JOB DESCRIPTION- RELATED DIFFERENCES IN WORK SAFETY PERCEPTIONS OF THE WORKERS IN CONSTRUCTION INDUSTRY

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ABSTRACT
The construction sector is a challenging sector where many stakeholders have to work together to ensure occupational health and safety. Workers are the most important actors in ensuring a safe climate. Therefore, the workers' perceptions of work safety are very substantial in a construction site. This study aims to investigate the work safety perceptions of the workers having different job descriptions in the construction industry. A questionnaire was applied to 130 workers in different job positions at a residential building construction site in Turkey. The workers' perceptions were asked in four categories: construction work safety, coworkers' safety attitude, occupational health and safety specialists' safety attitude, and site manager's safety attitude. For analysis, the relative importance index was calculated, and ANOVA analysis was used. The results showed that (1) the workers' work safety perceptions were limited with their job description, (2) the cultural structure of the employees may prevent workers from being impartial in evaluating safety issues, (3) and considering different workgroups' safety needs and ensuring participation in the safety issues are compulsory for safety managers. The findings of the study are expected to contribute to improvements in safety management practices of safety management actors.

1. Introduction
The collaboration and involvement of all actors in the organizational system is an important issue to control the risks related to the work (Kouabenan, Ngueutsa, and Mbaye 2015) in work safety practices. Prevention of the losses and potential risks are directly related to the collaboration of the actors, as well as their behavior in the construction site. Among these actors, workers have a crucial role in preventing work accidents with their behavior (Solís-Carca and Franco-Poot 2014) since they directly work on the site. Ismail et al. (2012) pointed out that despite the high number of organizations taking occupational health and safety measures and complying with the relevant policies, there were a lot of work accidents. According to them, worker behavior was a possible cause of these accidents. Han et al. (2019) revealed that about 80–90% of the accidents were caused by the unsafe actions and behaviors of the employees in the construction sector. In this context, unsafe behaviors of the workers could result in severe injuries and death. Despite improved legislation and measures taken, Turkey has a rather high number of work accidents as a developing country. Data derived from statistics of the Turkish Social Security Institution (SSI) had revealed that 422,463 work accidents occurred in 2019. Also, 160,158 of these accidents were worker-related accidents, and 257 of the workers have died. The number of worker-related accidents corresponds to 39.7% of the total accidents in Turkey in 2019.

Assuring work safety at workplaces is a dynamic subject that interacts with many factors. Usukbayar and Choi (2020) state that creating safe working
environments as a dynamic factor significantly reduces potential hazards, injuries, and accidents. Work safety behaviors and attitudes of the participants constitute an important factor, and they are directly related to workers’ motivation towards work safety. Motivation is an important factor in determining how workers will behave in the workplace (Reese 2018; Khan, Proverbs, and Xiao 2021). Panuwatwanich, Al-Haadir, and Stewart (2017) evaluated the roles of safety motivation and safety climate in the development of safety behavior and safety outcomes. The results showed that internal and external safety motivation would provide positive changes in safety behavior for ensuring a positive safety climate in which workers comprehend the value of occupational safety and health practices. In this sense, safety motivation mediates the impact of a safe climate on workers’ safety behavior (Griffin and Neal 2000). It is very significant to direct the employee to the safety measures with appropriate motivation tools in an organization. An employee with the essential motivation will show a more willing and participatory approach for ensuring work safety. This approach will contribute to the constitution of a positive work safety climate.

Establishing a positive safety climate through safety motivation is the most fundamental element in work safety. Safety climate was conceptualized by Zohar (1980) as the beliefs and perceptions of the employees about work safety. It is one type of climate experienced by individuals in organizations (Griffin and Neal 2000). Safety climate has a significant negative correlation with accident rates (Vinodkumar and Bhasi 2009) in most industries. Therefore, it is possible to encounter a high number of work accidents in an organization with a weak safety climate. Besides the weakness of the safety climate, incorrect safety management practices, and poor working conditions are the sub-factors that have a negative influence on safety climate. Although the worker, site manager, and occupational health and safety (OHS) specialists have played a substantial role in constituting an assertive safety climate, previous research has mostly focused on worker behavior. Numerous studies concentrate on worker-related accidents as a result of unsafe behaviors in construction sites (Han et al. 2019; Mohan and Zech 2005; Huang and Hinze 2006; Kim et al. 2020), and many of them revealed that the most significant cause of these accidents was workers’ unsafe behaviors (Jiang, Fang, and Zhang 2015; Fang, Zhao, and Zhang 2016; Yu et al. 2017; Asilian-Mahabadi et al. 2018). Since workers’ compliance with occupational health and safety rules is directly related to their attitudes and perceptions on work safety, the results obtained from all these studies revealed the necessity of evaluating the workers’ safety perceptions on work safety in ensuring a safety climate.

Safety perception refers to employees’ awareness of basic safety knowledge in the workplace, workplace hazards, risks, implementation of hazard precautions, and safety culture (Url-2 2021). In other words, safety perception could be defined as the point of view of how a worker evaluates the work safety measures, and it contains his/her judgment on safety. According to Ferraro (Ferraro 1995), individuals’ perceptions of safety include generalized judgments about the likelihood of injury or loss (Url-2 2021). Safety perceptions of the construction workers have been subjected to numerous studies (Shao et al. 2004; Hassan, Basha, and Hanafi 2007; Hallowell 2010; Sanni-Anibire et al. 2018; Korkmaz and Park 2018). Various studies have revealed that psychological factors have effects on the safety perception of workers at construction sites (Siu, Phillips, and Leung 2004; Shin et al. 2014; Fung et al. 2016; Idrees, Hafeez, and Kim 2017; Newaz et al. 2019). Psychological climate has indirect and direct relation with safety behavior (Larsson, Poussette, and Törner 2008) since workers attach meaning to other participants’ behaviors such as supervisors (Newaz et al. 2019), site manager, OHS specialist, and coworkers in ensuring safety. On the other hand, inevitably the psychological factors affecting the participants are different. Idrees, Hafeez, and Kim (2017) revealed the differences in psychological factors between different age groups. While the main psychological factors were workload and job satisfaction for older workers, organizational relationships, mental stress, and work safety were the main factors for younger workers. Because the work safety climate is shaped by the behavior of the individuals, these psychological factors should also be taken into consideration.

Apart from psychological factors, workers’ safety perceptions and attitudes may differ depending on other factors. While Marin et al. (2019) assert that employees’ perceptions of safety are related to their duties and their organizational and social environment, Cox and Cox (1991) matches employees’ attitudes towards work safety within the organization with five orthogonal factors. They include personal skepticism, individual responsibility, the safety of the work environment, the effectiveness of safety regulations, and personal immunity. Besides these points of view, Gyekye and Salminen (2009) argued age and workers perceptions, Gyekye (2006) also investigated workers’ perceptions of workplace safety between high- and low-accident groups in Ghana, Han et al. (2019) focused on demographic factors and Gao et al. (2017) focused on nationality, religious belief, and employment mode.

Despite this attention, little attention has been given to whether there is a difference between the perceptions of the workers according to their job descriptions. To this end, the purpose of this study is to investigate the relationship between the job
descriptions of the workers and their perceptions about the safety behaviors of the other actors on the construction site. The perceptions of the workers examined within the scope of the study are about co-workers’ behaviors, OHS specialist’s behavior, and the site manager’s behavior. The study further aims to examine their perceptions about construction work safety.

2. Materials and methods

The components of the safety climate defined as co-workers’ safety attitude, OHS specialist’s attitude, site manager’s safety attitude direct the workers’ safety behavior in the workplace. Therefore, the workers’ perceptions of these components have gained importance. Perceptions may differ from worker to worker for various reasons (Gyekye and Salminen 2009). In the scope of the study, the job descriptions were selected as a factor having differences in the workers’ perceptions. At this point, the initial question of the research has arisen: Do the perceptions of the employees on the safety attitudes of other actors differ according to their job description? To find out the answer to this question, the perceptions of the employees were examined in four categories: perceptions of the construction work safety, perceptions of safety attitudes of co-workers, perceptions of safety attitudes of the OHS specialist, and perceptions of safety attitudes of the site manager.

The work performed during the construction process has different levels of difficulty. This differentiation could also be reflected in the workers’ perspective on the safety of construction work. Firstly, in this scope, it is hypothesized that there is a significant difference between construction works’ safety perceptions of workers with different job descriptions (Hypothesis-1). The weak co-worker commitment to safety could diminish the positive effects of a high perceived safety climate as it relates to perceived safety effectiveness (Usukhbayar and Choi 2020; Tucker et al. 2008). In this context, the work safety attitudes of co-workers’ also gain importance for a worker. Secondly, it is hypothesized that there is a significant difference between perceptions on the coworkers’ safety attitude of workers with different job descriptions (Hypothesis-2).

Incorrect safety management practices and poor working conditions are the other factors that cause work accidents on a construction site. The worker, site manager, and OHS specialist have been playing a major role in ensuring a positive safety climate. On the other hand, the employer’s perspective influences safety management practices and work conditions in this organizational relationship. It is possible to see this effect in the attitudes and behaviors of safety managers.

Workers’ perspectives on the identification of safety-critical positions and the occupant attributes and behaviors that may directly affect safety on-site are important (Dingsdag, Biggs, and Sheahan 2008) and safety management has a positive influence on safety performance, competitiveness performance, and economic-financial performance (Fernández-Muñiz, Montes-Peón, and Vázquez-Ordás 2009). For example, site managers could affect workers’ safety behaviors directly and indirectly (Fang, Wu, and Wu 2015; He et al. 2019) in a site by their behaviors. Therefore, site management actors’ attitudes gain importance in creating a positive safety climate in the organization. It is hypothesized that there is a significant difference between perceptions on the OHS specialist’s safety attitude of workers with different job descriptions (Hypothesis-3) and there is a significant difference between perceptions on the site manager’s safety attitude of workers with different job descriptions (Hypothesis-4). The conceptual framework of the research and the hypotheses are summarized in Figure 1.

2.1. Survey design

A questionnaire survey was conducted to test the hypotheses. An adapted version of the Work Safety Scale (WSS) defined by Hayes et al. (1998) was used.

Figure 1. Conceptual framework and relation of the hypotheses. Adapted from Marin et al. (2019).
The questionnaire was divided into two sections. In the first section, workers were asked about their personal information (age, education level, the term of employment, job description) and whether they had a work accident before or not. The job descriptions of the workers were divided into eight basic subgroups as concrete/mold work, ironworks, plaster works, paint works, installation works, and ceramic works. Job descriptions that did not come within any of these groups were also defined as "other works". The second section was about safety perception and consisted of four subsections with 8 to 10 questions each. In the scope of the subsections, workers' perceptions were asked in four categories: construction work safety (subsec. A), coworkers’ safety (subsec. B), OHS specialists’ safety (subsec. C), and site manager’s safety (subsec. D). All subsections measured on the 5-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). The questionnaire item content, the relationship between subsections, and the hypothesis were defined in Figure 2.

2.2. Sample group

The sampling method of the study was convenience sampling, the method in which participants are available and are willing to participate in the research (Omona 2013). Asiamah, Mensah, and Oteng-Abayie (2017) define three types of the population: the general population, target population, and accessible population. The general population is generally determined by identifying the research objectives. The target population is defined as individuals or a group of participants with particular interests and relevance and consists of the rest of the general population after refining (Asiamah, Mensah, and Oteng-Abayie 2017; Kotlik and Higgins 2001). The accessible population consists of members of the target population who are willing to participate in the study and available at the time of the study. Within the study, measuring the safety perceptions of workers working in the same safety climate constitutes the constraint of the population. For this reason, the questionnaire was applied to only one construction site. The accessible population of the study consists of workers working at a residential building site with six blocks in Antalya. Antalya is one of the most significant cities in Turkey with its tourism incomes. The population of the selected work site was 420. According to Bal (2001) minimum sample size was formulated as:

\[ n = \frac{N \times \sigma^2 \times Z^2}{(N - 1) \times t^2 + (p \times q \times Z^2)} \]

\([N = \text{Population (420)}, n = \text{sample size}, p = \text{The frequency of occurrence of the feature interested in the population (0.50), } q = \text{The frequency of non-occurrence of the feature interested in the population (1-p)}, Z = \text{standard value for confidence level (1.96 for 95%), } t = \text{margin of error (0.10)}]\]

According to this formulation, the minimum sample size was 78. The questionnaire was applied to 130 workers for 2 months. The number of the sample size was deemed as sufficient. A total of 12 architecture students were assigned to conduct the surveys. Students were requested to survey workers having different job descriptions at the construction site. Before the implementation, the site manager of the construction site was enlightened about the questionnaire. It was emphasized to the workers that the construction site management could not access any information obtained.

2.3. Statistical analysis

To obtain preliminary information by making a general evaluation on subjects, such as understandability, applicability, efficiency, recycling, and duration by the
target audience (Baş 2001) a pilot survey was conducted on 25 people. The Cronbach’s Alpha reliability coefficient was calculated according to the pilot study. Accordingly, it was calculated as: \( \alpha = 0.785 \). Considering this value, it was observed that the scale has reliability.

Data collected from the survey were analyzed using the statistical software package SPSS version 23.0. To investigate demographic characteristics of the respondents, descriptive statistics were applied to the first section questions of the questionnaire. For each item in the second section, a mean score was computed and the distribution of the data were examined. According to George and Mallery (2010), a kurtosis value between \( \pm 1.0 \) is considered excellent for most psychometric purposes, but a value between \( \pm 2.0 \) is in many cases also acceptable, depending on the particular application. On the other hand, Hair et al. (2013) state that skewness measures the symmetry of a distribution; in most instances, a comparison is made to a normal distribution. A positively skewed distribution has relatively few large values and tails off to the right, and a negatively skewed distribution has relatively few small values and tails off to the left. Skewness values falling outside the range of \(-1 \) to \(+1\) indicate a substantially skewed distribution. Therefore, the distribution of the data is assumed to be a normal distribution.

The relative importance index (RII) was used to rank the perceptions of employees towards construction work safety. RII was calculated using the equation applied by Tam (2009), Eadie et al. (2013), and Han, Lee, and Peña-Mora (2013). A high RII value ranging from 0 to 1 indicates that the item was considered more important by the employees.

To establish the relationship between job descriptions of the workers (independent variables) and safety perceptions about construction work safety, coworkers’ safety attitude, OHS specialist’s safety attitude, and site manager’s safety attitude (dependent variables) ANOVA test was performed. Whether there was a statistically significant difference between the means in the groups or not was tested by the ANOVA test. Statistical significance was based on \( p < 0.05 \).

### Table 1. Reliability of the subsections.

| Subsec. | Variables          | Items | α    | Reliability |
|---------|--------------------|-------|------|-------------|
| Subsec.A | Work safety       | 10    | 0.84 | high        |
| Subsec.B | Coworkers’ safety | 8     | 0.64 | medium      |
| Subsec.C | OHS specialists’ safety | 10 | 0.88 | high        |
| Subsec.D | Site managers’ safety | 10 | 0.88 | high        |

### 3. Results

This part of the study presents the results of the study. The results were presented in three sub-sections: results of the reliability test, results of the characteristics of the participants, and results of the SPSS analysis. All the results were interpreted in the discussion part in detail.

#### 3.1. Reliability test

Cronbach’s \( \alpha \) was calculated for each subsection. Özdamar (1999) stated that the criterion values for the reliability coefficient are as follows:

- \( 0.00 < \alpha < 0.40 \): Scale is not reliable
- \( 0.41 < \alpha < 0.60 \): Low reliability
- \( 0.61 < \alpha < 0.80 \): Medium reliability
- \( 0.81 < \alpha < 1.00 \): High reliability

According to these values workers’ safety, OHS specialist safety, and safety management practice scales have high reliability, while coworkers’ safety scale has medium reliability (Table 1). Considering the values, it is observed that the scale has reliability.

#### 3.2. Characteristics of the participants

The participants’ characteristics are summarized in Table 2. The data include age, work experience, educational level, the definition of their job, and whether they had an accident before or not.

The data showed that 29.2\% (\( n = 38 \)) were aged between 36 and 45, and 66.9\% (\( n = 87 \)) had no accident. In addition, 44.6\% (\( n = 58 \)) had between 5 and 15 years of work experience, 38.5\% (\( n = 50 \)) had attained lower secondary education. In terms of their job description, 18.5\% (\( n = 38 \)) of the respondents were concrete/mold workers, 10.8\% (\( n = 14 \)) were

### Table 2. Summary of participants’ characteristics (\( N = 130 \)).

|             | N       | Percentage (%) | Job Description       | N       | Percentage (%) |
|-------------|---------|----------------|-----------------------|---------|----------------|
| Age         |         |                |                       |         |                |
| 17 or below | 1       | 0.8            | Concrete works        | 24      | 18.5           |
| 18–25       | 18      | 13.8           | Ironworks             | 14      | 10.8           |
| 26–35       | 39      | 30             | Plaster works         | 16      | 12.3           |
| 36–45       | 38      | 29.2           | Paintworks            | 18      | 13.8           |
| 46–55       | 26      | 20             | Installation works    | 30      | 22.1           |
| 56 or above | 8       | 6.2            | Ceramic works         | 10      | 7.7            |
| Had an accident | 43 | 33.1           | Other works           | 18      | 13.8           |
| No          | 87      | 66.9           |                       |         |                |
| Work Experience |      |                |                       |         |                |
| Less than 5 years | 27 | 20.8           | Education Level       |         |                |
| 5–15       | 58      | 44.6           | Primary school        | 38      | 29.2           |
| 16–25       | 29      | 22.3           | Lower secondary       | 50      | 38.5           |
| 26–35       | 12      | 9.2            | Higher secondary      | 31      | 23.8           |
| More than 35 years | 4 | 3.1             | Associate degree      | 8       | 6.2            |
|             |         |                | Undergraduate         | 3       | 2.3            |
ironworkers, 12.3% (n = 16) were plaster workers, 13.8% (n = 18) were painters, 10.8% (n = 14) were steelworkers, 23.1% (n = 30) were plumbers, 7.7% (n = 14) were ceramic workers. 13.8% (n = 18) of the respondents were the other workers that did not belong to these groups.

3.3. Analyze

The analyses of RII with associated rankings are summarized in Table 3. It has been found that the rankings differ between job groups. Accordingly, the highest-ranked item was the item dangerous (Q1/RII = 0.908) for concrete/mold workers. For ceramic workers, the highest-ranked item was safe (Q2/RII = 0.820), which is the lowest-ranked item for concrete/mold workers (Q2/RII = 0.383). For the ironworkers and workers in other works, the highest-ranked item was could get hurt easily (Q6/RII = 0.885). While the highest-ranked item was risky for plaster workers (Q4/RII = 0.650) and plumbing workers (Q4/RII = 0.773), it was unhealthy for paint workers (Q5/RII = 0.688).

Statistical analysis involving the mean and standard deviation (std) of the groups and ANOVA test of perceptions of the workers on work safety are summarized in Table 4. Except for the item called unhealthy (Q5), significant differences were found among workgroups (p < 0.05). When the differences regarding each item were evaluated, it was determined that the ceramic workers had different perceptions than other workgroups. Their answers showed that unlike other groups, they did not find construction work dangerous. They defined construction work as safe (Q2). The RII results also support this result due to the highest-ranked item for ceramic workers was safe. When the average of the concrete/mold workers, ironworkers, and plumbing workers were evaluated, it was seen that these groups found construction work dangerous. They significantly perceived that the construction work

### Table 3. RII of employees perceptions towards construction work safety.

|          | Conc. works | Ironworks | Plaster works | Painters | Installation | Ceramic | Others | Ceramic | Others | RII Rank | RII Rank | RII Rank | RII Rank | RII Rank | RII Rank | RII Rank | RII Rank |
|----------|-------------|-----------|---------------|----------|--------------|---------|--------|---------|--------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dangerous| 0.908       | 1.08      | 0.587         | 3.522    | 0.760        | 0.360   | 6.033  | 4.000   | 0.908  | 1.08      | 0.587    | 3.522    | 0.760    | 0.360    | 6.033    | 4.000    | 0.908    |
| Safe     | 0.383       | 1.00      | 0.471         | 4.644    | 0.566        | 0.820   | 1.557  | 6.000   | 0.383  | 1.00      | 0.471    | 4.644    | 0.566    | 0.820    | 1.557    | 6.000    | 0.383    |
| Hazardous| 0.725       | 0.685     | 0.525         | 0.611    | 0.463        | 0.440   | 7.584  | 7.455   | 0.725  | 0.685     | 0.525    | 0.611    | 0.463    | 0.440    | 7.584    | 7.455    | 0.725    |
| Risky    | 0.858       | 0.842     | 0.650         | 1.050    | 0.773        | 0.380   | 5.655  | 5.344   | 0.858  | 0.842     | 0.650    | 1.050    | 0.773    | 0.380    | 5.655    | 5.344    | 0.858    |
| Unhealthy| 0.708       | 0.657     | 0.575         | 0.688    | 0.593        | 0.460   | 2.577  | 6.000   | 0.708  | 0.657     | 0.575    | 0.688    | 0.593    | 0.460    | 2.577    | 6.000    | 0.708    |
| Could get hurt easily | 0.866 | 0.885 | 0.575 | 0.522 | 0.746 | 0.420 | 4.000 | 0.700 | 0.866 | 0.885 | 0.575 | 0.522 | 0.746 | 0.420 | 4.000 |
| Unsafe   | 0.808       | 0.728     | 0.575         | 0.555    | 0.673        | 0.420   | 4.600  | 5.344   | 0.808  | 0.728     | 0.575    | 0.555    | 0.673    | 0.420    | 4.600    | 5.344    | 0.808    |
| Fear for health | 0.733 | 0.728 | 0.575 | 0.688 | 0.613 | 0.420 | 4.600 | 5.344 | 0.733 | 0.728 | 0.575 | 0.688 | 0.613 | 0.420 | 4.600 |
| Chance of death | 0.841 | 0.714 | 0.600 | 0.433 | 0.753 | 0.320 | 7.666 | 2.000 | 0.841 | 0.714 | 0.600 | 0.433 | 0.753 | 0.320 | 7.666 |
| Scary    | 0.700       | 0.557     | 0.487         | 0.400    | 0.613        | 0.300   | 8.488  | 8.000   | 0.700  | 0.557     | 0.487    | 0.400    | 0.613    | 0.300    | 8.488    | 8.000    | 0.700    |

### Table 4. Means, standard deviations, and ANOVA results on construction work safety perceptions of different job groups.

|          | Conc. works | Ironworks | Plaster works | Painters | Installation | Ceramic | Others | Ceramic | Others | ANOVA TEST |
|----------|-------------|-----------|---------------|----------|--------------|---------|--------|---------|--------|------------|
| Mean     | 4.541       | 4.285     | 0.913         | 2.937    | 1.289        | 2.611   | 1.289 | 3.800   | 1.323 | 1.800      | 0.421   | 3.166   | 1.248 | 11.43   | 0.000 |
| Std      | 0.779       | 4.285     | 0.913         | 2.937    | 1.289        | 2.611   | 1.289 | 3.800   | 1.323 | 1.800      | 0.421   | 3.166   | 1.248 | 11.43   | 0.000 |

### Table 5. Means, standard deviations, and ANOVA results on different workgroups' perceptions of coworkers' safety behavior.

|          | Conc. works | Ironworks | Plaster works | Painters | Installation | Ceramic | Others | Ceramic | Others | ANOVA TEST |
|----------|-------------|-----------|---------------|----------|--------------|---------|--------|---------|--------|------------|
| Mean     | 2.708       | 2.857     | 1.406         | 2.500    | 1.366        | 2.111   | 1.278 | 2.600   | 1.544 | 1.900      | 0.9494  | 2.666   | 1.533 | 0.842   | 0.540 |
| Std      | 1.343       | 2.857     | 1.406         | 2.500    | 1.366        | 2.111   | 1.278 | 2.600   | 1.544 | 1.900      | 0.9494  | 2.666   | 1.533 | 0.842   | 0.540 |

*p value < 0.05.
was dangerous, hazardous, risky, unhealthy, unsafe, and scary. They also stated that they had fair of hurt easily, fear for health, and fear of death. Plaster workers, paint workers and other workers have an indiscernible perspective with the average score at 2.868, 2.783, 3.022, respectively, between neutral and agree.

No significant group differences were found among employees related to the perception of coworker’s safety. In general, all groups had a positive perspective of their colleagues’ work safety behavior. All groups perceived that their colleagues pay attention to safety rules, follow safety rules, look out for others’ safety, encourage others to be safe, keep working area clean and they were safety-oriented. In contrast to this perception, they expressed that their co-workers as taking chances with safety (Q6). Although there was no statistically significant difference about this item, the answer to this item showed incongruity with others. While responses to the other items constitute a positive perspective, this item reflects a negative perspective on their colleagues’ safety behavior.

Two significant differences were found regarding OHS specialist’s safety behavior (Table 5 and 6). The ironworkers, plaster workers, and paint workers perceived that the OHS specialist did not involve workers in setting safety goals (Q5) and act on safety suggestions (Q10), while others found his safety behavior positive. Apart from the ironworkers, all the groups strongly believed that the OHS specialist acted on safety suggestions. They perceived that the OHS specialist praised safe work behaviors (Q1), encouraged safe behaviors (Q2), kept workers informed of safety rules (Q3), rewarded safe behaviors (Q4), discussed safety issues with others (Q6), updated safety rules (Q7), trained workers to be safe (Q8), enforced safety rules (Q9).

There were significant differences between groups about site manager’s safety behavior. Table 7 displays the comparative analysis. The differences were due to ironworkers. They perceived that the site manager did not reward safe workers (Q4), provide safe equipment (Q5), provide safe working conditions (Q6), respond quickly to safety concerns (Q7), provide safety information (Q9), keep workers informed of hazards (Q10). On the other hand, plaster workers, installation workers, and other workers also have a negative perception of the site manager’s behavior as to rewarding safe employees (Q4).

4. Discussion

More attention should be paid to eliminating unsafe acts to ensure work safety in the construction industry (Shin et al. 2014). Therefore, safety perception and behavior of the workers, as the individuals at the center of the construction work, are important. This study showed that there were significant job description-related differences in the work safety perception of the workers. These differences are mainly related to the work itself and safety management actors’ attitudes in the construction site.

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### Table 6. Means, standard deviations, and ANOVA results on different workgroups’ perceptions of OHS specialist’s safety behavior.

|                | Conc. works | Ironworks | Plaster works | Paintworks | Installation | Ceramic works | Other works | ANOVA TEST |
|----------------|-------------|-----------|---------------|------------|--------------|---------------|-------------|------------|
| **Mean**       |             |           |               |            |              |               |             |            |
| Q1             | 3.125       | 3.125     | 3.125         | 3.444      | 3.466        | 3.466         | 3.666       | 3.125      |
| Q2             | 3.250       | 3.250     | 3.250         | 3.555      | 3.666        | 3.666         | 3.888       | 3.250      |
| Q3             | 3.958       | 3.958     | 3.958         | 4.066      | 4.066        | 4.066         | 4.066       | 3.958      |
| Q4             | 4.333       | 4.333     | 4.333         | 4.444      | 4.444        | 4.444         | 4.444       | 4.333      |
| Q5             | 4.778       | 4.778     | 4.778         | 4.888      | 4.888        | 4.888         | 4.888       | 4.778      |
| **Std**        |             |           |               |            |              |               |             |            |
| Q1             | .250        | .250      | .250          | .250       | .250         | .250          | .250        | .250       |
| Q2             | .375        | .375      | .375          | .375       | .375         | .375          | .375        | .375       |
| Q3             | .500        | .500      | .500          | .500       | .500         | .500          | .500        | .500       |
| Q4             | .625        | .625      | .625          | .625       | .625         | .625          | .625        | .625       |
| **F value**    |             |           |               |            |              |               |             |            |
| Q1             | 9.875       | 9.875     | 9.875         | 9.875      | 9.875        | 9.875         | 9.875       | 9.875      |
| Q2             | 11.250      | 11.250    | 11.250        | 11.250     | 11.250       | 11.250        | 11.250      | 11.250     |
| Q3             | 12.500      | 12.500    | 12.500        | 12.500     | 12.500       | 12.500        | 12.500      | 12.500     |
| Q4             | 13.750      | 13.750    | 13.750        | 13.750     | 13.750       | 13.750        | 13.750      | 13.750     |
| **p value**    |             |           |               |            |              |               |             |            |
| Q1             | <0.001      | <0.001    | <0.001        | <0.001     | <0.001       | <0.001        | <0.001      | <0.001     |
| Q2             | <0.001      | <0.001    | <0.001        | <0.001     | <0.001       | <0.001        | <0.001      | <0.001     |
| Q3             | <0.001      | <0.001    | <0.001        | <0.001     | <0.001       | <0.001        | <0.001      | <0.001     |
| Q4             | <0.001      | <0.001    | <0.001        | <0.001     | <0.001       | <0.001        | <0.001      | <0.001     |

*P value < 0.05.*
The perceptions of all groups are that the construction work is unhealthy. Shamsuddin et al. (2015) state that the construction sector includes risky and unhealthy activities that cause many human tragedies, discourage workers, disrupt construction, delay progress, and negatively impact costs, productivity, and reputation. The results have shown that the “unhealthy” (QS) structure of the construction sector was accepted by all the workers, and they were conscious about unhealthy conditions. Having this consciousness is quite important for workers since they play the leading role in ensuring work safety.

Although they were aware of the unhealthy conditions involved in the construction work, there has been a significant difference between workers’ perceptions of construction work safety. Therefore, Hypothesis-1 has been accepted. When this difference was evaluated, it was seen that the average value of ceramic workers was significantly lower than the other groups. The risk of fatal injuries shows differences among construction occupations (Dong and Platner 2004). While ironworkers, roofers, brick masons, electricians, insulation workers, carpenters, and painters, and paperhangers are high-risk trades in terms of safety; comparatively, other building trades have lower safety risks (Baradan and Usmen 2006; Chen and Jin 2015). Rozenfeld et al. (2010) stated that the most frequent accidents in the construction industry were those related to exterior work at height in their study. In light of this research, the main reason why ceramic workers did not find construction work dangerous may the thought they did not believe their work was as risky as the work of ironworkers or concrete/mold workers since they did not do exterior work at height. It is an important deficiency that workers do not associate the safety of their work with the safety of other work items. In this case, the worker could ignore the other dangers that await him.

On the other hand, plaster workers, paint workers, and other workers’ perceptions have shown indecision. It could be thought that the indecisive attitudes of plaster and paint workers are due to the fact that their work is related to both indoor and outdoor spaces. The workers in the “other works” group have been defined as unskilled workers, working in any work item needed. They are working as auxiliary staff on the site. For this reason, it was thought that they have shown indecision since they were working in jobs with different dangerous conditions at the same time.

Since the safety behavior of an individual affects all participants, the risk posed by every worker working in the construction work also poses a risk to other workers. The risk perception of employees in the construction industry is an important factor in increasing accident numbers (Man, Chan, and Alabdulkarim 2019) and should be in consideration of the safety managers. The risk-taking behavior of the workers could show differences among the workers. This would also affect their safety behavior in the face of risk. Attitude toward risk-taking behavior is one of the factors that influences risk-taking behavior (Man et al. 2021), and risk perception influences the behaviors of workers (Man et al. 2021; Areses and Miquel 2008). The scope of work safety is not limited only to the work description of the worker. Results of the study showed that workers believe that work safety in the construction site is only about the safety of their works. For high-risk groups, construction work is a dangerous job, while it is not dangerous for low-risk groups. In this context, it is necessary to improve safety management practices for workers to have a holistic perspective on ensuring work safety.

There has been no significant difference regarding the co-workers’ safety. Therefore, Hypothesis-2 has been rejected. On the other hand, there has been a discrepancy between the answers. While workers thought that their co-workers’ behaviors were safe, they stated that co-workers could take risks about work safety. It is possible to associate this difference with culture. According to Feng (2014) the cultural structure of the groups in the construction sector affects work safety. Hofstede (1980) defined Cultural Dimension Theory in his study and “individualism” was defined as one of the four cultural dimensions. The opposite of this dimension is collectivism. According to individualism, individuals define themselves as “I” or “we”. While individualist societies are only responsible for themselves and their immediate families, in collectivist societies people are loyal to the groups they belong to and express their belonging to those groups. According to the individualism-collectivism dimension, Turkey is a collectivist society (Hofstede 2011). So in Turkey the concept of “we” and, to gain acceptance by the group to which they belong to are important factors for the individuals. For all these reasons, although employees express that their colleagues take risks related to work safety, they may have a positive perspective on co-workers’ safety behavior since they are a member of that working group and want to gain acceptance by the group. Therefore, they could lose their neutrality about the perception of co-workers’ safety behavior. In this respect, it is also possible for them to be easily affected by possible negative work safety behaviors of co-workers and to find these behaviors normal. The OHS specialist and the site manager should consider this situation in safety management practices.

Hypotheses on occupational health and safety attitudes of OHS specialist (Hypothesis-3) and construction site manager (Hypothesis-4) have been accepted. The differences in perception of the worker groups about the work safety behaviors of construction site management actors reveal the inadequacy of the safety management process. Perceptions about OHS specialists have differed in terms of participation in the
safety issues, while perceptions about site managers have differed in both participation and supplying the safety needs. Dedobbeleer and Béland (1991) tested the three-factor safety climate model of Brown and Holmes’ (1986) on construction workers and defined that workers’ involvement in safety was one of the main factors for ensuring a safety climate. The fact that the workers have different views on work safety management practices at the construction site is an indication of the safety climate weakness. Not being included in the safety practices on the construction site negatively affects the perception of the workers about the actors’ safety attitudes at the management level. Mohamed (2002) also confirms the importance of management behavior, worker participation, and the attitudes of individuals in achieving a positive safety climate.

On the other hand, the safety needs (equipment, material, suitable working conditions, etc.) of workers that should be met by the site manager could vary depending on the work they do. According to Man, Chan, and Wong (2017), meeting the expectations of construction workers is important to reduce the risk-taking behaviors of construction workers. Gittleman et al. (2010) recommend in their study that periodic safety needs assessment surveys or informal interviews be conducted to enable employees to share their opinions and to ensure employee participation. In this sense, the site manager should consider the different safety needs of the different workgroups. The results of the study revealed that the safety needs of different workgroups were not met equally at the site. This situation weakens the perception of the workers about the safety behavior of the site manager.

4.1. Theoretical implications

Despite these limitations, the research has important theoretical implications. First, the results of this research showed that due to the safety perceptions of the workers are limited with their job description, there is a necessity to develop a holistic approach to work safety. A team effort is required (Furst 2013) for all participants working at the same time of the construction process. Safety climate is composed of worker attitudes about safety and worker perceptions of the characteristics of the workplace (Williamson et al. 1997), perceptions on attitudes of the other participants. Individual behaviors compose the perception that the worker’s work safety is limited to the work he/she does. Therefore, an individualistic understanding of safety should be turned into a collective understanding of safety.

Secondly, the research has provided insight into the need for discussion of the cultural aspects of workers’ perceptions on work safety from a wider perspective. Perceptual processes are affected by culture. Also, social and physical cultural environments shape perceptual processes (Nisbett and Miyamoto 2005). Therefore, cultural difference should be an important input for work safety issues, especially for international construction works.

Lastly, the research indicates that the attitudes and behaviors of work safety management actors must be oriented towards promoting worker participation and finding solutions to their different needs. Worker participation is essential for the identification, assessment, and control of workplace hazards to reduce work-related injury. The most directly interested party in occupational health and safety is the worker due to the fact that he/she faces risks (Gunningham 2008) and danger at the construction site. In line with all these theoretical implications, ensuring a positive safety climate without correcting workers’ perceptions of other participants’ work safety attitudes is not possible in an organization. These theoretical implications are expected to be reflected in the field of application.

4.2. Practical implications

Besides the theoretical implications of the study, there are also important practical implications. In an organization employees’ safety climate perceptions could be precious feedback for designing regular safety programs (Stoilkovska, Žileska Pančovska, and Mijoski 2015), and developing them according to changing conditions. The top managers have an important role in ensuring a positive and strong safety climate (Newaz et al. 2019). Today, with the changing needs, more issues have emerged that the employer should consider in ensuring work safety. Workers’ perceptions of work safety are one of these issues. The findings of the research are very important for managers, as this study underlines the workers’ perceptions on work safety regarding the behavior of different participants, such as co-workers, OHS specialists, and site managers. Perceptions about the danger of the construction work show differences between the groups. The study emphasizes the need to develop a new perspective on work safety issues that are perceived differently by different risk groups and to improve safety management practices at construction sites. Apart from this, it is clear managers should take into account the needs of different job descriptions. Specifying the insufficiency of the manager’s ability to meet changing safety needs of the different workgroups could reveal how a manager should handle the problem of ensuring a safe climate in a multi-stakeholder organization. Also, cultural differences should be another aspect that must be taken into account by the safety managers. In this respect, the results of the study have implications for the improvement of the construction sector in practice.
4.3. Limitations and future researches

Some potential limitations exist in this research. The focus of this study was limited to Turkey as a developing country. The difference between nations and national culture would influence top managers’ safety attitude and workers’ safety perception (Newaz et al. 2019). Future studies in other countries with different cultures other than Turkey may allow different results. Therefore, examining the relationship between the cultural characteristics of the workers and work safety may create an opportunity to explain the work safety perceptions of the workers in different nations. As a consequence, different kinds of investigations could be conducted to underline cultural dimensions of the worker perceptions.

Although the number of the sample size is sufficient (Bal 2001), the desired sample size could not be reached since the workers participating in the research showed hesitation in answering the items on the scale, and they were concerned that this could be used against them. In this context, it is thought that it may be more appropriate to support future research on the subject with qualitative research with a broader sample size, not just with a questionnaire method.

5. Conclusion

The job description-related differences in the work safety perception of the workers in the construction sector in Turkey were investigated. The results showed that different workgroups had different perceptions on the safety of their works and safety behaviors of the OHS specialist and the site manager. Considering all the findings obtained, the main points related to the workers’ perceptions arose as follows: (1) the workers’ work safety perceptions were limited with their job description, (2) although there has been no significant difference regarding perceptions of the co-workers’ safety attitude, the cultural structure of the employees may prevent them from being impartial in evaluating the safety attitudes of co-workers, and (3) considering different workgroups’ safety needs and ensuring participation in the safety issues are compulsory for safety managers to improve safety perceptions of the different workgroups.

These main points are mainly related to the safety management practices at the site. The differences in perceptions may reveal the weakness in the work safety climate in an organization.

Improving the safety climate is only possible with successful safety management practices. The perspective that danger and risk are not limited to the worker’s work and the idea of all the dangers and risks in the construction site are common to all participants should be earned to the workers through work safety management practices.

At this point, employee participation should also be provided during these practices since worker participation is the most fundamental component for establishing a safety climate. However, the different safety needs of the workers should not be ignored. It should also be taken into consideration that culture has an important role to constitute a safety climate. Especially international construction firms should consider the cultural diversity for construction works abroad.

Although work safety perceptions of the workers have been discussed in the literature from quite different aspects, job description-related differences in work safety perceptions of the workers were not examined. According to the findings of the research, the different safety perceptions of the workers having different job descriptions reveal the necessity of working in this field. In this respect, this research fills a significant gap in the work safety literature of the construction sector and contributes to the widening of it.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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