



# Predicting workers' compensation claims and disciplinary actions using SecureFit®: Further support for integrative models of workplace safety

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## ABSTRACT

**Introduction:** A growing body of applied research has identified certain psychological traits that are predictive of worker safety. However, most of these studies suffer from an overreliance on common method bias caused by self-report measures of both: (a) personal factors such as personality traits; and (b) outcomes such as safety behaviors and injuries.

**Method:** This study utilized archival data from 796 employees at a large U.S. automobile manufacturer. Data were gathered on a pre-employment assessment, SecureFit®, that measured key personality characteristics such as conscientiousness, locus of control, and risk taking. In addition, objective measures of workers' compensation claims and disciplinary actions were also gathered.

**Results:** The results indicated that disciplinary actions and workers' compensation claims were strongly correlated. It also demonstrated that the pre-employment assessment was able to predict both disciplinary actions and workers' compensation claims up to 12 months in the future. Screening out just 8% of the applicant sample using the assessment would have resulted in a 35% reduction in disciplinary actions and 46% in workers' compensation claims, respectively.

**Conclusions:** The study found a very strong relationship between counterproductive work behaviors (CWBs), such as not following rules, and workers' compensation claims. It also found a strong relationship between a combination of personality traits that have been shown to be associated with both variables, although the current study was able to demonstrate that relationship with objective measure of both variables.

**Practical applications:** Individuals who receive disciplinary actions for things such as not following rules, not coming to work on time, etc. are significantly more likely to also be involved in serious safety incidents, and vice versa. Identifying those individuals early on in the hiring process and screening them out can significantly reduce the number of CWBs as well as workers' compensation claims.

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## 1. Introduction

Workplace safety incidents are often attributed to two very broad factors: those pertaining to the situation (e.g. culture, ergonomics, equipment design, leadership, etc.) and those pertaining to the person (Iverson & Erwin, 1997). The term “safety incident” refers to any safety-related event, ranging from low to high severity or consequence. This includes anything from a “near miss” where there was a potential for injury, to an incident resulting in a severe injury or fatality.

A recent meta-analysis in the Industrial/Organizational Psychology literature investigated the role of person and situation factors in predicting workplace safety incidents (Christian, Bradley, Wallace, & Burke, 2009). In their model there are two primary factors, situational and personal, that lead to safety behaviors, which in turn lead to safety incidents. (See Fig. 1.)

### 1.1. Situational factors

One of the primary and most important situational factors is the safety climate of the organization. *Safety climate* can be defined as the shared perceptions of individuals in the work environment related to safety-related policies, practices and procedures pertaining to safety matters that affect personal wellbeing (James, James, & Ashe, 1990). It is impacted by factors such as management's commitment to safety practice, perceived organizational support, training provided about safe practices and procedures, safety systems that are put in place and the leadership style of the direct supervisor. Research consistently shows that there is a strong, significant relationship between safety climate and safety behavior (Clark, 2006).

### 1.2. Personal factors

Research indicates that personal factors such as conscientiousness, and in particular rule-orientation, locus of control, and thrill seeking,

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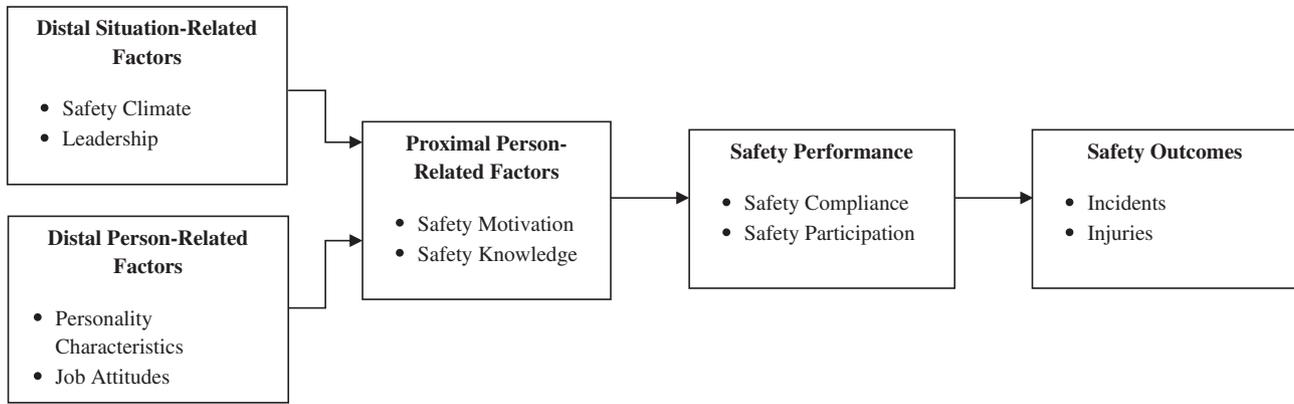


Fig. 1. An integrative model of workplace safety.

Adapted from Christian, M.S., Bradley, J.C., Wallace, J.C., & Burke, M.J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology*, 94, 1103–1127, Figure 1, page 1105.

are all related to safety behavior. Across occupations, acting responsibly is of utmost importance. Following safety policies and procedures, remaining on-task, working hard, and making well thought-out judgments all contribute to being a safe worker. A key factor that contributes to these behaviors is the trait of conscientiousness. People who are highly conscientious are hard workers; they want to do the right thing and are more apt to follow rules and follow through. As such, they are much more likely to be safe employees (Beus, Dhanani, & McCord, 2015; Clarke & Robertson, 2005; Christian et al., 2009; Wallace & Vodanovich, 2003). Individuals who are low in conscientiousness may disregard rules and, in some cases, actively rebel against authority. These behaviors are associated with higher traffic violations, and unsafe behaviors such as speeding and running red lights behaviors (Cellar, Nelson, Yorke, & Bauer, 2001; Wallace & Vodanovich, 2003).

Locus of control is another personality trait that can differentiate people who work safely from those who do not. Individuals who have an *internal* locus of control believe they have control over what happens to them. As such, they are much more likely than individuals with an *external* locus of control to take action to prevent negative events (e.g., safety incidents, equipment failure). In contrast, individuals with an external locus of control perceive that many things are out of their hands, including safety issues, and they may not intervene or take action when needed (Hattrup, O'Connell, & Labrador, 2005; Jones & Wuebker, 1993; Spector, 1982). Across a variety of occupations locus of control has been found to predict injury risk, number of reported injury and injury severity (Jones & Wuebker, 1993; Wuebker, 1986).

Thrill seeking and recklessness have long been associated with unsafe behaviors (c.f. Zuckerman & Link, 1968). Individuals who are more thrill seeking are more likely to drive fast, accelerate through yellow traffic lights, take dangerous shortcuts, drive while intoxicated, use illicit drugs and abuse alcohol (Arnett, Offer, & Fine, 1997; Ashton, 1998; Killgore, Vo, Castro, & Hoge, 2006). Previous research has shown that a combined measure of conscientiousness, locus of control, and thrill seeking is predictive of an individual's likelihood of acting responsibly and safely on the job (Bell, O'Connell, Reeder, & Nigel, 2008; Hattrup et al., 2005). This study attempted to replicate and expand upon those findings. This particular study uses an individual assessment named SecureFit®, that combines these key personality traits into an overall score.

### 1.3. Safety behavior

The aforementioned antecedents to situational and personal factors lead directly to safety behavior. Safety behavior can be broken down into two distinct types of behavior: *Safety Compliance* and *Safety Participation*. *Safety Compliance* refers to the core activities that individuals need to perform in order to maintain workplace safety. These include

wearing personal protective equipment, adhering to standardized work procedures, following sound safety practices, etc. *Safety Participation* describes behaviors that do not relate directly to an individual's safety but help develop an environment that supports safety for everyone (Griffin & Neil, 2000). It is important to note that in this model both situational and personal factors do not lead directly to accidents or safety outcomes, they lead directly to safety behavior, which in turn leads to safety outcomes.

### 1.4. Safety incidents

The final part of this model describes the outcomes associated with safety-related events, including near misses, minor or first aid injuries, recordable injuries, and recordable injuries resulting in lost or restricted time, and fatalities. Safety incidents can also refer to motor vehicle incidents or events resulting in any kind of company property damage.

### 1.5. The need for objective measures of incident data

One of the primary challenges of Industrial/Organizational Psychology research on workplace safety is that it has been primarily reliant on self-report ratings of safety incidents. Consider, for instance, the table below that summarizes the types of safety incident data used in three recent meta-analyses related to predicting safety behavior, either from personal or situational characteristics (Table 1).

Based on these recent meta-analyses, almost 60% of safety-related incident data used in research studies are self-reported incidents, injuries or other safety behaviors. This is not necessarily surprising for a number of reasons. The first is that, until recently, many organizations did not keep records of safety incidents that are easily linked with individual employee records. Therefore, it is difficult to tie specific outcomes (injuries, incidents, etc.) to an individual when conducting research. Secondly, a lot of good, objective, observational safety data are collected anonymously, and often at an aggregate or group level. In fact, one of the hallmarks of the behavioral safety approach is to focus on observed "exposures" and "near misses" without singling out individual workers (c.f. Krause, 1995, 2005). Lastly, safety incidents are simply the outcomes of a myriad of other factors, including repeated unsafe behaviors on the part of the individual, as well as a hazardous environment. While Heinrich's classic pyramid, which hypothesizes that for every one major injury there are 29 minor injuries, 300 no-injury accidents, and potentially thousands of unsafe acts (Heinrich, 1959), has come under scrutiny of late (c.f. Manuele, 2011), it is clear that injuries represent only a small fraction of actual unsafe behaviors. This significantly restricts the amount of potential safety outcome data available for research.

**Table 1**  
Types of incident data used in safety meta-analyses.

Study	Total incident data	Self-report incident data	Objective incident data	Other data
Christian et al. (2009)	113	73 (65%)	33 (29%)	7 (6%)
Clarke and Robertson (2005)	45	19 (42%)	26 (58%)	
Clark (2006)	35	19 (54%)	15 (43%)	1 (3%)
Total	193	111 (58%)	74 (38%)	8 (3%)

Nonetheless, from an organization's perspective, workers' compensation claims due to injuries on the job constitute significant expenses and can have serious impact on morale. Estimates vary, but according to the Occupational Safety and Health Administration (OSHA), for every dollar that is spent on medical expenses for a workers' compensation claim, an additional \$4 for indirect workers' compensation costs is incurred. Also, for every dollar of disability (lost time) expenses paid for a workers' compensation claim OSHA estimates an additional \$2 to \$10 is incurred in indirect workers' compensation costs. Considering that in 2007, the average workers' compensation claim was \$46,800, the indirect cost would be over \$200,000.

In addition, workplace injuries are both more ubiquitous and serious than is commonly thought. According to a recent study by the U.S. Bureau of Labor Statistics, slightly more than one-half of the 3 million private industry injury and illness cases reported nationally in 2013 were of a more serious nature that involved days away from work, job transfer, or restriction — commonly referred to as DART cases. Therefore, over 50% of all injuries are severe enough to lead to loss of work, restricted duty upon return and/or transferring out of the original job. Thus, we believe that for a number of reasons it is important to look at objective measures of safety incidents whenever possible.

## 2. Hypotheses

The focus of the current paper is twofold. The first is to evaluate the relationship between safety incidents (i.e. workers' compensation claims), and counterproductive work behaviors (CWBs), in this case disciplinary actions). The second is to evaluate the effectiveness of the SecureFit® assessment in predicting objective measures of both safety incidents and CWBs, specifically workers' compensation claims, and disciplinary actions, respectively, and how using such an assessment to screen candidates could impact both of those variables.

Assuming that safety outcomes such as workers' compensation claims are the result of repeated exposures caused in part by multiple unsafe behaviors, then one would expect that individuals who have received a formal disciplinary action would be more likely to be also involved in a safety incident that results in a workers' compensation claim. Obviously, not all disciplinary actions are for unsafe behaviors, with some being for things such as attendance, tardiness, etc. Nonetheless, the assumption would be that individuals who are likely to engage in other CWB's are also more likely to engage in unsafe behaviors and therefore have higher levels of objective safety outcomes. Gruys (1999) identified 11 categories of counterproductive behaviors, one of which was "unsafe behavior" which included failure to follow safety procedures and failure to learn safety behaviors. Sackett (2002) states that "... the intentional violation of safety procedures is an example of counterproductive behavior, as such behavior put the individual and the organization at risk" (p. 5).

**Hypothesis 1.** Workers' compensation claims will be significantly positively related to disciplinary actions.

**Hypotheses 2 & 3.** The overall score on the SecureFit® assessment will be significantly negatively related to workers' compensation claims, and disciplinary actions, respectively.

**Hypothesis 4.** Screening out individuals who fall in the lowest level (in this case the "Poor Fit") on the SecureFit® assessment will significantly

reduce both the number of workers' compensation claims, and disciplinary actions.

## 3. Methods

### 3.1. Applicant sample and procedure

As part of a pilot study, approximately 2500 candidates from a staffing agency were administered SecureFit® at the front end of the hiring process for hourly manufacturing work at a large U.S. based automotive manufacturer. The results from that assessment were not used in the decision making process and neither the staffing agency, the automotive manufacturer, nor the individuals in question knew of the results of the assessment. Over a two-year continuous hiring process 1932 individuals were hired into hourly, production associate positions. To be included in this study, individuals needed to be employed for a minimum of 90 days. Individual information was tracked over a 12-month time period. The final sample resulted in a group of 796 individuals with data over that time period. Demographic information on these individuals was not made available.

### 3.2. Measures

#### 3.2.1. Assessment

SecureFit is a web-based assessment covering two primary assessment methodologies: (a) self-report personality scales; and (b) behavioral self-report/biodata scales. The assessment was developed for screening applicants to entry-level jobs with a physical component, such as dock workers, construction workers, miners, warehouse associates, etc. The assessment was initially designed by a team of Industrial/Organizational psychologists based on extensive job analysis across numerous industries, in-depth review of the existing literature, and feedback from organizations. The personality and biodata scales have been refined over time through multiple empirical studies and cross-validations. The assessment scores are norm-referenced, i.e., it is benchmarked to a large normative data which consisted of over 40,000 applicants to entry level jobs with physical elements across a broad range of industries in North America. Research has demonstrated that SecureFit is a significant predictor of job performance as rated by employees' supervisors (Tenbrink, Gammon, Kung, & O'Connell, 2015; Tristan, Kung, Morris, Periard, & Burns, 2014). Space considerations prevent an in-depth discussion of the development and content of the specific scales used in that assessment. That information can be found elsewhere<sup>1</sup> (Delgado & O'Connell, 2012; Delgado, Gammon, O'Connell, & Kung, 2012; Lawrence, Kung, O'Connell, & Delgado, 2012).

The self-report personality scales consisted of 50 individual items measured using a 6-point Likert-type scale of agreement. There were 7 risk factors measured: safety, quality, impulsivity, dependability, attitude, absenteeism, and turnover.

A total of 25 behavioral self-report items, which fall under the rubric of biodata also covered the 7 risk factors. Seventeen of the items followed a 6-point Likert type scale of frequency, whereas another 8 followed a 6-point Likert-type scale of likelihood.

<sup>1</sup> These reports can be obtained by contacting the first author.

The self-report personality and biodata items are combined to form the final 7 risk factors. Final risk factor scores are transformed into a 10-point Sten scale scores. Reliabilities for the final scales, estimated using Mosier coefficients (Mosier, 1943) range from .82 to .87 (Lawrence et al., 2012). The Mosier coefficient tends to be a more accurate estimate of reliability when multiple methods are used (Widhiarso, 2007).

A final score is obtained based on a unit-weighted composite of those 7 factors. A scoring algorithm that involves cutoff scores for each risk factors as well as the final scores determines candidates' standing in one of four recommendation categories; Poor Fit, Potential Fit, Good Fit, and Very Good Fit. For the purposes of this study, only the overall SF score and the final recommendation categories are considered.

### 3.2.2. Outcomes

There were three primary outcomes gathered as part of this study: (a) an archival measure of *Disciplinary Actions*. These were dichotomized as 0 = no and 1 = yes. As stated earlier, disciplinary actions could have been caused by a wide range of counterproductive work behaviors that were serious enough to result in a formal action in the employee personnel file; and (b) an archival measure of *Workers' Compensation* claims. Again, these were dichotomized as 0 = no and 1 = yes.

## 4. Results

Table 2 below provides descriptive statistics and intercorrelations for the predictors and criteria used in the study.

Hypothesis 1 was supported. Workers' compensation claims were strongly correlated with disciplinary actions.

Hypotheses 2 & 3, namely that the SecureFit assessment would be significantly negatively related to workers' compensation claims and disciplinary actions, respectively, were confirmed. The correlations between the overall SecureFit score and both of these outcome measures were in the predicted direction and statistically significant.

Hypothesis 4 predicted that "screening out" (i.e., removing individuals who scored in the lowest category [i.e. Poor Fit] on the SecureFit assessment) would lead to significantly lower workers' compensation claims as well as disciplinary actions. To evaluate this a t-test was used for each of the two outcome variables in question. This analysis compares the difference in the average rate of workers' compensation claims and disciplinary actions, respectively, for the entire group versus the group where individuals were screened out. As can be seen in Table 3, screening out 8% of the entire applicant sample would have resulted in a 35% reduction in disciplinary actions and a 46% reduction in workers' compensation claims. Both of these were statistically significant reductions and therefore Hypothesis 4 was supported.

## 5. Discussion

Improving workplace safety is an important goal for individuals in multiple fields of study from I/O psychology to Health, Safety and

**Table 2**  
Descriptive statistics and intercorrelations for variables used in the study (n = 677).

Variable	M	SD	1	2	3
1. SecureFit composite	5.51	1.62	–		
2. Workers Comp claims	0.36	0.48	–.23**	–	
3. Disciplinary Actions	0.26	0.63	–.25**	.54**	–

Note. \*\* =  $p < .01$ .

(Note: to correct for family-wise error rates, a Bonferroni correction was used for 2 hypotheses ( $M = 2$ ), which converts the alpha rate from .05 to .025. As can be seen, both correlations are significant beyond that level. We did not make specific predictions regarding the correlation between Workers' Compensation and Disciplinary Actions, and therefore did not correct the analysis for that comparison. However, even going to a more conservative correction of  $M = 3$ , the alpha level would go from .05 to .017. In either case, all of the correlations presented here would be significant at an alpha level of .025 or .017).

**Table 3**  
Effect of screening out lowest group on SecureFit on workers' compensation claims and disciplinary actions.

Outcome	SecureFit group		t	df
	Pre-screen	Post-screen		
Workers' Comp Claims	.13 (.39)	.07 (.32)	3.07**	1296
Disciplinary Actions	.26 (.65)	.17 (.57)	2.65**	1296

Note: \*\* =  $p < .01$ . The pre-screen group is the full sample and the post-screen group has "Not Recommended" removed. Standard deviations appear in parentheses below means.

Environment (HSE) to Engineering. The causes of workplace safety incidents and injuries are numerous; some situational, some individual, and undoubtedly most being a combination of the two. Previous research into personal characteristics associated with safety behavior and safety outcomes has demonstrated that there are certain individual difference characteristics that are related to important safety outcomes (c.f. Beus et al., 2015; Clarke & Robertson, 2005; Christian et al., 2009). The research evidence, however, is limited because more than half of the studies rely primarily on self-reports of safety behavior and incident involvement. While there are clearly limitations with looking solely at objective safety outcomes such as injuries, safety incidents or workers' compensation claims, self-reports of safety behavior present a different set of problems. The use of self-reports of safety behavior is not inherently negative. In fact, research has shown that in certain situations there are only minimal differences among self, co-worker, and supervisory ratings of safety performance (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002). However, the concerns of common method bias always come into play when self-report data is gathered both as a predictor (e.g., personality variables) and as the outcome (e.g., safety incidents).

An important finding from this study is the strong, positive relationship between disciplinary actions and workers' compensation claims. This lends further support to models, such as Christian et al. (2009), linking employee safety performance and safety outcomes. A limitation of the current study is that we were not able to determine a temporal relationship between these two variables (i.e., we don't know if the individual received disciplinary action prior to having a safety incident serious enough to result in a workers' compensation claim or after such an incident). Future research should evaluate such a causal link.

This study also demonstrated that a pre-employment selection tool focused on several core personal characteristics such as rule orientation, internal locus of control, and low thrill seeking can be a significant predictor of objective safety outcomes, as well as employee disciplinary actions, which can be seen as indicative of CWB's. This is consistent with other research on personal predictors of safety behavior and CWB's (c.f. Jones & Wuebker, 1993; Killgore et al., 2006; Wuebker, 1986; Zuckerman & Link, 1968).

Using such an individual assessment, in this case SecureFit, as part of the pre-employment screening process may in some cases be an effective strategy to reduce the occurrence of safety incidents and disciplinary actions. A comparison was made between two groups of employees, one where a small percentage, in this case 8%, who scored in the lowest category on SecureFit (i.e., "poor fit") and the larger group that contained those individuals. The group with "poor fit" employees removed had workers' compensation claims that were 46% less, and disciplinary actions that were 35% less than the larger group. This is consistent with the argument made in O'Connell and Gantt (2013) that posited that effective employee selection procedures can be seen as fitting into the second highest level, i.e. Replacement, in ANSI's *hierarchy of controls*. That strategy effectively replaces higher risk employees with those who are more likely to engage in more positive safety behaviors and therefore reduce the risk of safety incidents. The current study clearly demonstrated that this was possible.

While not specifically tested in this study, taken together, these findings lend support to the fuller Christian et al. (2009) model, in which

person related factors lead to employee safety performance behaviors, which in turn lead to safety outcomes. In addition, they do so without an overreliance on self-report variables. Both disciplinary actions and workers' compensation claims were archival variables that were obtained at least 12 months after the individual completed the SecureFit assessment. The current study used largely correlational analyses to evaluate the relationships between these variables and therefore making causal attributions is not possible. However, the current study did indeed support that a relationship does exist between person related factors and employee safety performance variables.

The current study sought to expand research into the areas of predictors of safety incidents and counterproductive work behaviors, specifically disciplinary actions, by using more objective measures of both variables. A limitation of this study was that we did not have access to additional factors, such as demographic variables, specific job groupings, etc. that may have served as possible mediators or moderators of the relationships in question. Future research should continue to test models of both personal and situational factors associated with safety outcomes using more objective criteria variables whenever possible, and to look for potential moderators and/or mediators of those relationships.

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