conceptualization, M.-Y.L. and K.A.; Methodology, M.-Y.L., K.A. and I.Y.S.C.; Software, K.A.; Validation, M.-Y.L., K.A. and I.Y.S.C.; Formal analysis, M.-Y.L. and K.A.; Investigation, K.A.; Resources, M.-Y.L. and I.Y.S.C.; Data curation, K.A.; Writing—original draft, M.-Y.L. and K.A.; Writing—review and editing, M.-Y.L., K.A. and I.Y.S.C.; Visualization, M.-Y.L., K.A. and I.Y.S.C.; Supervision, M.-Y.L. and I.Y.S.C.; Project administration, M.-Y.L. and I.Y.S.C.; Funding acquisition, M.-Y.L. and I.Y.S.C. All authors have read and agreed to the published version of the manuscript.

Funding: The work described in this paper was fully supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (Project No. CityU 11214523).

Data Availability Statement: Data are available upon request from corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Holden, S.; Sunindijo, R.Y. Technology, long work hours, and stress worsen work-life balance in the construction industry. *Int. J. Integr. Eng.* **2018**, *10*, 13–18. [CrossRef]
2. Zhang, S.; Sunindijo, R.Y.; Frimpong, S.; Su, Z. Work stressors, coping strategies, and poor mental health in the Chinese construction industry. *Saf. Sci.* **2023**, *159*, 106039. [CrossRef]
3. Golzad, H.; Teimoory, A.; Mousavi, S.J.; Bayramova, A.; Edwards, D.J. Mental Health Causation in the Construction Industry: A Systematic Review Employing a Psychological Safety Climate Model. *Buildings* **2023**, *13*, 2442. [CrossRef]
4. Leung, M.Y.; Chen, D.; Yu, J. Demystifying moderate variables of the interrelationships among affective commitment, job performance, and job satisfaction of construction professionals. *J. Constr. Eng. Manag.* **2008**, *134*, 963–971. [CrossRef]
5. Liu, Q.; Feng, Y.; London, K.; Zhang, P. Coping strategies for work and cultural stressors in multicultural construction workplaces: A study in Australia. *Constr. Manag. Econ.* **2023**, *41*, 537–553. [CrossRef]
6. RIBA (The Royal Institute of British Architects). RIBA Plan of Work 201, 2013. Available online: https://www.ribaplanofwork.com/Download.aspx, (accessed on 5 January 2020).
7. EMSD (Electrical and Mechanical Services Department). Regulating Railway Safety, 2020. Available online: https://www.emsd.gov.hk/en/railway_safety/regulating_railway_safety/ (accessed on 6 September 2023).
8. CEDD (Civil Engineering and Development Department). Guide to Retaining Wall Design. 2017. Available online: https://www.cedd.gov.hk/filemanager/eng/content_106/eg1_20170829.pdf (accessed on 5 September 2023).
9. Srinivasan, N.P.; Alagesan, R.; Boojakan, K.; Nivas, R.R. A review on stress management for site engineers working in construction industry. *Test Eng. Manag.* **2020**, *83*, 17904–17910.
10. ISE (Institution of Structural Engineers). Confederation of Engineers, 2020. Available online: http://ceindia.org/ISE.html (accessed on 20 March 2023).
11. HSE (Health and Safety Executive). Work Related Stress Depression or Anxiety Statistics in Great Britain, 2018. Available online: http://greeningconsultants.co.uk/wp-content/uploads/2019/03/HSE-Stats-2018.pdf (accessed on 8 February 2024).
12. AIS (American Institute of Stress). "Workplace Stress", 2020. Available online: https://www.stress.org/workplace-stress (accessed on 5 September 2023).
13. Tsui, S.H. Employees are under Great Stress, Economic Losses Due to Stress Exceed HK$530 Million Annual. *The Hong Kong Economic Times*, 30 December 2019; pp. 1–2.
14. Zheng, J.; Wu, G. Work-family conflict, perceived organizational support and professional commitment: A mediation mechanism for Chinese project professionals. *Int. J. Environ. Res. Public Health* **2018**, *15*, 344. [CrossRef] [PubMed]
15. Lu, C.; Yu, D.; Luo, Q.; Xu, C. A Study of the Effects of Job Stress on the Psychosocial Safety Behavior of Construction Workers: The Mediating Role of Psychological Resilience. *Buildings* **2023**, *13*, 1930. [CrossRef]
16. Bakker, A.B.; de Vries, J.D. Job Demands–Resources theory and self-regulation: New explanations and remedies for job burnout. *Anxiety Stress Coping* **2021**, *34*, 1–21. [CrossRef]
17. Goodwin, J.; Swaab, L.; Campbell, L.E. She'll be able to live independently... as long as I'm around": The "lived" experience of parenting a child with 22q11. 2 deletion syndrome in the transition to adulthood. *J. Appl. Res. Intellect. Disabil.* **2020**, *33*, 565–573. [CrossRef]
18. Finney, C.; Stergiopoulos, E.; Hensel, J.; Bonato, S.; Dewa, C.S. Organizational stressors associated with job stress and burnout in correctional officers: A systematic review. *BMC Public Health* **2013**, *13*, 82. [CrossRef] [PubMed]
19. Leung, M.Y.; Liang, Q.; Chan, I.Y. Development of a stressors–stress–performance–outcome model for expatriate construction professionals. *J. Constr. Eng. Manag.* **2017**, *143*, 04016121. [CrossRef]
20. James, K.E.; Sidin, J.P. Revisit the effect of Type A and B personality, and its effect on job-related stress in the organization. In Proceedings of the International Conference on Economics (ICE 2017), Sabah, Malaysia, 28–29 November 2017; pp. 334–344.
21. Sogaard, A.J.; Dalgard, O.S.; Holme, I.; Roysamb, E.; Haheim, L.L. Associations between type A behaviour pattern and psychological distress. *Soc. Psychiatry Psychiatr. Epidemiol.* **2008**, *43*, 216–223. [CrossRef]
22. Piepiora, P. Assessment of personality traits influencing the performance of men in team sports in terms of the big five. *Front. Psychol.* **2021**, *12*, 679724. [CrossRef] [PubMed]
23. Johnson, H.M.; Singh, A. The personality of civil engineers. *J. Manag. Eng.* **1998**, *14*, 45–56. [CrossRef]
24. Leung, M.Y.; Chan, I.Y.S.; Cooper, C.L. *Stress Management in the Construction Industry*; Wiley: Chichester, UK, 2014.
25. Nixon, A.E.; Mazzola, J.J.; Bauer, J.; Krueger, J.R.; Spector, P.E. Can work make you sick? A meta-analysis of the relationships between job stressors and physical symptoms. *Work and Stress* **2011**, *25*, 1–22. [CrossRef]
26. Ling, F.Y.Y.; Goh, X. Managing stressors faced by cost engineers. *J. Prof. Issues Eng. Educ. Pract.* **2018**, *144*, 04017014. [CrossRef]
27. Glazer, S.; Beehr, T. Consistency of implications of three role stressors across four countries. *J. Organ. Behav.* **2005**, *26*, 467–487. [CrossRef]
28. Khoshnaw, S.; Alavi, H. Examining the interrelation between job autonomy and job performance: A critical literature review. *Multidiscip. Asp. Prod. Eng.* **2020**, *3*, 606–616. [CrossRef]
29. Emre, O.; De Spiegeleare, S. The role of work–life balance and autonomy in the relationship between commuting, employee commitment and well-being. *Int. J. Hum. Resour. Manag.* **2021**, *32*, 2443–2467. [CrossRef]
30. Bowen, P.; Edwards, P.; Lingard, H. Workplace stress experienced by construction professionals in South Africa. *J. Constr. Eng. Manag.* **2013**, *139*, 393–403. [CrossRef]

31. Russell, G.; Lightman, S. The human stress response. *Nat. Rev. Endocrinol.* **2019**, *15*, 525–534. [CrossRef] [PubMed]
32. Leung, M.Y.; Chan, Y.S.; Olomolaiye, P. Impact of stress on the performance of construction project managers. *J. Constr. Eng. Manag.* **2008**, *134*, 644–652. [CrossRef]
33. Liang, Q.; Zhou, Z.; Li, X.; Hu, Q.; Ye, G. Revealing the mechanism of stress generation for construction frontline professionals through development of structural stressors–coping–stress models. *Saf. Sci.* **2022**, *150*, 105708. [CrossRef]
34. Cooper, C.L.; Quick, J.C. *The Handbook of Stress and Health: A Guide to Research and Practice*; Wiley: Chichester, UK, 2017.
35. Haque, A.U.; Aston, J.; Kozlovski, E. Do causes and consequences of stress affect genders differently at operational level? Comparison of the IT Sectors in the UK and Pakistan. *Int. J. Appl. Bus.* **2016**, *1*, 1–7.
36. Allen, N.J.; Meyer, J.P. Affective, continuance, and normative commitment to the organization: An examination of construct validity. *J. Vocat. Behav.* **1996**, *49*, 252–276. [CrossRef] [PubMed]
37. Meyer, J.; Stanley, D.; Herscovitch, L.; Topolnytsky, L. Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *J. Vocat. Behav.* **2002**, *61*, 20–52. [CrossRef]
38. Setiawati, T.; Ariani, I.D. Influence of performance appraisal fairness and job satisfaction through commitment on job performance. *Rev. Integr. Bus. Econ. Res.* **2020**, *9*, 133–151.
39. Haque, A.; Aston, J.; Kozlovski, E. The impact of Stressors on organizational commitment of managerial and non-managerial personnel in contrasting economies: Evidences from Canada and Pakistan. *Int. J. Bus.* **2018**, *23*, 166–182.
40. Hogan, N.L.; Lambert, E.G.; Jenkins, M.; Wambold, S. The impact of occupational stressors on correctional staff organizational commitment: A preliminary study. *J. Contemp. Crim. Justice* **2006**, *22*, 44–62. [CrossRef]
41. Dawson, K.M.; O'Brien, K.E.; Beehr, T.A. The role of hindrance stressors in the job demand–control–support model of occupational stress: A proposed theory revision. *J. Organ. Behav.* **2016**, *37*, 397–415. [CrossRef]
42. Edwards, J.R.; Cooper, C.L. *The Person-Environment Fit Approach to Stress: Recurring Problems and Some Suggested Solutions. From Stress to Wellbeing Volume 1*; Palgrave Macmillan: London, UK, 2013.
43. Allen, N.J.; Meyer, J.P. The measurement and antecedents of affective, continuance and normative commitment to the organization. *J. Occup. Psychol.* **1990**, *63*, 1–18. [CrossRef]
44. Gmelch, W.H. *Beyond Stress to Effective Management*; Wiley: New York, NY, USA, 1982.
45. Goodwin, C.J. *Research in Psychology: Methods and Design*, 6th ed.; Wiley: Hoboken, NJ, USA, 2010.
46. Fellows, R.; Fellows, R.F.; Liu, A.M. *Research Methods for Construction*, 4th ed.; Wiley: Chichester, UK, 2015.
47. Oke, A.E.; Ogunsami, D.R.; Ogunlana, S. Establishing a common ground for the use of structural equation modelling for construction related research studies. *Constr. Econ. Build.* **2012**, *12*, 89–94. [CrossRef]
48. HKIE (Hong Institute of Engineers). *Changes for the Betterment of the Building Services Profession in Hong Kong: Final Report of the Research Study on Hong Kong's Building Services Profession*; The Hong Kong Institute of Engineers: Hong Kong, China, 2010; pp. 74–76.
49. Pallant, J. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*, 7th ed.; Routledge: New York, NY, USA, 2020.
50. Sutherland, V.; Cooper, C. *Strategic Stress Management: An Organizational Approach*; Palgrave: New York, NY, USA, 2000.
51. Liu, A.M.; Chiu, W.M.; Fellows, R. Enhancing commitment through work empowerment. *Eng. Constr. Archit. Management* **2007**, *14*, 568–580. [CrossRef]
52. Abdelhamid, T.S.; Everett, J.G. Physiological demands during construction work. *J. Constr. Eng. Manag.* **2002**, *128*, 427–437. [CrossRef]
53. De Silva, N.; Samanmali, R.; De Silva, H.L. Managing occupational stress of professionals in large construction projects. *J. Eng. Des. Technol.* **2017**, *15*, 488–504. [CrossRef]
54. Meiksins, P.F.; Watson, J.M. Professional autonomy and organizational constraint: The case of engineers. *Sociol. Q.* **1989**, *30*, 561–585. [CrossRef]
55. Phua, F.T. Do national cultural differences affect the nature and characteristics of HRM practices? Evidence from Australian and Hong Kong construction firms on remuneration and job autonomy. *Constr. Manag. Econ.* **2012**, *30*, 545–556. [CrossRef]
56. Hair, J.F.J.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Prentice-Hall: Upper Saddle River, NJ, USA, 2010.
57. Asghar, M.; Minichiello, A.; Ahmed, S. Mental health and wellbeing of undergraduate students in engineering: A systematic literature review. *J. Eng. Educ.* **2023**. [CrossRef]