Using Personality Assessments to Predict Workplace Safety Performance

Background

From the BP oil spill, the Target credit card breach, to the missing Malaysia Airline flight, countless tragedies continuously warn us of the invaluable costs of occupational accidents. In high-stakes industries such as mining, banking, and airline, risky behaviors can not only damage organizational performance, but also cause large-scale impact on the public and the environment. To minimize human errors in the workplace, organizations implement advanced technology to automate and standardize work procedures. Unfortunately, while technology can effectively minimize accidents on daily basis, human judgments still play a critical role in crisis where the complexity and novelty of the situation is beyond the capacity of pre-programmed technology, and human errors can still cause substantial consequences.

The 2009 crash of Air France Flight 447 provides an example of how a fully automated cockpit became a death trap during crisis. To ensure safe flying, the aviation industry has optimized the autopilot function to minimize pilot errors and reduce accident rates. As a result, even pilots with long flight hours can have minimal experience handling an airplane. The captain of Air France Flight 447 was one such pilot. According to a recent reflection on this accident (Langewiesche, 2014), the crash was a result of the captain’s inexperience with flying in the thunderstorm, the co-pilot’s irresponsibility, the confusion in the interface between the pilots and the semi-robotic aircraft, and poor communication in the cockpit. Clearly, despite technology advancement, human factors still carry significant impact on work outcomes.

Personality and Safety Performance

Considering the role of human factors in workplace, it is critical to predict error-prone characteristics. One way to effectively manage safety performance is personality assessments.

Numerous researchers have demonstrated the value of Five-Factor Model personality (FFM; Digman, 1990; Goldberg, 1992; John, 1990; McCrae & Costa, 1987) for predicting safety performance (e.g., Cellar et al., 2001; Demerouti, 2006; Wallace & Chen, 2006). Furthermore, recent researchers (e.g., Hogan & Foster, 2013) proposed forming combinations of broad personality scales to predict specific safety outcomes such as accidents and injuries. These composite personality-based safety predictor scales (Appendix 1) can effectively predict safety criterion across industries. For example, all 6 predictor scales show clear relevance to the problem behaviors during the Air France accident (Langewiesche, 2014):

Compliant. The pilot insisted to climb to the airplane’s altitude limit despite the rule against flying at the airplane’s performance margin, which led to stalling.

Confident. The pilot lacked confidence when flying in a thunderstorm and conformed to the senior co-pilots without acceding to them completely, therefore losing independent judgment.
Emotionally Stable. Both the pilot and the co-pilots lost their tempers as they realized the airplane was out of control, therefore failing to analyze and properly react to the situation.

Vigilant. The most experienced co-pilot was distracted by his personal agenda the night before the flight and was asleep when mechanical failure occurred, therefore missing the best time to intervene.

Cautious. The pilot and co-pilot tried to maneuver the control stick at the same time without carefully considering the impact of their action on the airplane.

Trainable. The pilots lacked knowledge of the automated cockpit and feared the complexities of its design. This lack of trainability led to their confusion of the warning signals during the accident.

Implication

The Air France tragedy revealed that automation is not the ultimate solution for human errors. Instead, understanding individual differences in safety tendencies is crucial to inform the management of safety performance.

First, using personality assessments to select job candidates and develop talents in high-stakes industries can help organizations identify risky behaviors and take preventive actions such as implementing better selection batteries or training programs. Second, understanding individual differences in safety performance can help leaders leverage the strengths and weaknesses of each team member and form functional teams. Last, implementing safety measures would facilitate employee awareness of safety procedures and help organizations establish a culture of safety practice.

Conclusion

Understanding personality-based individual differences can help organizations predict risky behaviors and reduce occupational accidents and injuries. Moreover, organizations need to take into consideration factors beyond human characteristics to sustain a safety workplace climate. For example, a performance management system that rewards safety behaviors and punishes misconducts can motivate employees to follow safety standards. Training programs that clearly communicate company rules and regulations are also necessary to ensure employee compliance. By managing safety practice at both individual and organizational levels, employers will be able to minimize occupational accidents, sustain business growth, and better fulfill their corporate social responsibilities.
## Appendix 1: Safety Predictor Scales and Descriptions

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<tr>
<th>Dimension</th>
<th>Description</th>
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<tbody>
<tr>
<td>Compliant</td>
<td>A person’s tendency to follow rules. Poor performers ignore authority and company rules. Exceptional performers willingly follow rules and guidelines.</td>
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<tr>
<td>Confident</td>
<td>A person’s ability to handle stress with poise and self-assurance. Poor performers tend to panic under pressure and make mistakes. Exceptional performers are steady under pressure.</td>
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<tr>
<td>Emotional Stable</td>
<td>A person’s ability to handle pressure without emotional outbursts. Poor performers easily lose their temper and then make mistakes. Exceptional performers control their tempers.</td>
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<tr>
<td>Vigilant</td>
<td>A person’s ability to stay focused when performing monotonous tasks. Poor performers are easily distracted and then make mistakes. Exceptional performers stay focused on the task at hand.</td>
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<tr>
<td>Cautious</td>
<td>A person’s tendency to avoid risk. Poor performers tend to take unnecessary risks. Exceptional performers evaluate their options before making risky decisions.</td>
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<tr>
<td>Trainable</td>
<td>A person’s tendency to respond favorably to training. Poor performers overestimate their competence and are hard to train. Exceptional performers listen to advice and like to learn.</td>
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References


