

Purpose

Fire fighters and rescue squads should take larger risk than workers in industries and health care organizations. There are a variety of scales to evaluating safety culture but there is no scale for firefighting organizations in Japan. The purpose of this research is to develop a scale to survey safety culture of fire department taking particular characteristics of firefighting into account.

Scale Development

Based on interviews and preliminary surveys, we presumed that the safety culture of fire organizations should be evaluated for 3 different levels of hierarchy: individuals (firefighters, rescue workers, ambulance crew, etc.), teams (brigades, groups, units, etc.), and local organizations (fire stations, departments, etc.). Therefore, we constructed a prototype of the Safety Culture Scale for Firefighting Organizations (SCSFO) composed of 3 subscales corresponding to each level. All the items were seven-level Likert scales.

Survey

In order to validate the SCSFO, we carried out a questionnaire survey. In addition to the prototype of SCSFO, we used four established psychological scales to check concurrent validity: subscale of “vigor” from the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2004), the Safety Climate Scale (Neal & Griffin, 2006), and psychological safety scales (Edmondson, 1999; Garvin, Edmondson & Gino, 2008). Five hundred and twenty out of a sample of 571 (3% of personnel working for the Tokyo Fire Department) completed the questionnaire.

Psychometric analyses

Based on exploratory factor analyses we extracted 2 factors of individuals’ safety attitude, i.e. occupational pride (3 items) and awareness of risk (3 items); 3 factors of individuals’ behavior, i.e. omission of procedure (4 items), safety first behavior (4 items), and communication for safety (3 items); 3 factors of safety culture of teams, i.e. psychological safety (5 items), continuous improvement (4 items), and non-blame attitude (3 items); and 3 factors of local organizations, i.e. leadership (4 items), understanding of safety measures (5 items), and safe work environment (4 items).

All the factors were found to be available for subscales of SCSFO because Cronbach’s α ranged between .64 and .89. Then we carried out confirmatory factor analysis to clarify factor structure of the SCSFO and found good fitness of data for each subscale. Correlation analysis showed a wide range of correlation coefficients ($.21 < r < .75$), but most correlations were moderate, indicating appropriate concurrent validity of the subscales. As a result, we finalized the SCSFO with 3 major subscales each of which had 2 to 5 subordinate subscales, 42 items in total. The structural model of the SCSFO was validated using a SEM technique with a good fit as shown in Fig. 1.

Conclusion

As a result, we completed the SCSFO with 3 major subscales each of which had 2 to 5 subordinate subscales, 43 items in total.

