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Worklife and Burnout in the Concrete Industry—Part 1: Applying Structural Equation Modeling to Examine the Relationship Between Worklife and Burnout

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ARTICLE

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Worklife and Burnout in the Concrete Industry—Part 1: Applying Structural Equation Modeling to Examine the Relationship Between Worklife and Burnout

ABSTRACT

Concrete industry professionals operate in a fast-paced and high-volume niche of the construction industry. Concrete is one of the most commonly used materials in the construction industry, and keeping up with demand often requires working long hours under stressful and dangerous conditions (Alvanchi et al., 2012; Bowen et al., 2014; Leung et al., 2008; Maslach & Leiter, 1997; Yang et al., 2018). In this study, the researchers used the Areas of Worklife Survey (AWS) and Maslach Burnout Inventory (MBI) to investigate factors contributing to burnout for professionals in the concrete industry. The internal consistency was tested for each of the dimensions of the AWS and MBI. Structural equation modeling was applied to analyze the structural relationships between the dimensions of the AWS and MBI. The results showed that respondents experienced heavy workloads and, subsequently, elevated exhaustion, cynicism, and high professional efficacy. This is Part 1 of a two-article series that examines the worklife and burnout phenomena for the concrete industry.

Introduction

This is the first article of a two-part series on employee burnout and worklife in the concrete industry. The study replicates a worklife and burnout study conducted in 2018 (Avila, et al., 2021). The purpose of the research is to apply the procedures used in the 2018 study (Avila et al., 2021) to a different population in the construction industry. The first study (Avila et al., 2021) examined disaster restoration professionals in the construction industry, and this study examines concrete professionals. Part 1 introduces the background and theoretical basis of worklife and burnout, shares internal consistency analysis data, and examines the relationship between worklife and burnout as it relates to concrete industry professionals. Part 2 advances the conversation and discusses what the impact specific roles or positions have on burnout and what long-term employment intentions reveal about burnout one may be experiencing. Parts 1 and 2 share the same instruction, methodology, and statistical summary.

This study replicates a 2021 published article by Avila et al. titled "Burnout and Worklife in Disaster Restoration: Maslach Burnout Inventory and Areas of Worklife Survey." Replicating research allows for comparisons to be made with the original study results and can aid in validating/invalidating initial results. Additionally, research indicates that replication of studies provides merit in extending understanding of concepts or methods (Creswell & Creswell, 2018; Park, 2004). Researchers cannot generalize results outside of the present, as results are time-bound. Replicating a study at a later time can mitigate this threat to external validity (Creswell & Creswell, 2018). Lastly, replication of research can help control for biases. By replicating the original study, the authors validated the results of the original study and added new findings.

The concrete industry is a specialized niche within the construction sector, demanding expertise in material science, logistics, project management, and contracting, among other skills. Professionals in this field work long hours and must be readily available to handle dynamic events commonly found on construction sites. Their responsibilities encompass a wide spectrum, ranging from product design, delivery, and placement to sales, marketing, and contracting. Surprisingly, there has been limited research on burnout, work-life context, and turnover intentions in the concrete industry.

Over time, scholars have developed various measures to understand burnout (Maslach & Jackson, 1981; Maslach et al., 2008, 2016; Pines et al., 1981), work-life context (Bakker & Demerouti, 2014; Leiter & Maslach, 2011), and engagement (Schaufeli & Bakker, 2004) across multiple industries. This study aims to contribute to the literature in two significant ways. Firstly, we apply the Maslach Burnout Inventory (MBI) and the Areas of Worklife Survey (AWS) in a sequence to a population that has not been previously studied using similar instruments or to this extent. It is important to distinguish between burnout and engagement as separate phenomena, contrary to the view of some researchers who see them as opposite ends of the same spectrum (Schaufeli et al., 2002). Investigating these concepts within this unique industry will advance our understanding of their interrelations.

Secondly, this research adds to the literature by examining the dynamics of burnout, work-life context, and engagement specifically in the concrete industry, a distinct subset of the construction sector. Our aim is to identify behavioral and work-related trends that can enhance worker satisfaction, health, and performance while improving the overall effectiveness of processes for professionals and ultimately benefiting the customers they serve. In this pursuit, we focus on exploring the work attributes and work-life context that directly impact burnout among concrete industry professionals.

The work undertaken by concrete industry professionals is mentally and physically challenging, with many of them working long hours in hazardous environments. Stress faced by contractors often transfers to concrete service providers and contractors, making their job demanding. Even in the absence of external stressors, the inherent nature of the work and the pressure to meet deadlines in a dynamic environment pose significant challenges. Concrete industry professionals must be attuned to these dynamics and remain highly adaptable. The primary purpose of this study is to investigate the workplace factors influencing burnout among professionals in this industry.

Background and Theoretical Basis

The construct of burnout is "a prolonged response to chronic emotional and interpersonal stressors on the job, and is defined by the three dimensions of exhaustion, cynicism, and inefficacy" (Maslach et al., 2001, p. 397). The World Health Organization includes burnout in its International Statistical Classification of Diseases and Related Health Problems (World Health Organization, 2022). Burnout was first studied in the 1970s by Herbert Freudenberger (1974), a consulting psychologist for St. Mark's Free Clinic. Christina Maslach, a preeminent researcher in the field of burnout, began studying burnout years after Freudenberger (Maslach & Leiter, 1997). Since its inception, burnout transitioned through three phases: (a) the Pioneering Phase, (b) the Empirical Phase, and (c) the Expanding Phase.

The initial phase of burnout is referred to as the Pioneering Phase. This phase is characterized as being exploratory, as Freudenberger and Maslach aimed to express and define the construct of burnout. Research during this phase was descriptive and qualitative, and primarily was pursued in the care-giving and service occupations. The Pioneering Phase was followed by the Empirical Phase, which started in the 1980s and continued until the 1990s. During this phase, research shifted from qualitative to quantitative methods. The predominant burnout measure tool, the MBI, was developed in this phase. Such instruments allowed researchers to conduct longitudinal studies and study burnout related to job satisfaction, organizational commitment, and turnover (Chih et al., 2016; Maslach et al., 2001). The final phase of burnout, the Expanding Phase, saw the expansion of quantitative tools as burnout was studied in numerous industries. Burnout researchers began to incorporate the ramifications of technology, both at home and in the workplace (Dunbar et al., 2020).

Developed in the Empirical Phase, the MBI is considered the gold standard for measuring burnout and continues to be the dominant tool to measure burnout (Maslach et al., 2012). The instrument consists of 16 total items; five items correspond to the Exhaustion dimension, six items correspond to the Professional Efficacy dimension, and five items correspond to the Cynicism dimension. Participants respond to each item by selecting 0 indicating Never, 1 indicating *A few times a year or less*, 2 indicating *Once a month or less*, 3 indicating *A few times a month*, 4 indicating *Once a week*, 5 indicating *A few times a week*, or 6 indicating *Every day*. Internal reliability for the MBI has been established through Cronbach's alpha values being above 0.70 for all three dimensions in multiple

studies. Validity of the MBI has been demonstrated through the correlation of job conditions, such as job demands and scarcer job resources, that are expected to contribute to burnout. Additionally, scores from the MBI have been correlated to outcomes associated with burnout, including physical health, work-to-family interference, and turnover. Lastly, scores obtained from the MBI were correlated with data obtained from instruments other than the MBI that were designed to measure constructs similar to burnout (Maslach et al., 2018).

The AWS was developed to accompany the MBI. The AWS is used to measure employees' perceptions of workplace traits and conditions in order to understand whether these traits and conditions lead to employee engagement or employee burnout. The instrument consists of 28 total items; five items correspond to Workload, four items correspond to Control, four items correspond to Reward, five items correspond to Community, six items correspond to Fairness, and four items correspond to Values. Each of the aforementioned scales contains positively worded items and negatively worded items. Participants respond to each statement by selecting 1 indicating *Strongly disagree*, 2 indicating *Disagree*, 3 indicating *Hard to decide*, 4 indicating *Agree*, or 5 indicating *Strongly agree*. Reliability of the AWS was established through test re-test correlations, which revealed that all scales in the AWS indicate strong consistency. Additionally, validity of the AWS was established through examining written comments by participants, with the corresponding AWS measure (Leiter & Maslach, 2011).

This study replicates a 2021 published article by Avila et al. titled "Burnout and Worklife in Disaster Restoration: Maslach Burnout Inventory and Areas of Worklife Survey." Replicating research allows for comparisons to be made with the original study results and can aid in validating/invalidating initial results. Additionally, research indicates that replication of studies provides merit in extending understanding of concepts or methods (Creswell & Creswell, 2018; Park, 2004). Researchers cannot generalize results outside of the present, as results are time-bound. Replicating a study at a later time can mitigate this threat to external validity (Creswell & Creswell, 2018). Lastly, replication of research can help control for biases. By replicating the original study, the authors validated the results of the original study and added new findings.

Research Methods and Results

Respondents provided text entries to multiple portions of the survey. These qualitative responses were coded. Eight items from the AWS were reverse coded. Datapoint labels were created for the SPSS datafile.

A total of 183 persons participated in the survey. Respondents who did not complete the survey ($n = 68$) were removed from the dataset prior to the analyses and were not included in any further quantitative statistical analyses. Specifically, 68 participants did not complete the AWS, and 62 participants did not complete the MBI. The final usable sample size was 115.

ITEM-LEVEL ANALYSES & SCORING

Missing values were analyzed on the AWS and MBI to determine whether a respondent demonstrated a systematic pattern when missing survey items. Results from the missing value analysis indicated that values were missing completely at random; that is, there was no systematic pattern when skipping items from the survey. Blanks in the survey were replaced with values that were estimated using the expectation maximization algorithm. This was done to keep all respondents who completed the survey, as survey blanks would disqualify and remove the participants from some analyses.

The AWS and MBI were scored according to their testing manuals, respectively. The AWS measures six dimensions of worklife: workload, control, reward, community, fairness, and values. Respondents indicate their agreement with each survey item on a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) with the neutral response of 3 (*Hard to Decide*). The MBI measures three dimensions of burnout: exhaustion, cynicism, and professional efficacy. Survey participants selected a response on a scale ranging from 0 (*Never*) to 6 (*Every Day*). For all subscales, the mean score of items for that subscale was calculated and used as a respective subscale score.

Three questions regarding job search status were also included as an index of turnover intentions. Survey respondents were asked to choose between true and false for each question. The turnover intentions index was calculated by taking the sum of the equally weighted "true" responses.

PARTICIPANT DATA

Survey participants lived in 38 different geographical locations across the U.S. and Canada (i.e., states or provinces). Respondents were primarily male (94%). Participant age and tenure information was collected as a categorical variable and was represented as follows in Tables 1 and 2.

Table 1.
Participants by age group

Percent of Participants' Age	
Category	**Percent**
18–24 years old	0.0%
25–34 years old	10.4%
35–44 years old	26.1%
45–54 years old	27.0%
55–64 years old	31.3%
65 years old and older	5.2%

$N = 115$.

Table 2.
Participants by tenure with employer

Percent of Participants' Tenure With the Employer, Position, and Industry			
Category	**Years worked for the current employer**	**Years worked in the current position**	**Years worked in the concrete industry**
Less than 2 years	8.7	11.3	0.9
2–5 years	22.6	21.7	6.1
6–10 years	11.3	20.9	10.4
11–15 years	15.7	11.3	11.3
16–20 years	7.0	8.7	11.3
21 or more years	34.8	26.1	60.0

$N = 115$.

Survey participants also reported their current role. Respondent role categories were as follows in Table 3.

Data on the types of services and/or products that individuals' current employer provides were also collected. For this question, survey participants could select multiple answers. The type of services and/or producers were as follows in Table 4.

Table 3.
Participants by role

Role	Percent
Sales and marketing	12.2%
Estimating	5.2%
Owner or General Manager	34.8%
Administrative	26.1%
Production Management	2.6%
Field Operations/Technical Services	19.1%

$N = 115$.

Table 4.
Services

Services	Percent
Concrete contracting	52%
Specialty concrete contracting	6%
Concrete testing and consulting	60%
Materials	32%
Equipment	60%
Ready mix	10%
Concrete pipe and related products	14%
Concrete block and related products	28%
Precast/prestressed products	46%
Repair and restoration	24%
Other (please specify)	24%

$N = 50$.

SUMMARY STATISTICS

Mean and standard deviation of the AWS and MBI by subscales are presented in Tables 5 and 6, respectively. The AWS uses a 5-point scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The MBI utilizes a 7-point scale ranging from 0 (*Never*) to 6 (*Every Day*). Higher scores on workload, control, reward, community, fairness, and values indicate greater levels of worklife issues. Higher scores on exhaustion and cynicism indicate greater levels of burnout, and lower scores on professional efficacy indicate greater levels of burnout.

Test manuals of the AWS and MBI provide normative data from the general population. When compared to the normative data, survey participants reported significantly worse workload, $t(114) = -5.29$, $p < 0.001$, significantly better levels of control, $t(114) = 6.15$, $p < 0.001$, significantly better fairness, $t(114) = 3.87$, $p < 0.001$, and significantly better values, $t(114) = 6.16$, $p < 0.001$. In terms of burnout, participants reported significantly higher levels of exhaustion, $t(114) = 7.57$, $p < 0.001$, significantly higher levels of cynicism, $t(114) = 3.71$, $p < 0.001$, and significantly higher levels of professional efficacy, $t(114) = 8.30$, $p < 0.001$. That is, when compared to the general population, concrete industry professionals have heavier workload, have better control over their work, perceive more fairness at work, and have better person–organization fit. Additionally, persons working in the concrete industry feel more exhausted and more negative attitudes toward work, but they also feel more effective and capable at work.

Correlations between the nine subscale scores (three of the MBI and six of the AWS) were explored. People who reported higher scores in the areas of worklife (e.g., reasonable workload, better control

Table 5.
Areas of Worklife Survey (AWS)

	μ	M	SD
Workload	2.96	2.57	0.80
Control	3.31	3.84	0.92
Reward	3.19	3.16	0.94
Community	3.38	3.36	0.75
Fairness	2.78	3.09	0.87
Values	3.24	3.67	0.75

$N = 115$. μ = Population Mean (Normative Data), M = Sample Mean, SD = Standard Deviation.

Table 6.
Maslach Burnout Inventory (MBI)

	μ	M	SD
Exhaustion	2.26	3.30	1.47
Cynicism	1.74	2.27	1.53
Professional Efficacy	4.34	5.04	0.91

$N = 115$. μ = Population Mean (Normative Data), M = Sample Mean, SD = Standard Deviation.

over their work, etc.) reported less frequent feelings of exhaustion and cynicism. On the other hand, higher quality of worklife was associated with higher levels of professional efficacy.

Analysis 1: Internal Consistency

Cronbach's alpha was estimated using subscale items of the AWS and MBI. All Cronbach's alphas of subscales were above 0.70. The AWS subscales displayed acceptable levels of internal consistency reliability. The MBI subscales demonstrated good levels of internal consistency reliability. Thus, the AWS and BMI are consistent measures of the areas of worklife and burnout, respectively. See the following Table 7.

Analysis 2: Relationship Between Areas of Worklife and Burnout

METHOD

In the 2018 study, it was hypothesized that the workload domain of the AWS would be the most important antecedent for predicting burnout. To test the hypothesis, a mediation model was created using subscales of AWS and MBI. The model suggests that an individual's level of six worklife dimensions affects the person's level of exhaustion; then, the level of exhaustion predicts a level of cynicism and professional efficacy. Refer to Figure 1.

A structural equation modeling (SEM) technique was performed through the IBM Analysis of Moment Structure (AMOS, version 25.0.0) statistical package to analyze structural relationships between areas of worklife and burnout. The mediation model from the previous study was adopted and tested with new data, using a maximum likelihood parameter estimation (MLE) method. A total of 115 survey respondents working in the concrete industry were included. Sample demographics are presented in "Summary Statistics."

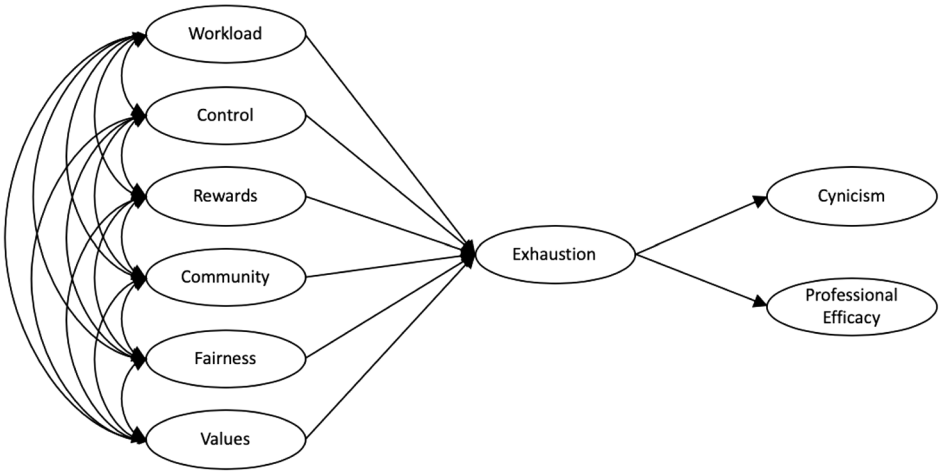
RESULTS

The chi-square statistic was significant, $\chi^2(872, N = 115) = 1367.45$, $p < 0.001$. However, the chi-square to degrees of freedom ratio ($\chi^2/df = 1.57 < 5$) and root mean square error of approximation

Table 7.
Cronbach's alpha

	Number of Items	Cronbach's Alpha
AWS		
Workload	5	0.76
Control	4	0.88
Reward	4	0.87
Community	5	0.82
Fairness	6	0.89
Values	4	0.81
MBI		
Exhaustion	5	0.90
Cynicism	5	0.84
Professional Efficacy	6	0.81

Figure 1.
Mediation Model of Areas of Worklife and Burnout.



(RMSEA = 0.071 < 0.08) were well inside the recommended limits to show a good fit. The Comparative Fit Index (CFI) fell slightly short on the standard limits that allow the model to be accepted: CFI = 0.85. It may be worth performing a cross-validation analysis in the future to determine whether the model was well defined.

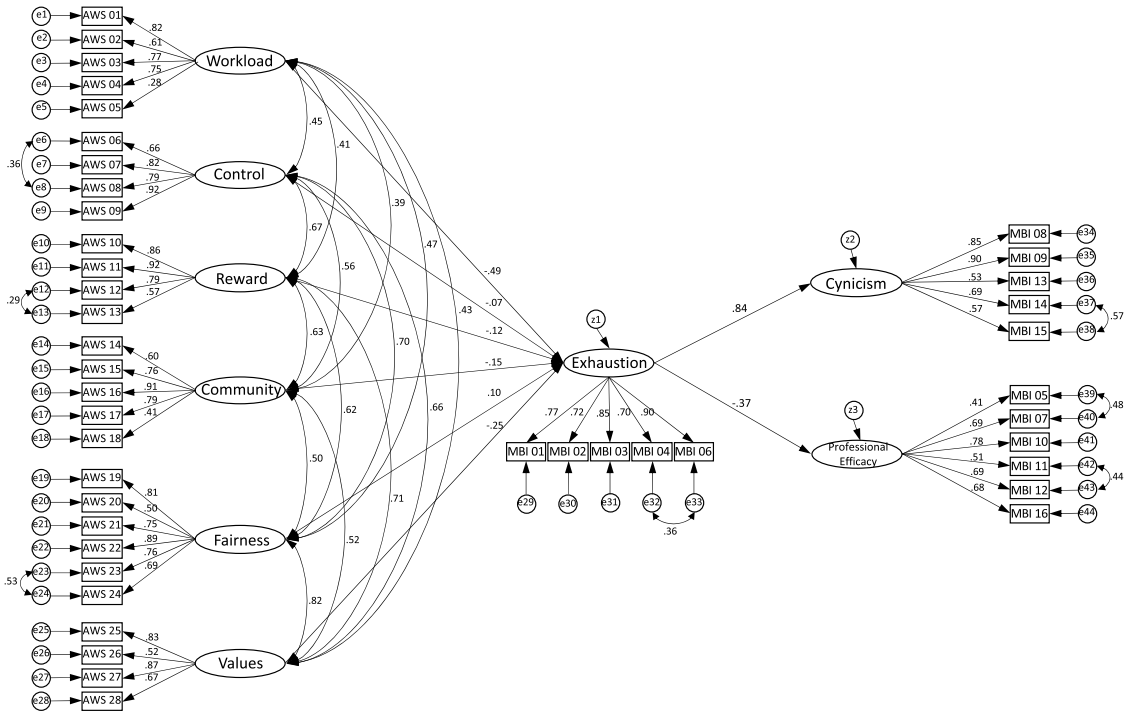
The workload domain of the AWS was the only significant predictor of the exhaustion domain of the MBI, $\beta = -0.49$, $p = 0.011$. Exhaustion significantly predicted cynicism ($\beta = 0.84$, $p < 0.001$) and professional efficacy ($\beta = -0.37$, $p = 0.007$). These findings effectively replicate the results of the 2018 study. Further, the observed significant relationships are approximately the same magnitude and direction as those from the 2018 study. See Table 8 and Figure 2 for results. According to the AMOS analysis guideline,

Table 8.
Results of the SEM analysis

Model	β	*b*	SE	*p*
Workload → Exhaustion	**−0.493**	**−1.720**	0.680	0.011
Control → Exhaustion	−0.067	−0.088	0.163	0.587
Reward → Exhaustion	−0.120	−0.224	0.249	0.368
Community → Exhaustion	−0.150	−0.464	0.332	0.162
Fairness → Exhaustion	0.095	0.149	0.262	0.570
Values → Exhaustion	−0.253	−0.522	0.369	0.158
Exhaustion → Cynicism	**0.835**	**1.095**	0.137	<0.001
Exhaustion → Professional Efficacy	**−0.372**	**−0.104**	0.038	0.007

Note: Bolded values are significant at the 0.05 level (2-tailed). β = standardized regression coefficients, b = unstandardized regression coefficients, SE = standard error.

Figure 2.
Structural Model of AWS and BMI (Standard Estimates).



observed variables (e.g., survey items) are presented in rectangles, whereas latent variables and measurement errors are presented in circles.

INTERPRETATION

Similar to the 2018 study, only the level of workload had an impact on burnout in the concrete industry. Specifically, heavy workload makes individuals feel more exhausted, and the high level of exhaustion leads to higher cynicism and less professional efficacy. The other areas of worklife (i.e., control, reward, community, fairness, and values) do not show any meaningful relationships with exhaustion.

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