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The influence of individual differences on organizational safety attitudes

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ABSTRACT

Workplace accidents cost organizations and the economy billions of dollars annually, disabling and injuring millions of employees. Employee attitudes toward safety have been shown to relate to safe workplace behavior. In an effort to determine what contributes to stronger employee attitudes toward safety, we examined the relationships between safety attitudes and a wide array of individual differences reflecting preferences and tendencies toward risk and control. Using a sample of 190 engineering and occupational safety students from two universities, we found that agreeableness, conscientiousness, prevention regulatory focus, and fatalism related significantly to all six safety attitudes examined. Regression analyses demonstrated that agreeableness, prevention focus, and fatalism significantly related to safety attitudes when controlling for the other individual differences. This study illustrates the utility of examining individual differences when predicting safety-related attitudes.

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1. Introduction

Workplace accidents cost the US economy approximately \$142.2 billion each year, with 4 million nonfatal injuries and 5734 fatalities recorded in 2005 (Bureau of Labor Statistics, 2006; National Safety Council, 2005). These injuries result in production losses equivalent to 80 million days lost each year (National Safety Council, 2005). Similarly, 4664 work-related fatalities were recorded in the European Union in 2003, with a reported work-related accident occurring every 5 s and fatality occurring every 2 h (Health and Safety Executive, 2003). Researchers have speculated that safety attitudes may predict safe behavior in the workplace (Neal and Griffin, 2004) and have found some empirical evidence to support these claims. For example, Rundmo (1996) found attitudes toward safety had a direct effect on risk behaviors, and McGovern et al. (2000) found attitudes toward risky behavior predicted safety compliance behaviors. Thus, research facilitating our understanding of the development of safety attitudes may contribute to our ability to reduce workplace accidents and enhance organizational safety. In this study, we examine the relationships between safety attitudes and a broad array of individual differences reflecting preferences and tendencies toward risk and control as a step toward understanding the causes of safety attitudes.

2. Safety attitudes

Safety attitudes reflect an individual-level construct of beliefs and emotions regarding safety policies, procedures, and practices (Neal and Griffin, 2004; Rundmo and Hale, 2003), including one's personal commitment to and sense of personal responsibility toward safety. Safety attitudes are positively related to but distinct from the group- or organizational-level safety climate (Diaz and Cabrera, 1997; Neal and Griffin, 2004) or shared employee perceptions of organizational policies, procedures, and practices concerning safety, which can be summarized as the relative priority of safety over productivity (Zohar, 2003). Numerous researchers have examined a wide range of safety climate perceptions, including the commonly identified factors of perceived level of risk in the workplace, perceived management safety practices, and perceptions of the priority of safety in the workplace (Cox and Cheyne, 2000; Hayes et al., 1998; Rundmo, 1992a,b; Zohar, 1980). Whereas safety climate is primarily determined by the workplace environment, safety attitudes are influenced by both the environment and individual differences (Neal and Griffin, 2004). Despite this distinction, many researchers have incorporated safety attitudes into their definition of safety climate (e.g., Harvey et al., 2002) or erroneously used them as indicators of safety climate (e.g., Cheyne et al., 1998; Cox and Cox, 1991).

As Clarke (2006) noted, few studies have attempted to identify particular individual differences relevant to occupational safety attitudes; however, research examining attitudes toward traffic

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safety suggests such relationships do exist (Ulleberg, 2007; Ulleberg and Rundmo, 2003). For example, Ulleberg and Rundmo (2003) found the personality traits of sensation-seeking, aggression, and normlessness were negatively related to attitudes toward traffic safety, while altruism and anxiety were positively related to traffic safety attitudes. Safety attitudes were also found to mediate the relationship between personality and risky driving behavior. Similarly, in a study examining the priority given to traffic safety, Meon (2007) found the personality trait of excitement-seeking to be negatively related to traffic safety attitudes. Although the domains of traffic safety and occupational safety may differ in many ways, attitudes in each domain share a focus on risk and control (Neal and Griffin, 2004; Ulleberg and Rundmo, 2003). Therefore, relationships between personality and attitudes toward safety in the domain of driving may be informative to studies of personality and safety attitudes in other domains.

In the current study, we examined relationships between individual differences and occupational safety attitudes. Individual differences (e.g., conscientiousness) have been found to be systematically related to other work-related attitudes (e.g., job satisfaction; Judge et al., 2002) as well as to workplace behavior (Barrick and Mount, 1991). Thus, this study contributes to this body of organizational research, as well as research on safety in the workplace.

3. Individual differences

Individual differences in one's personality, attitudes, and beliefs can influence a worker's ability to safely handle workplace hazards (Forcier et al., 2001). Several personality variables have been examined in relation to safety behavior (see Neal and Griffin, 2004, for a review). Neuroticism, Type A behavior, sensation-seeking, and high levels of extraversion have all been found to be positively related to risk taking behavior and accident involvement (Frone, 1998; Hansen, 1989; Sutherland and Cooper, 1991). However, research is lacking regarding reasons why these relationships exist. Given that individual differences have been found to predict other work attitudes which are related to workplace behavior, it is plausible that safety attitudes may be one mechanism useful in explaining the relationship between individual differences and safety behaviors.

Although individual differences as a whole are linked to work-related attitudes, which individual differences are predictive is likely to vary according to the particular attitude of interest. Safety attitudes are distinct from more typically studied workplace attitudes (e.g., job satisfaction) in that they do not merely describe an individual's evaluation or personal pleasure with a particular aspect of the job; instead, safety attitudes reflect cognitions and evaluations of activities that could impact others' well-being through the focal person's behavior.

We chose specific individual difference constructs following McCrae and Costa's (1996) view of basic tendencies and characteristic adaptations. McCrae and Costa argued that basic tendencies, including demographic characteristics as well as individual differences such as personality traits, influence the development of characteristic adaptations (habits, knowledge, attitudes). They argued that peoples' basic tendencies guided them to and in specific situations, which result in the development of characteristic adaptations. Thus, in addition to the typical set of personality characteristics studied (i.e., the Big Five), we chose basic tendencies that reflected some form of risk (or risk avoidance), safety, and control, all of which could interact with situational experiences to influence safety attitudes. We briefly describe each individual difference included and how we expect it to relate to safety attitudes.

3.1. The Big Five

First, we examine the Big Five (Costa and McCrae, 1992; Digman, 1990; Goldberg, 1990). *Agreeableness* encompasses cooperation, empathy, selflessness, and identification with others. Low agreeableness has been shown to be related to accident involvement in the workplace (Clarke, 2006; Clarke and Robertson, 2005), and is therefore likely to be related to safety attitudes as well. In organizations, agreeable individuals – who are motivated to be altruistic (Graziano and Eisenberg, 1997) – might feel responsibility toward others within the organization, leading to more positive safety attitudes (H1a).

Extraversion is the extent to which one seeks out, enjoys, and is confident in social situations. Highly extraverted individuals are characterized as bold, sociable, assertive, and enthusiastic (Watson and Clark, 1997). Excitement-seeking is a facet of extraversion that is likely to be positively related to risk taking tendencies, and therefore negatively related to safety attitudes (H1b).

Individuals with high levels of *neuroticism* are more likely to be anxious, depressed, and insecure (McCrae and Costa, 1985). Neuroticism also reflects low stress tolerance, such that neurotic individuals are more likely to become flustered or frantic from job demands, resulting in a reduction in attention and focus at work (Forcier et al., 2001); thus neuroticism is expected to relate negatively to safety attitudes (H1c).

Conscientiousness is a broad trait consisting of both dependability and the drive to achieve (Mount and Barrick, 1995). Highly conscientious individuals tend to be careful, thorough, achievement-oriented, and dutiful hard workers (Hogan and Ones, 1997). One facet of conscientiousness is cautiousness (Costa and McCrae, 1992), or the extent to which individuals try to avoid mistakes (Goldberg, 1999). Conscientious individuals follow rules and are aware of expected behavior in a given situation. Previous research has shown that conscientiousness is positively related to safe behavior (Arthur and Doverspike, 2001; Wallace and Chen, 2006); we expect it to be positively related to safety attitudes as well (H1d).

Openness to experience is demonstrated through an interest in novel experiences, comfort with ambiguity, and an appreciation for artistic and imaginative endeavors (Tesch and Cameron, 1987). Individuals with high levels of openness are broad-minded and original (McCrae and Costa, 1985). We did not speculate regarding the relationship between openness to experience and safety attitudes.

3.2. Risk propensity and sensation-seeking

Further, we examine two specific facets of extraversion (Costa and McCrae, 1992; Jackson, 1994). *Risk propensity* is the extent to which individuals are inclined to take risks, seek adventure, and engage in risky behaviors (e.g., hang-gliding, gambling). Because individuals who have a greater risk propensity are more likely to make rash decisions, to gamble on lesser odds, and to act with less caution, we expect risk propensity to be negatively related to safety attitudes (H2a).

Sensation-seeking refers to the propensity to seek adventure and avoid boredom (Rosenbloom and Wolf, 2002). Sensation-seeking describes one's optimal level of arousal and stimulation (Zuckerman, 1994), and encompasses attraction to thrill, loss of self-control, intolerance of predictable events, and willingness to take risks in order to engage in exciting experiences (Forcier et al., 2001; Rosenbloom and Wolf, 2002). Previous research has found sensation-seeking to be negatively related to traffic safety attitudes (Ulleberg and Rundmo, 2003); thus, we expect sensation-seeking to be negatively related to workplace safety attitudes (H2b).

3.3. Regulatory focus at work

We also measure *regulatory focus at work* (Wallace and Chen, 2006). Regulatory focus theory describes two cognitive approaches individuals use to strategize about enacting behaviors to meet goals: (1) *promotion* and (2) *prevention focus* (Higgins, 1997). Promotion-focused individuals seek out ways to accomplish tasks whereas prevention-focused individuals avoid things that deter successful task execution (Higgins et al., 1994). That is, a promotion focus is a desire to avoid errors of omission, whereas a prevention focus is a desire to avoid errors of commission (Crowe and Higgins, 1997). Employees with a strong promotion focus engage in strategies that maximize productivity, whereas employees with a strong prevention focus engage in strategies that maximize quality or safety (Crowe and Higgins, 1997; Wallace and Chen, 2006). Thus, we hypothesize promotion focus to be negatively (H3a) and prevention focus to be positively (H3b) related to safety attitudes.

3.4. Fatalism

Fatalism concerning accidents refers to the belief that accidents are unavoidable results of chance or fate, and that individuals can do little to prevent them. Fatalistic employees might be less likely to engage in safe work practices because they believe these behaviors have little influence on accidents (Rundmo and Hale, 2003). Fatalism concerning accident prevention has been examined as an attitude variable (e.g., Mearns et al., 2004; Rundmo and Hale, 2003); however, fatalism may not necessarily contain the evaluative component characteristic of an attitude and could instead reflect an individual's characteristic pattern of thinking and feeling, developed regardless of experience with accidents and workplace safety procedures. For example, fatalism is similar to an external locus of control for safety, in which individuals lack feelings of control over safety and do not believe they are direct contributors to and causes of accidents (Forcier et al., 2001; Jones and Wuebker, 1993; Murray et al., 1997). Williamson et al. (1997) found that fatalism did not change with experience, or differ for those with accident experience or different perceptions of the workplace, leading them to conclude fatalism may be an enduring individual difference rather than an attitude or perception regarding safety climate. Finally, Kouabenan (1998) showed that fatalistic individuals take bigger risks because they possess limited knowledge of risks and accidents, leading them to misestimate the probability of their occurrence. We expect fatalism to be negatively related to safety attitudes (H4).

3.5. Type A behavior pattern

Type A refers to a behavior pattern including competitiveness, aggressiveness, and achievement striving (Price, 1983). Research has shown that Type A individuals tend to be more erratic and careless during task performance (Shahidi et al., 1991). Additionally, Type A has been associated with risk taking and accident involvement (e.g., Sutherland and Cooper, 1991), possibly due to the accompanying heightened sense of time urgency (Frone, 1998). Previous research has shown aggression to be negatively related to traffic safety attitudes (Ulleberg and Rundmo, 2003). Type A is expected to negatively relate to safety attitudes (H5).

4. Method

4.1. Participants

Participants were 190 students from two universities located in the United States. The sample consisted of 135 engineering stu-

dents from a large Southwestern university (90% response rate, 63% male; $M_{\text{age}} = 21.28$, $SD = 2.00$) and 55 occupational safety students from a Midwestern university (83.3% response rate, 84% male; $M_{\text{age}} = 21.47$, $SD = 3.31$), recruited during classes to participate in a survey on safety decision-making in organizations. The majority of the participants (80%) were Caucasian, most (42%) were seniors, and 33% reported having internship experience in a related field. *t*-Tests revealed significant differences between the samples regarding sex ($t_{(187)} = 2.22$, $p < .05$). Analyses also indicated significant differences between samples and individuals with internship experience compared to those without regarding several safety attitudes; therefore, sex, location, and internship experience were used as control variables in all regressions.

4.2. Measures

4.2.1. Individual differences measures

The Big Five personality constructs were assessed using the 44-item Big Five Inventory (John et al., 1991). *Risk propensity* was measured with a nine-item scale from the International Personality Item Pool (Goldberg, 1999). *Sensation-seeking* was assessed using the 10-item thrill and adventure seeking subscale developed by Zuckerman (1979). *Promotion regulatory focus and prevention regulatory focus at work* were each measured with six items developed by Wallace and Chen (2006). *Fatalism concerning accident prevention* was measured with seven items developed by Rundmo and Hale (2003). *Type A pattern* was measured using the five-item impatience-irritability subscale developed by Spence et al. (1987). Coefficient alphas for each scale appear in Table 1.

4.2.2. Safety attitudes measure

Safety attitudes were assessed with 65 items tapping attitudes toward safety at the organizational/management, group, and individual level. Safety attitudes and perceptions have been measured using a variety of instruments, with few replications using the same measures. In an attempt to capture as many relevant aspects of safety attitudes as possible, we administered items based on a combination of several previously developed safety attitude and climate measures (e.g., Cheyne et al., 1998; Cox and Cox, 1991; Rundmo, 1996; Zohar, 1980).

Given our focus on safety attitudes as opposed to safety perceptions, items needed to assess attitudes and beliefs individuals may hold concerning workplace safety regardless of experience. Thus, items assessing perceptions of safety in the workplace (e.g., "Safety has a high priority") were revised to reflect attitudes toward safety (e.g., "Safety should have a high priority"). Further, items referring to specific organizational contexts (e.g., "Depot Safety Committee is effective") were revised to be more general (e.g., "Safety committees are effective"). Items that could not easily be revised in such a manner were not included in the study. Because of these revisions and the administration of several scales, an exploratory factor analysis using principal components extraction was conducted. Based on these results, six safety attitude scales were constructed (items and loadings can be found in Table 2): (1) *general attitudes*: beliefs regarding whether organizations should give safety a high priority ($\alpha = .83$); (2) *what workers should do*: how individual workers should behave in regards to safety ($\alpha = .71$); (3) *what management should do*: beliefs about how managers should behave in regards to safety and when given information from subordinates regarding safety issues ($\alpha = .88$); (4) *safety as an expense and interference with productivity*: beliefs regarding monetary and production costs associated with safety ($\alpha = .66$); (5) *compromising safety in favor of production*: beliefs regarding taking risks and shortcuts in exchange for productivity ($\alpha = .71$); and (6) *safety discipline*: beliefs regarding whether those who depart from safety procedures should be disciplined ($\alpha = .73$).

Table 1
Descriptive statistics, reliabilities and correlations for key variables^a

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Demographics</i>																						
1. Sex	–	–	–																			
2. Location	–	–	–.16	–																		
3. Internship experience	–	–	.02	.15	–																	
<i>Individual differences</i>																						
4. Agreeableness	3.80	.44	.06	–.04	.00	(.71)																
5. Extraversion	3.31	.70	.15	–.09	.23*	.34**	(.88)															
6. Neuroticism	2.62	.65	.32**	–.05	–.06	–.40**	–.27**	(.83)														
7. Conscientiousness	3.72	.51	.20*	–.21*	.08	.42**	.31**	–.24*	(.78)													
8. Openness	3.54	.53	–.04	–.15	.17	.12	.33**	–.28**	.19	(.63)												
9. Risk propensity	2.80	.63	–.20*	.16	.05	–.18	.12	–.09	–.26**	.07	(.78)											
10. Sensation-seeking	3.36	.81	–.22*	.03	.08	–.02	.28**	–.22*	–.10	.21*	.62**	(.87)										
11. Promotion focus	3.71	.64	.07	.02	.10	.11	.34**	–.10	.33**	.18	.04	.11	(.80)									
12. Prevention focus	4.27	.48	.21*	–.05	.13	.39**	.33**	–.08	.53**	.16	–.13	–.07	.44**	(.83)								
13. Fatalism	2.39	.61	–.17	.03	–.17	–.26**	–.11	.25*	–.27**	–.25*	.17	.09	–.13	–.27**	(.81)							
14. Type A	2.65	.59	–.02	.13	.12	–.32**	–.01	.40**	–.21*	–.17	.23*	.11	.20*	–.03	.27**	(.64)						
<i>Safety attitudes</i>																						
15. General attitudes	3.96	.54	.08	.03	.26*	.46**	.27**	–.18	.36**	.21*	–.17	.04	.24*	.44**	–.32**	–.12	(.83)					
16. Workers should do	3.98	.45	.18	–.07	.17	.39**	.28**	–.17	.33**	.28**	–.06	.08	.26**	.42**	–.42**	–.12	.66**	(.71)				
17. Management should do	4.16	.44	.18	–.06	.20*	.44**	.24*	–.16	.34**	.26**	–.16	.05	.29**	.49**	–.48**	–.12	.73**	.80**	(.88)			
18. Safety as an expense ^b	2.72	.62	–.03	.17	.12	.24*	.05	–.13	.16	.05	–.18	–.02	–.02	.16	–.20*	–.25*	.22*	.04	.10	(.66)		
19. Compromising safety ^b	3.04	.73	.13	.20*	.12	.16	.01	–.13	.21*	.02	–.33**	–.18	.02	.20*	–.41**	–.23*	.36**	.20*	.24*	.35**	(.71)	
20. Safety discipline	4.04	.57	.10	–.01	.23*	.31**	.19*	–.20*	.31**	.31**	–.19*	–.04	.30**	.43**	–.47**	–.09	.63**	.62**	.68**	.15	.32**	(.73)

^a Coefficient alphas reported on the diagonal.

^b Scales reverse-coded so higher values reflect positive safety attitudes.

* $p < .01$.

** $p < .001$.

Table 2
Exploratory factory analysis of safety attitudes^a

Item	Factor ^b					
	GA	WSD	MSD	SEI	CSP	SD
Safety should have a high priority	.66					
Safety specific jobs should always get done	.78					
Safety training should be given top priority over other training	.61					
Organizations should have defined safety objectives	.99					
Companies should be as concerned for safety as for profit	.68					
I think safety issues should be assigned high priority in management meetings	.68					
Employees should encourage colleagues to work safely		.76				
Workers who work safely should try to emphasize it		.34				
Workers who use personal protective equipment should not be considered to be cowards but rather good workers		.43				.33
Workers who do not work under a premium system should work more carefully		.84				
When workers confront a dangerous situation in their work environment, they should report it to the safety officer		.86				
Line supervisors should actively support safety			.74			
Management should listen to safety concerns			.50			
Plant management should be willing to invest money and effort to improve the safety level		.37	.50			
Management should be well informed about safety problems and act quickly to correct them			.84			
Managers in a factory should really care and try to reduce risk levels as much as possible			.86			
Managers should view safety regulation violations seriously even when they have resulted in no apparent damage			.51			
When a manager realizes a hazardous situation has been found he/she should immediately attempt to put it under control			.83			
Good proposals on how to improve safety should be dropped if they cost too much				.35		
Good operational economy is often in conflict with measures to improve personal safety				.59		
Rules and instructions relating to personal safety sometimes make it difficult to keep up with production targets				.87		
Calling attention to breaches of safety can easily be felt as an unnecessary hassle				.76		
Sometimes it is necessary to take risks to get a job done					.85	
Sometimes it is necessary to take shortcuts					.79	
Sometimes it is necessary to depart from safety requirements for the sake of production					.60	
Workers who act unsafely should be disciplined						.76
Unsafe behaviors should not be tolerated						.51
Working safely should be a condition of employment						.55
% of variance	36.4	9.72	4.78	4.75	3.68	3.45

^a Values less than .30 are not displayed.

^b GA = general attitudes; WSD = what workers should do; MSD = what management should do; SEI = safety as an expense and interference with productivity; CSP = compromising safety in favor of production; and SD = safety discipline.

All responses were made on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale. Items were reverse-coded when necessary, resulting in higher values reflecting positive attitudes toward safety.

5. Results

5.1. Correlation results

Descriptive statistics and correlations for all variables appear in Table 1. The first set of hypotheses stated four of the Big Five personality factors would be related to safety attitudes. Consistent with H1a, agreeableness was positively related to five of the six safety attitudes (general attitudes, what workers should do, what management should do, safety as an expense and interference with productivity, and safety discipline). Contrary to expectations, extraversion was positively rather than negatively related (H1b) to four of the six safety attitudes (general attitudes, what workers should do, what management should do, and safety discipline). Finding limited support for H1c, neuroticism was negatively related only to safety discipline. Consistent with H1d, conscientiousness was positively related to five of the safety attitudes (general attitudes, what workers should do, what management should do, compromising safety in favor of production, and safety discipline). Although no hypothesis was offered for openness to experience, it was positively related to four of the attitude scales.

In partial support of H2a, Risk propensity was negatively related to two of the six attitudes (compromising safety in favor of produc-

tion and safety discipline). Finding no support for H2b, sensation-seeking was not related to any of the safety attitudes.

Contrary to H3a, promotion focus was positively rather than negatively related to four of the six attitude scales (general attitudes, what workers should do, what management should do, and safety discipline). Consistent with H3b, prevention focus was positively related to five of the six safety attitudes (all but safety as an expense and interference with productivity).

In support of H4, fatalism was negatively related to all six attitude scales; it was the only individual difference to be related to each of the attitude scales. Finally, Type A was negatively related to attitudes concerning safety as an expense and interference with productivity, as well as compromising safety in favor of production, providing some support for H5.

5.2. Multiple regression results

Multiple regression analyses were also conducted to examine the proportion of variance explained in each attitude by the set of individual differences and to determine which may be most useful in predicting safety attitudes. Separate hierarchical regression analyses were conducted for each of the six safety attitude variables. The individual difference variables accounted for a significant amount of variance, after controlling for sex, location, and internship experience for all six attitudes. Table 3 summarizes the results.

Agreeableness ($\beta = .34$, $p = .000$), prevention focus ($\beta = .20$, $p = .011$), and sensation-seeking ($\beta = .16$, $p = .050$) significantly

Table 3
Multiple regression results for the prediction of safety attitudes

Safety attitude	B (SE)	β	Adjusted R^2	ΔR^2	F _Δ	F ^b
<i>General attitudes</i>						
Step 1			.07	.08		5.41**
Control variables ^a						
Step 2			.36	.33	8.51***	8.38***
Agreeableness	.42 (.09)	.34***				
Extraversion	-.02 (.06)	-.02				
Neuroticism	.06 (.07)	.07				
Conscientiousness	.05 (.08)	.05				
Openness	.07 (.07)	.06				
Risk propensity	-.12 (.07)	-.14				
Sensation-seeking	.11 (.05)	.16				
Promotion focus	.05 (.06)	.06				
Prevention focus	.23 (.09)	.20*				
Fatalism	-.12 (.06)	-.13				
Type A	-.10 (.07)	-.01				
<i>What workers should do</i>						
Step 1			.05	.07		4.38**
Control variables ^a						
Step 2			.34	.32	7.94***	7.58***
Agreeableness	.27 (.08)	.26**				
Extraversion	-.01 (.05)	-.01				
Neuroticism	.03 (.06)	.05				
Conscientiousness	.02 (.07)	.02				
Openness	.10 (.06)	.12				
Risk propensity	.00 (.06)	.01				
Sensation-seeking	.07 (.05)	.13				
Promotion focus	.06 (.05)	.08				
Prevention focus	.17 (.08)	.18*				
Fatalism	-.20 (.05)	-.27***				
Type A	.00 (.06)	.00				
<i>What management should do</i>						
Step 1			.07	.08		5.42**
Control variables ^a						
Step 2			.46	.42	12.82***	12.08***
Agreeableness	.31 (.07)	.31***				
Extraversion	-.06 (.04)	-.10				
Neuroticism	.04 (.05)	.06				
Conscientiousness	-.02 (.06)	-.03				
Openness	.08 (.05)	.09				
Risk propensity	-.09 (.05)	-.13				
Sensation-seeking	.11 (.04)	.20**				
Promotion focus	.07 (.05)	.10				
Prevention focus	.21 (.07)	.23**				
Fatalism	-.24 (.05)	-.33***				
Type A	.01 (.05)	.02				
<i>Safety as an expense and interference with productivity</i>						
Step 1			.02	.04		2.40
Control variables ^a						
Step 2			.13	.15	2.93**	2.87**
Agreeableness	.15 (.12)	.11				
Extraversion	-.01 (.08)	-.01				
Neuroticism	.08 (.09)	.08				
Conscientiousness	.08 (.11)	.07				
Openness	-.03 (.09)	-.02				
Risk propensity	-.19 (.09)	-.20*				
Sensation-seeking	.11 (.07)	.14				
Promotion focus	-.07 (.08)	-.07				
Prevention focus	.18 (.12)	.09				
Fatalism	-.09 (.08)	-.09				
Type A	-.22 (.09)	-.21*				
<i>Compromising safety in favor of production</i>						
Step 1			.06	.07		4.73**
Control variables ^a						
Step 2			.28	.26	5.93***	5.98***
Agreeableness	-.16 (.13)	-.09				
Extraversion	-.02 (.08)	-.02				
Neuroticism	-.06 (.09)	-.06				
Conscientiousness	.11 (.12)	.08				
Openness	-.08 (.10)	-.06				
Risk propensity	-.36 (.10)	-.31***				
Sensation-seeking	.06 (.08)	.07				

Table 3 (continued)

Safety attitude	B (SE)	β	Adjusted R ²	ΔR^2	F _A	F ^b
Promotion focus	-.07 (.09)	-.06				
Prevention focus	.15 (.13)	.10				
Fatalism	-.36 (.09)	-.30***				
Type A	-.13 (.10)	-.11				
<i>Safety discipline</i>						
Step 1			.05	.07		4.48**
Control variables ^a						
Step 2			.35	.33	8.42***	8.02***
Agreeableness	.19 (.10)	.15				
Extraversion	-.08 (.06)	-.10				
Neuroticism	-.05 (.07)	-.05				
Conscientiousness	-.01 (.09)	-.01				
Openness	.17 (.07)	.16*				
Risk propensity	-.12 (.07)	-.14				
Sensation-seeking	.03 (.06)	.05				
Promotion focus	.10 (.06)	.11				
Prevention focus	.25 (.10)	.21**				
Fatalism	-.27 (.06)	-.29***				
Type A	.06 (.07)	.06				

^a Control variables included location, sex and internship experience.

^b Degrees of freedom for F tests were: Step 1 (3, 179), Step 2 (14, 168).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

contributed to the prediction of general attitudes. Agreeableness ($\beta = .26, p = .001$), prevention focus ($\beta = .18, p = .028$), and fatalism ($\beta = -.27, p = .000$) significantly predicted attitudes concerning what workers should do. These three variables [agreeableness ($\beta = .31, p = .000$), prevention focus ($\beta = .23, p = .002$), and fatalism ($\beta = .33, p = .000$)], in addition to sensation-seeking ($\beta = .20, p = .007$), also significantly predicted attitudes regarding what management should do.

Risk propensity ($\beta = -.20, p = .038$) and Type A personality ($\beta = -.21, p = .016$) significantly contributed to attitudes concerning safety as an expense and interference with productivity. Risk propensity ($\beta = -.31, p = .000$) and fatalism ($\beta = -.30, p = .000$) were significant predictors of attitudes toward compromising safety in favor of production. Finally, openness to experience ($\beta = .16, p = .019$), prevention focus ($\beta = .21, p = .008$), and fatalism ($\beta = -.29, p = .000$) predicted attitudes toward safety discipline.

6. Discussion

This study begins to examine which individual difference variables may be related to safety attitudes, which can be antecedents of safe behavior in the workplace. Several of the variables studied were indeed related to safety attitudes. As hypothesized, agreeableness and conscientiousness were positively related to several of the safety attitudes. Also, consistent with prediction, prevention focus, risk propensity, and fatalism demonstrated significant relationships with many of the safety attitudes. In the multiple regression analyses, all of these variables (except for conscientiousness) demonstrated some ability to predict safety attitudes. Therefore, these seem to be important individual differences to pursue as individual-level root causes of safety attitudes. However, researchers must also keep in mind that situational and experiential factors contribute to safety attitudes (Neal and Griffin, 2004) and these factors should not be ignored in favor of a purely person-centered model of safety attitudes and behavior.

One of the biggest surprises in this study is that extraversion was positively related to safety attitudes, whereas risk propensity and sensation-seeking were negatively or unrelated to attitudes. While risk propensity and sensation-seeking are often viewed as facets of extraversion, in this study extraversion was significantly

correlated with sensation-seeking ($r = .28, p < .01$) but not risk propensity ($r = .12, p > .05$). The Big Five measure included in this study (John et al., 1991) focused on the sociable nature of extraverts more than on their thrill-seeking nature. It may be the case that sociable people are more attuned to safety situations and have more positive attitudes toward safety because they have many social ties and may feel more personally responsible for the well-being of others. Further, a safer workplace might provide more time to socialize and a comfortable environment in which to do so, because there are fewer concerns about looming disasters. This would motivate extraverted individuals to uphold safety standards in order to gain a desired social setting at work. The open environment would also allow for more communication among employees regarding safety issues in the workplace, which could be effective in addressing and correcting potential hazards. Future research should examine this issue more closely, but our results demonstrate the importance of using clearly delineated facets of personality in the prediction of safety attitudes.

6.1. Implications

The most important message from this study is that individual differences are related to safety attitudes. Although this is not particularly surprising, given the history of individual difference-attitude research, few studies have examined occupational safety attitudes in relation to individual differences. Additionally, this study demonstrated that examining individual differences beyond the Big Five, especially those related to the specific domain of interest (McCrae and Costa, 1996), is useful. Here, those individual differences refer to risk and control because the attitudes of interest were about safety.

Our findings suggest the set of individual difference variables examined account for a significant amount of variance in each of the attitudes, especially general safety attitudes and attitudes regarding management's responsibilities, workers' responsibilities, and discipline. Of the individual differences examined, agreeableness, prevention focus, and fatalism appear to play the greatest role in predicting safety attitudes and could be useful in the job selection process if one goal is to reduce workplace accidents. Additionally, it may be the case that having individuals in the workplace

who are dispositionally prone to more positive safety attitudes would result, over time, in a more positive organizational culture regarding safety (Schneider, 1987).

The implications of this information may be particularly important to the reduction of workplace accidents and associated costs. The findings of the current study suggest individuals who are “riskier” in their personalities hold more negative safety attitudes, and previous research suggests individuals with higher levels of these traits tend to engage in more risk taking behaviors and experience more accidents. Unfortunately, safety attitude items are quite transparent and therefore easy to answer in a socially desirable manner. One solution for promoting health and safety behaviors and the prevention of accidents may be to select individuals into the workplace who are lower in the personality traits associated with negative safety attitudes and risky behavior. Anytime human behavior is involved, the possibility of errors and resulting incidents and accidents exists; however, by including personality measures in selection procedures, which many organizations already do, those individuals most likely to hold negative safety attitudes and engage in risky behaviors could be eliminated from the applicant pool, especially in high reliability industries.

6.2. Limitations and directions for future research

Although students served as participants in this study and only a third of the sample had internship experience, it is much more likely that personal traits (as opposed to experiences in the workplace) directly influenced attitudes. This is further demonstrated by the significant differences found between those with internship experience and those with no experience regarding several of the safety attitudes assessed. However, given that this sample may not have real world work experiences influencing their safety attitudes to the same extent as full-time, careered workers, future research should replicate with a career sample in industry to determine if our findings generalize. It would also be interesting to see if safety attitudes change as a function of experience and other environmental influences by measuring safety attitudes prior to entry into the workforce and then reassessing attitudes after some experience is gained.

Additionally, by hypothesizing that stable individual differences are related to safety attitudes, we indirectly posited lifelong developmental processes were involved in the effect of personality traits on safety attitudes. Although this position is consistent with theory and empirical evidence in developmental psychology, it is one that cannot be empirically defended with these data. Future research should examine the effect of personality on safety attitudes in a developmental manner, in which not only individuals' traits but also the situations they encounter are examined. This would provide a more faithful test of McCrae and Costa's (1996) view regarding characteristic adaptations.

Finally, although it is suggested that attitudes toward safety may be one explanatory mechanism in the relationship between individual differences and safety behavior, our study can only address the relationship between individual differences and safety attitudes. Future research should examine the intermediate role safety attitudes may play in the relationship between individual differences and safety behavior.

7. Conclusion

Workplace accidents disable and take the lives of thousands every year. Although safety can be improved through efforts such as better process design, safety also relies on human elements, and safety attitudes are known antecedents of safe behavior (Neal and Griffin, 2004). Results of this study provide support for the

utility of individual differences in predicting safety attitudes; information valuable to both researchers and practitioners concerned with reducing workplace accidents and enhancing organizational safety.

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