A review of commercial products and academic articles associated with the psychological assessment of Safety Attributes within prospective and incumbent employees

October 2010

This review was originally carried out by myself for the Insight Partnership (London, UK Ltd) who were contracted to provide a new safety assessment for a commercial client. Almost 4 years have passed since the review was undertaken. The commercial value/leverage of this review is no longer an issue.

Advanced Projects R&D Ltd.

- Modeling the Utility/Impact of HR interventions over time
- Psychological Test Design, Construction, and Validation
- Person-Target Profile Design, Construction, and Validation

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Contents

1. Commercial Products

1.1 Employee Reliability Inventory

1.1.1 Publisher

Bay State Psychological Associates Inc.
http://www.eri.com/
http://www.eri.com/contents.html

1.1.2 Source Documents

Employee Reliability Inventory - brochure.pdf	45 KB	Adobe Acrobat Document
Employee Reliability Inventory - specimen report.pdf	156 KB	Adobe Acrobat Document
Employee Reliability Inventory - User Manual.pdf	192 KB	Adobe Acrobat Document
Employee Reliability Inventory- Validity References.pdf	22 KB	Adobe Acrobat Document
ERI - Summary_ Features Of.pdf	118 KB	Adobe Acrobat Document
The Rogers Group 2006 ERI Sample Safety Report.pdf	43 KB	Adobe Acrobat Document

1.1.3 Test Details

Administration Format: Questionnaire, phone, web, standalone PC, paper and pencil.
No. of Items: 81
Duration: 12-20 minutes
Scoring: Normative percentiles (60,000+ norm-base), multiple scores. No index score.
Attributes Assessed: 7

Freedom from Disrupted Job Performance (A)

The applicant's performance and productivity will not be disrupted by Behaviours such as inattentiveness, unauthorized absence/lateness, failing to follow through on assignments, or other inappropriate work Behaviours.

Courtesy (C)

The applicant's interactions with customers/guests will be characterized by a high level of courtesy and commitment to service.

Emotional Maturity (E)

The applicant's performance and productivity will not be disrupted due to the presence of maladaptive personality traits, such as irresponsibility, difficulty in working cooperatively with others, poor judgement, or poor impulse control, etc.

Conscientiousness (F)

The applicant will perform on the job in a productive and conscientious manner, and will not be fired in the first 30 days of employment.

Trustworthiness (H)

The applicant will perform on the job in a trustworthy manner.

Long Term Job Commitment (Q)

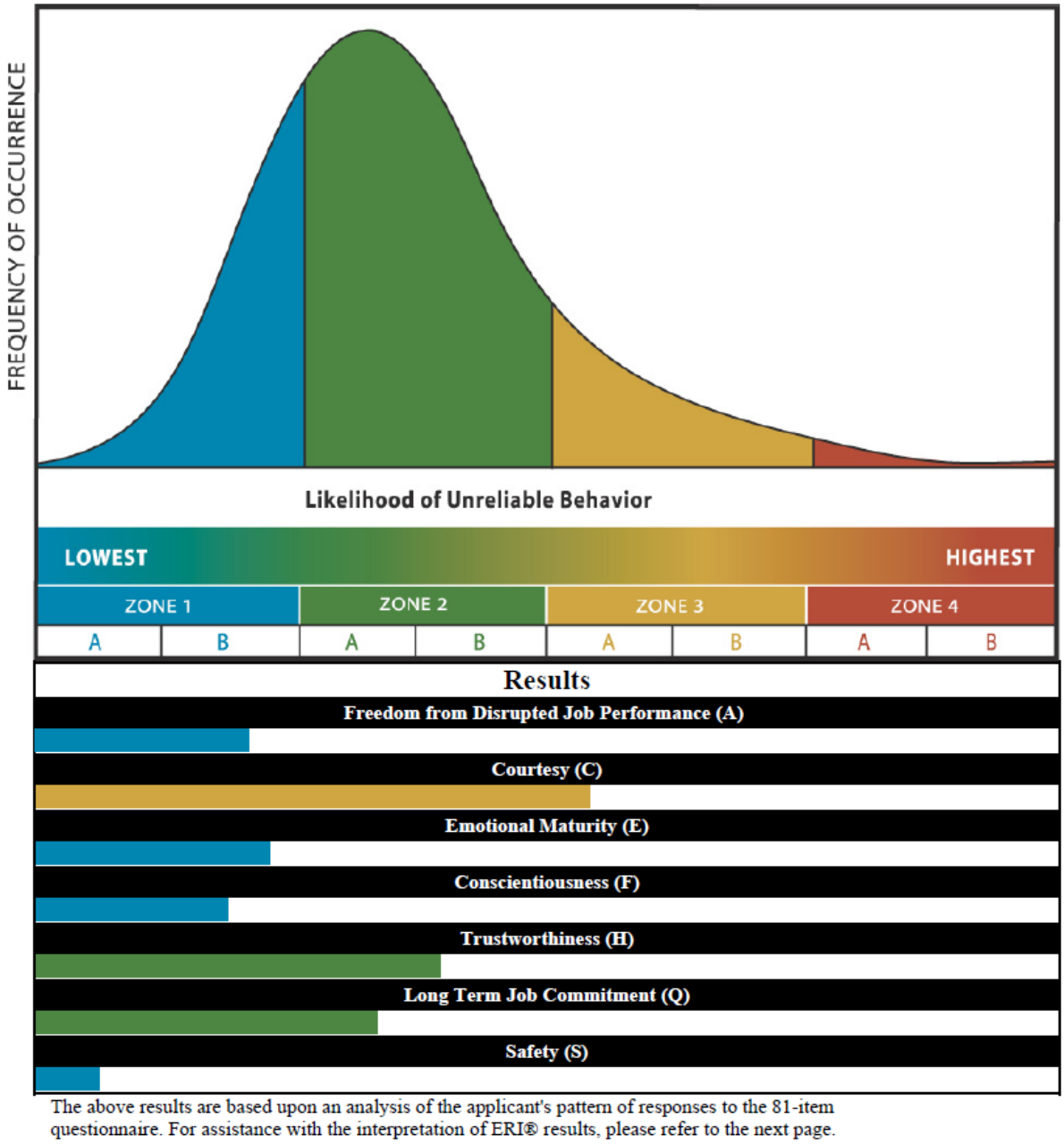
The applicant will show a long term commitment to the job and will not quit within the first 30 days of employment.

Safety (S)

The applicant will perform on the job in a safe manner, and will not have a significant on-the-job accident in the first 4 months of employment.

1.1.4 Results Format

3-page report, headed by graphic.



1.1.5 Predictive Validity Evidence

http://www.eri.com/credentials.html

http://www.eri.com/docs/validity.html

The test manual details some small-sample studies. Other validity evidence is presented in research articles.

1.2 Hogan Safe System

1.2.1 Publisher

Hogan Assessment Systems Inc.
http://www.hoganassessments.com/

1.2.2 Source Documents

Hogan Personality-Model-Safety.pdf	1,878 KB	Adobe Acrobat Document
Hogan Safer Climate White Paper May 2010_0.pdf	30 KB	Adobe Acrobat Document
Hogan SafeSystem_Safety_Specimen Report.pdf	189 KB	Adobe Acrobat Document
Hogan Safety inTransportation & Manufacturing.pdf	1,966 KB	Adobe Acrobat Document
Hogan Safety_ROI_PRINT_7 29_Final_0.pdf	1,984 KB	Adobe Acrobat Document
Hogan Safety-in-Health.pdf	2,109 KB	Adobe Acrobat Document
Hogan SS_Behavior_Whitepaper.pdf	1,181 KB	Adobe Acrobat Document
Hogan_How to Improve Safety-Climate.pdf	738 KB	Adobe Acrobat Document
Hogan_Rethinking-Employee-Safety-Training.pdf	600 KB	Adobe Acrobat Document
Hogan_Safety_Overview_PRINT_8_16_10.pdf	551 KB	Adobe Acrobat Document
Hogan_SS_eBrochure_6.28.pdf	2,109 KB	Adobe Acrobat Document

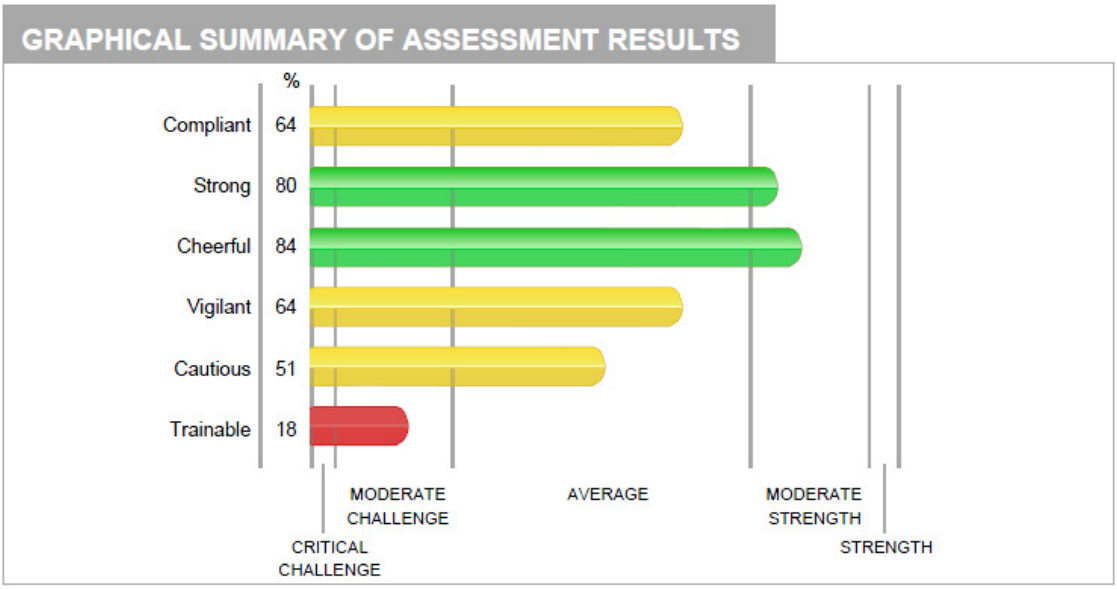
1.2.3 Test Details

Administration Format: Questionnaire, web-only.
No. of Items: 206 (HPI)
Duration: 15-30 minutes
Scoring: Normative percentiles (156,000+ norm-base), multiple scores, risk index score.
Attributes Assessed: 6
Defiant - Compliant: This component concerns a person's willingness to follow rules. Low scorers may ignore rules; high scorers follow them effortlessly.
Panicky - Strong: This component concerns handling stress. Low scorers are stress prone, may panic under pressure and make mistakes; high scorers typically remain steady.
Irritable – Cheerful: This component concerns anger management. Low scorers may lose their temper easily and make mistakes; high scorers control their temper.
Distractible - Vigilant: This component concerns focus. Low scorers tend to be easily distracted and may make mistakes; high scorers remain focused.
Reckless - Cautious: This component concerns risk-taking. Low scorers tend to take unnecessary risks; high scores avoid risky actions.
Arrogant - Trainable: This component concerns trainability. Low scorers tend to ignore training and feedback; high scorers pay attention to training.

1.2.4 Results Format

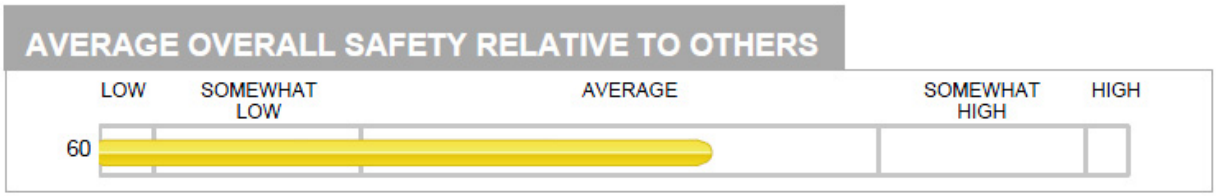
6-page report, 4 sections:
Section I: The first section defines the six components of safety-related Behaviour and then provides a graphic summary of the candidate's assessment results across those six components.
Section II: The second section is an optional reporting feature that can be selected by the user. It provides an overall safety score for the candidate, based on the graphic summary from Section I.
Section III: The third section is an optional reporting feature that can be selected by the user. It provides developmental, training, and coaching recommendations for the candidate, based on any scores in Section I that are noted as moderate or critical challenges.
Section IV: The fourth section is an optional reporting feature that can be selected by the user. It concerns the candidates' overall desirability as an employee, which is defined in terms of three broad components of

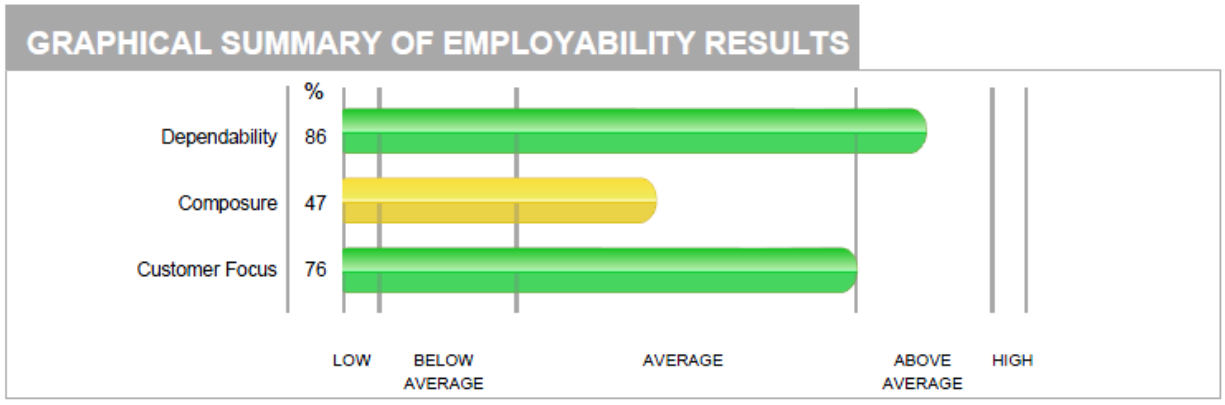
performance. The report then provides a graphic summary of the candidate's overall desirability. This section is often useful because a person may be a safe worker but a bad fit for some jobs. For example, many safe workers are unable or unwilling to provide good customer service.



SECTION II - AVERAGE OVERALL SAFETY SCORE

The Average Overall Safety score is an average of the six safety scales presented above.





1.2.5 Predictive Validity Evidence

The Hogan Safety Outcome (ROI) Highlights report provides brief summary details of 8 studies which show a decrease in undesirable safety-related incidents/ratings after introduction of the Hogan Safety Report System. In addition, a Transportation-Manufacturing report includes another case-study.

1.3 Personnel Reaction Blank

1.3.1 Publisher

IPAT Inc.

http://www.ipat.com/assessment_tools/tests_and_reports/Pages/personnel_reaction_blank.aspx

Niche Consulting

www.nicheconsulting.co.nz/psychometric_assessment/assessment_tools/safety_assessment.htm

1.3.2 Source Documents

Buros PRB Test Review.pdf	165 KB	Adobe Acrobat Document
IPAT – Personnel Reaction Blank webpage.pdf	62 KB	Adobe Acrobat Document
IPAT_Personnel_Reaction_Blank_Sample_Report.pdf	26 KB	Adobe Acrobat Document
Niche Consulting newsletter predicting safety.pdf	323 KB	Adobe Acrobat Document
Niche Consulting Safety Assessments & Tests webpage.pdf	203 KB	Adobe Acrobat Document
Niche PRB instructions-details.pdf	75 KB	Adobe Acrobat Document

1.3.3 Test Details

Administration Format: Questionnaire, paper and pencil, web.

No. of Items: 90 (42 scored)

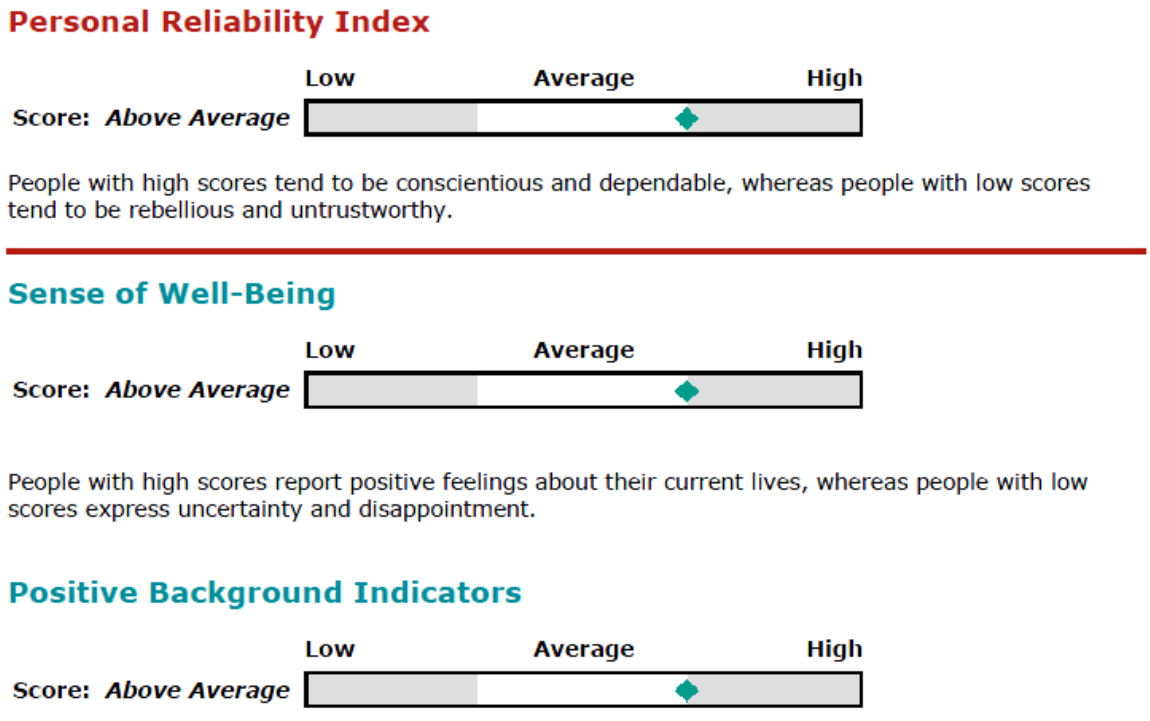
Duration: 10-15 minutes

Scoring: Low, Average, High designation, no norms, multiple scores, personal reliability index score.

Attributes Assessed: 4 + Single Overall Index score … See the Report section 1.3.4 below …

1.3.4 Results Format

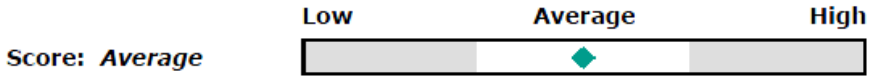
4-page report:



Compliance with Rules and Routines

People with high scores describe themselves as rule-abiding and disciplined, whereas people with low scores report more rule-breaking and unrestricted behaviors.

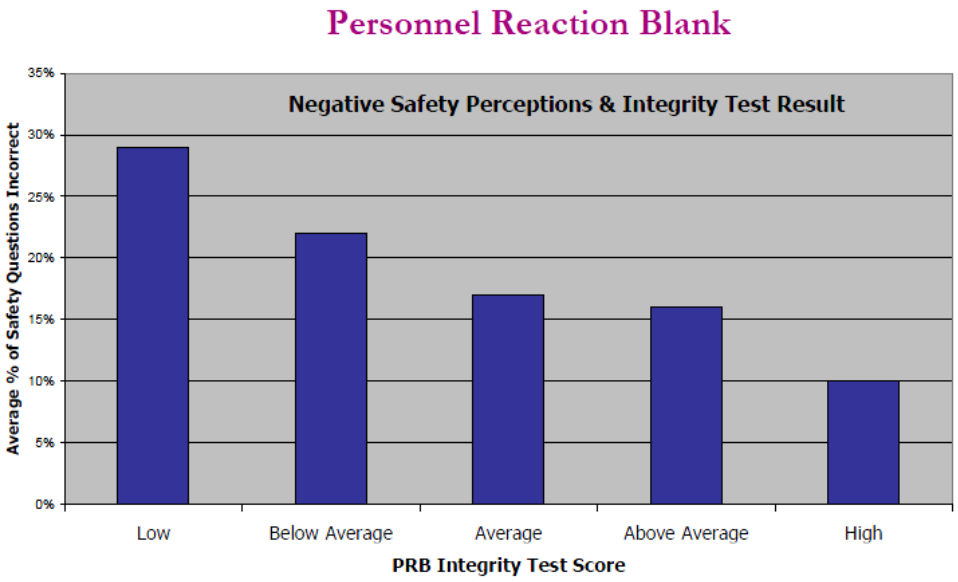
Conventional Occupational Preferences



People with high scores report liking conventional occupations offering advancement opportunities and involving little risk or danger, whereas people with low scores report liking occupations that offer little opportunity for advancement and involve higher risk or danger.

1.3.5 Predictive Validity Evidence

Claims are made about the existence of research publications reporting the PRB as a predictor of both job performance and counter-productive Behaviours. Niche consulting, in their newsletter entitled "Predicting Safety", provide the following graph (100+ supervisors):



"We found that supervisors with Low integrity test scores were almost **3** TIMES more likely to have negative perceptions and attitudes about safety than those with High scores, and almost **2** TIMES more likely than those with Average to High Scores."

1.4 Onetest Work Safety Assessment (OWSA)

1.4.1 Publisher

Onetest Pty Ltd.
http://www.onetest.com.au/home/AssessmentManagementSystem/WorkSafety.aspx

1.4.2 Source Documents

Onetest safety brochure.pdf	389 KB	Adobe Acrobat Document
Onetest whitepaper safety.pdf	224 KB	Adobe Acrobat Document

1.4.3 Test Details

Administration Format: Questionnaire, web only.
No. of Items: unknown.
Duration: 10 minutes
Scoring: 5 scales, an overall risk index score.
Attributes Assessed:

Safety control

measures the extent to which an individual takes responsibility for their own safety in the workplace. People with poor scores on safety control tend to attribute accidents and injuries to fate, luck or chance, rather than their own behaviour.

Risk Aversion

assesses the extent to which an individual seeks out thrills or excitement through taking risks at work.

Stress Management

measures the capacity of an individual to manage stress. People who are unable to manage stress are likely to be distracted by stressors at work, and are also likely to be more fatigued at work.

Drug Aversion

assesses attitudes towards the use of legal and illegal drugs which may pose a safety threat.

Attitudes Towards Violence

examines the likelihood that an individual will react violently within the workplace, placing themselves and others at risk.

OWSA has an inbuilt 'faking detector', which identifies whether a candidate is trying to present themselves in a more positive light.

1.4.4 Results Format

no report available

1.4.5 Predictive Validity Evidence

Claims:

- Reduce lost time injuries by **80%**
- Lower workers' compensation costs by **70%**
- Reduce sick days by **35%**
- Reduce risk of personal liability for directors and senior managers

5 cases-studies available for download from website. The Assessment Flyer contains some other summary validity reporting.

1.5 Orion Pre-Employment System PE3-SAFE

1.5.1 Publisher

Orion Systems Inc
http://www.orionsystem.com/
http://www.orionsystem.com/survey.htm

1.5.2 Source Documents

Orion Safe-System Sample_Profile_PE-3SAFE.pdf	24 KB	Adobe Acrobat Document
Orion Systems webpage.pdf	154 KB	Adobe Acrobat Document

1.5.3 Test Details

Administration Format: Questionnaire, web, paper and pencil.
No. of Items: unknown.
Duration: unknown
Scoring: 6 scales, qualitative ordered magnitude, no overall index.

Attributes Assessed:	Qualifier description
Supervisory Attitudes	*Average*
Work Attitudes	*Above Average*
Workplace Drug Use Attitudes	*Low Risk*
Workplace Theft Attitudes	*Low Risk*
Prospects for Long-Term Employment	*Above Average*
Safety and Risk Avoidance	*Counsel Level One*

Validity Index *e.g.*

VALIDITY INDEX: LEVEL 1 - Low Risk
The subject does not appear to be attempting to alter the results of the survey.

1.5.4 Results Format

1 page report. Text only.

1.5.5 Predictive Validity Evidence

None provided but the claim is made "All system development and validation procedures are based upon, and subscribe to, the guidelines and procedures of the American psychological Association and the Federal Uniform Guidelines of Employee Selection Procedures." and "Orion assessments are non-threatening and informative. And the results are valid, reliable, and accurate"

1.6 Situational Safety Awareness Test

1.6.1 Publisher

Psyfactors Pty Ltd
http://www.psyfactors.com/
http://www.psyfactors.com/rai.html

The Rogers Group
http://www.rogersgroup.com.au/index.htm

Prospect Consulting
http://www.prospectconsulting.com.au/

1.6.2 Source Documents

Prospect - Situational Safety Awareness Brochure.pdf	129 KB	Adobe Acrobat Document
Psyfactors - Situational Safety Awareness assessment - web-page.pdf	115 KB	Adobe Acrobat Document
Rogers Group - SSA details - Employee Safety Testing webpage.pdf	110 KB	Adobe Acrobat Document

1.6.3 Test Details

Administration Format: Questionnaire, unknown.
No. of Items: SSA = 104 questions, short form = 65
Duration: SSA = 30 minutes, Short form = 10 minutes.
Scoring: SSA = 10 scales, Short form = 5 scales, norm-based scoring, one overall index score.
Attributes Assessed:

Personal Status:

Coping Skills

Safety Attitudes:

Risk avoidance
Safety control
Safety diligence
Team safety orientation

Safety Competency:

Hazard awareness
Mental alertness
Safety habits
Perception and comprehension
Safety self-awareness

1.6.4 Results Format

No information available

1.6.5 Predictive Validity Evidence

None provided.

1.7 Work Safety Assessment

1.7.1 Publisher

Psych Press

http://psychpress.com.au/psychometric/talent-psychometric-testing.asp?work-safety

1.7.2 Source Documents

Psych Press safety report.pdf	211 KB	Adobe Acrobat Document
Psych Press Safety Web-page.pdf	175 KB	Adobe Acrobat Document
Psych Press work safety brochure.pdf	94 KB	Adobe Acrobat Document

1.7.3 Test Details

Administration Format: Questionnaire, web only.

No. of Items: unknown.

Duration: 5-10 minutes.

Scoring: 4 scales, percentiles plus 5 ordered class labels from "Poor" to "Superior"; overall risk score.

Attributes Assessed:

Accountability

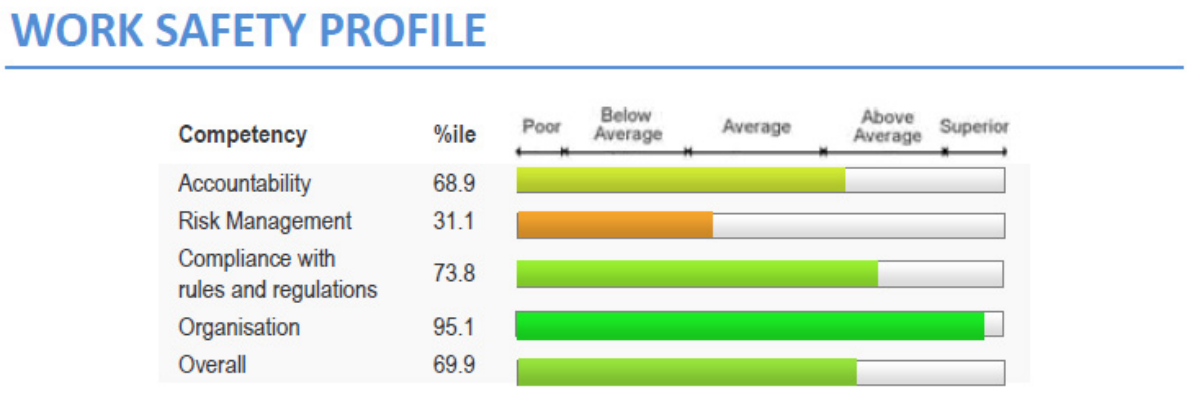
Risk Management

Compliance with rules and regulations

Organisation

1.7.4 Results Format

4 page report. Text with a single bar-graphic.



1.7.5 Predictive Validity Evidence

None provided but the claim is made "The Work Safety Questionnaire was developed and normed on employees in a variety of industries and businesses, and has been validated using specific client company industries as part of its implementation. Statistical analyses conducted on the Work Safety Questionnaire utilizing internal objective work safety data have found the instrument to have high internal consistency and validity. "

1.8 Risk-Type Compass

1.8.1 Publisher

Psychological Consultancy Ltd (PCL)
http://www.psychological-consultancy.com/

1.8.2 Source Documents

Rick Compass - HR Magazine article - 13-Sep-2010.pdf	98 KB	Adobe Acrobat Document
Rick Compass - Personality and Risk Tolerance paper.pdf	1,056 KB	Adobe Acrobat Document
Rick Compass - The Tour Presentation.pdf	3,524 KB	Adobe Acrobat Document
Risk Compass - comments.jpg	265 KB	IrfanView JPG File
Risk Compass - Recruiter Magazine -11-Oct-2010 Article.pdf	90 KB	Adobe Acrobat Document
Risk Compass - webpage.pdf	419 KB	Adobe Acrobat Document
Risk Compass Brochure.pdf	1,997 KB	Adobe Acrobat Document
Risk Compass specimen report.pdf	2,068 KB	Adobe Acrobat Document

1.8.3 Test Details

Administration Format: Questionnaire, web only.
No. of Items: 102
Duration: 10-15 minutes.
Scoring: Assignment to one of 8 risk-types, situational specificity/attitude variation across 5 risk domains, and a final overall rating of Risk Tolerance. Uses absolute scores (not normative).

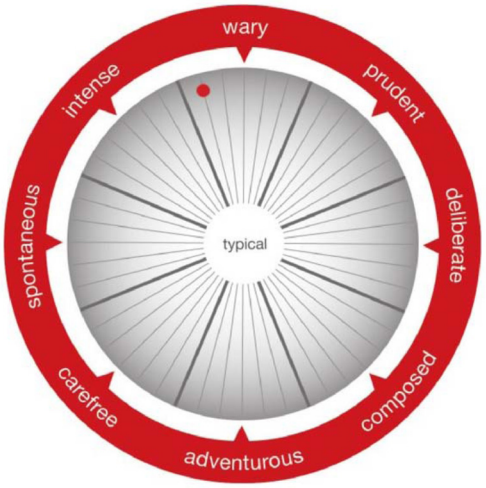
Risk Types:
Spontaneous - Impulsive and excitable, they enjoy the spontaneity of unplanned decisions.
Intense - Anxious, alert to any risk and fearful of any threat to their precarious equilibrium. Passionate and self-critical by nature, they take it personally when things don't work out.
Wary - Self-disciplined and cautious about risk, they are organised but unadventurous and they put security at the top of their agenda.
Prudent -Very self-controlled and detailed in their planning, a strong preference for tradition and the familiar.
Deliberate - Self-confident, systematic and compliant, they experience little anxiety and tackle risk and uncertainty in a business-like and unemotional way.
Composed - Cool headed, calm and unemotional, but at the extreme may seem almost oblivious to risk and unaware of its effect on others.
Adventurous - Impulsive and fearless. They combine a deeply constitutional calmness with impulsivity and a willingness to challenge
traditional approaches.
Carefree - Impulsive and unconventional, not good at careful preparation, they often seem vague about their intentions. Their impatience and impulsiveness can lead to hasty and imprudent
decisions.
Individuals who show none of the extremes that characterise the risk types are categorised as 'Typical' - not exceptionally prudent or unusually reckless, nor particularly emotional or extremely calm.

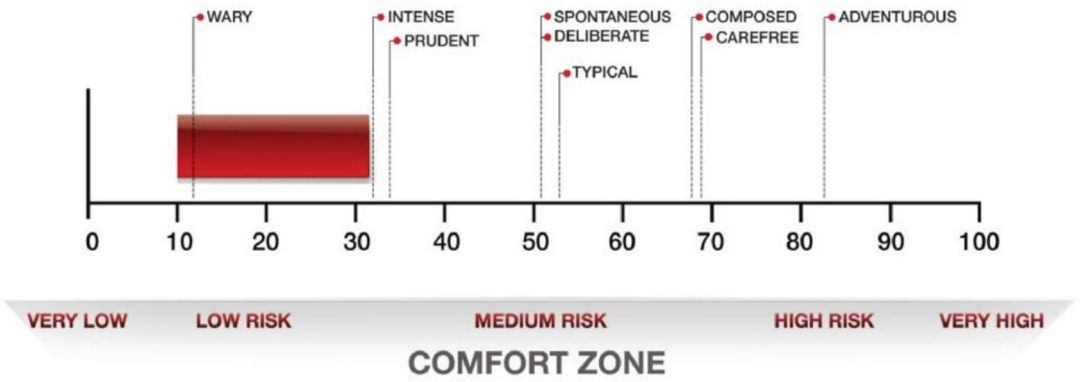
The Five Risk Attitudes
Financial , Health and Safety, Recreational, Social, Ethical

The Overall Risk Index "Comfort Zone" varies between Very Low to Very High

1.8.4 Results Format

8 page 'personal' report. Text with a single several graphics:





Summary for Simon Sample	
Risk Type:	Wary
Attitude Variation:	High
RTi:	21
Comfort Zone:	Low Risk

1.8.5 Predictive Validity Evidence

None provided but the claim is made "the Risk-Type compass is, in effect, a distillation of all the aspects of personality that have implications for risk taking. It was inspired in part by our review of previous research which indicates that assessment of risk tolerance based on personality is superior to assessments based solely on attitude. See, for example (Nicholson, Soane, Fenton-O'Creevy and Willman - 2005) . We scanned the personality research for any item themes that might impact on risk taking and wrote items for each. Factor analysis identified four factors which we adopted as the N, S, E & W of risk taking ('pure' types), the quarter points of the compass being combinations of these ('complex' types). The content of the final scales blends themes from 4 of the 5 factors of personality. The most influential scale being Adjustment/ Neuroticism, bearing in mind that only the risk related themes that are represented."

1.9 Health and Safety Indicator 2009

1.9.1 Publisher

Psytech International Ltd.
http://www.psytech.com/
http://www.psytech.com/assessments-HSI.php

1.9.2 Source Documents

Psytech Health and Safety Indicator - Manual.pdf	262 KB	Adobe Acrobat Document
Psytech Health and Safety Report.pdf	81 KB	Adobe Acrobat Document
Psytech International - Health and Safety Indicator - web-page.pdf	116 KB	Adobe Acrobat Document

1.9.3 Test Details

Administration Format: Questionnaire, web, LAN, standalone PC, paper and pencil.
No. of Items: unknown.
Duration: 35-40 minutes.
Scoring: 3 Ability scales, 6 personality scales, overall safety index. Normative scoring, stens.

Attributes Assessed:

Ability:

- Understanding Instructions
- Checking and Attention to Detail
- Understanding the Safety Environment

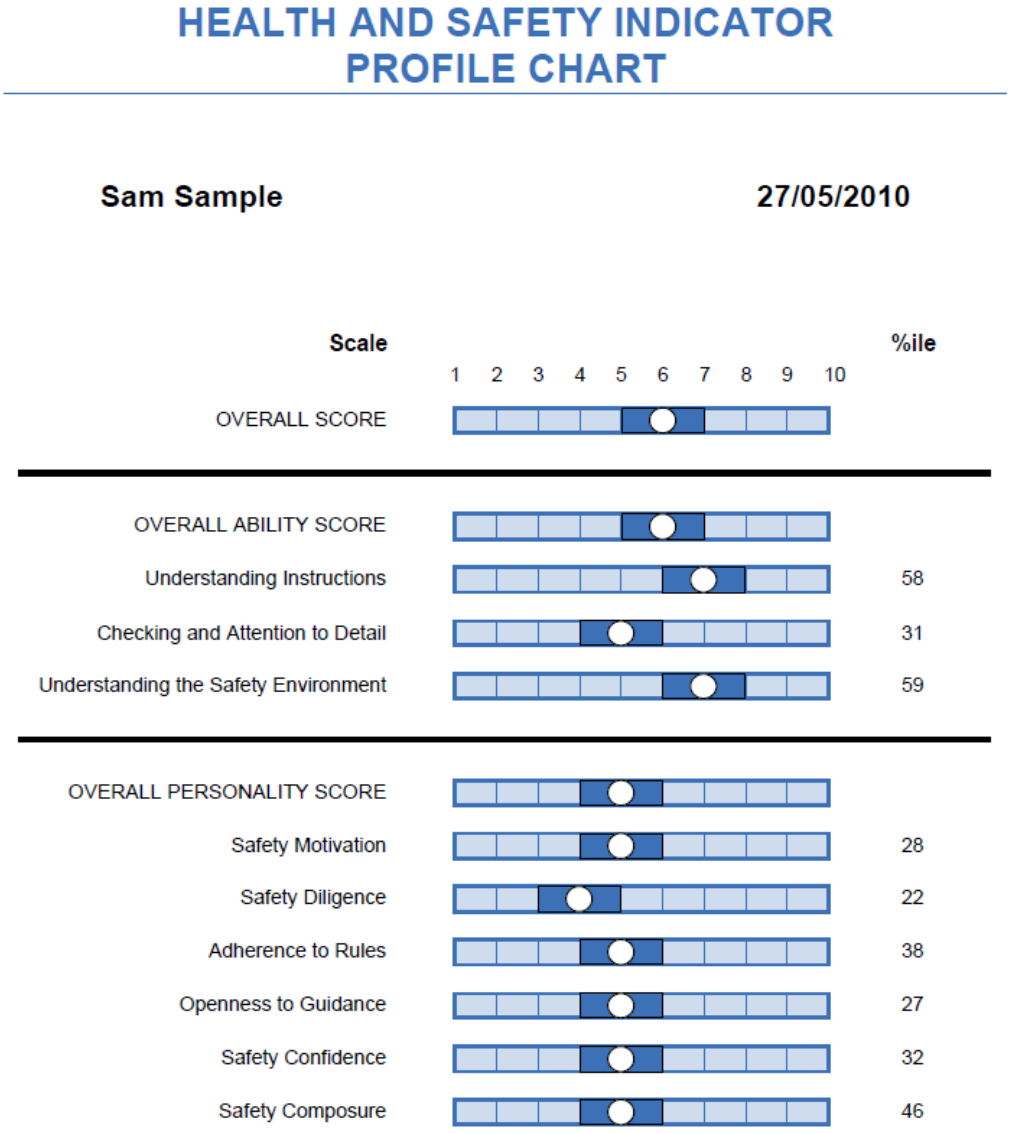
Personality:

- Safety Motivation
- Safety Diligence
- Adherence to Rules
- Openness to Guidance
- Safety Confidence
- Safety Composure

Also includes a Response-Style Indicator for *Faking Good* and *Faking Bad*.

1.9.4 Results Format

14 page report. Text with single bar-graphics.



1.9.5 Predictive Validity Evidence

None provided.

1.10 Work Attitude Inventory (WAI)

1.10.1 Publisher

Psytech International Ltd.

http://www.psytech.com/

http://www.psytech.com/assessments-WAI.php

1.10.2 Source Documents

Psytech Work Attitude Inventory - web-page.pdf	104 KB	Adobe Acrobat Document
Psytech Work Attitude Inventory manual.pdf	134 KB	Adobe Acrobat Document
Psytech Work Attitude Inventory Report - 2009.pdf	1,400 KB	Adobe Acrobat Document

1.10.3 Test Details

Administration Format: Questionnaire, web, LAN, standalone PC, paper and pencil.

No. of Items: unknown.

Duration: unknown.

Scoring: 1 scale is scored, Integrity. Norm-based scoring using stens.

Attributes Assessed:

Integrity:

Five other distractor scales are reported upon; these form the balanced (for social desirability) contrast items for the ipsative quadruplets used to assess integrity:

Meticulousness

Perseverance

Industriousness

Agreeableness

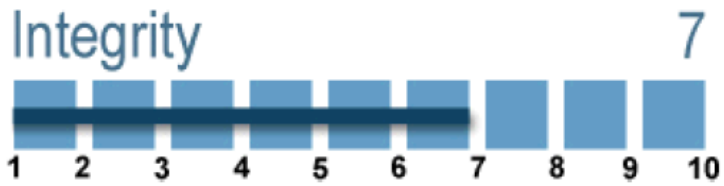
Stress Tolerance

1.10.4 Results Format

6 page report. Text with single bar-graphics.

INTEGRITY RATING

The WAI has been designed to identify applicants who are less prone to be involved in counter-productive incidents and have a higher degree of work ethic and integrity than others. It is a pre-employment questionnaire examining an applicant's attitudes towards integrity and workplace counter-productive behaviour. The applicant's responses to the survey are used as an indicator of their attitudes and behaviour concerning various work based transgressions and company policy infringements.



1.10.5 Predictive Validity Evidence

Very little. A couple of small (n < 100) studies indicate that self-report rule compliance is associated negatively with the Integrity score.

1.11 RMP Safety Inventory

1.11.1 Publisher

RightPeople
http://rightpeople.com.au/
http://rightpeople.com.au/rmp-safe-working-attitudes-and-behaviour-protocol.html

1.11.2 Source Documents

Home Page _ Rightpeople.pdf	174 KB	Adobe Acrobat Document
RMP Safe Working Attitudes webpage.pdf	93 KB	Adobe Acrobat Document

1.11.3 Test Details

Administration Format: Questionnaire, no details.
No. of Items: unknown.
Duration: unknown.
Scoring: 6 scales scored - no other details.

Attributes Assessed:
Safety Attitudes: People who score high on this scale believe that they are generally 'lucky' and tend to treat safety rules in regulations in contempt. These individuals believe that adhering to standard safety procedures has little effect on accident prevention.

Safety Behaviour: People who score high on this scale admit to behaving in an unsafe manner and being 'risk takers'. Items from this scale examine track record for following safety rules and regulations. As past behaviour is often a good predictor of future behaviour this scale help identify at risk individuals.

Safety Perception: This scale aims to identify employee perception about the level of adherence to safety practices within their current place of work. People who score high on this scale report that they believe that safety regulations are loosely followed at their place of work. They may also have a propensity to be pressured by the group in ignoring proper procedures.

Poor Impulse Control: People who score high on this scale are described as aggressive and easily moved to anger. Aggression is often associated with driving accidents and unsafe practices due to intolerance and impatience.

N - Stress Tolerance: People who score high on this scale are described as, anxious and are likely to panic in emergency situations. People with low scores are described as calm and even-tempered.

Conscientiousness: The major aspects of the Conscientiousness factor include, scrupulousness, and responsibility. People who score high on this trait are described as careful, and thorough. Individuals who score low tend to be careless, inefficient, and undependable.

1.11.4 Results Format

No details

1.11.5 Predictive Validity Evidence

No details.

1.12 Dependability and Safety Instrument (DSI)

1.12.1 Publisher

SHL plc

www.shl.com/WhatWeDo/PersonalityAssessment/Pages/DependabilitySafetyInstrument.aspx

1.12.2 Source Documents

SHL - DSI -Improving Workplace Safety webpage.pdf	159 KB	Adobe Acrobat Document
SHL - DSI -more webpage info.pdf	94 KB	Adobe Acrobat Document
SHL Dependability DSI and Vodafone - validity report.pdf	158 KB	Adobe Acrobat Document
SHL DSI and Qantas apprentice engineers.pdf	414 KB	Adobe Acrobat Document
SHL DSI Question format-examples and report.pdf	567 KB	Adobe Acrobat Document

1.12.3 Test Details

Administration Format: Questionnaire, web.

No. of Items: unknown.

Duration: 7 minutes.

Scoring: a single risk category (5 such categories, Low to Very High).

Attributes Assessed:

none.

1.12.4 Results Format

4 page report … simple index plus description of category thresholds.

Result

Name: **Sample Candidate**
Language: **US English**

Risk Scale

Low Risk	Moderate to Low Risk	Moderate Risk	High Risk	Very High Risk
				**

The likely impact of a DSI score in the **very high risk** band is a **very weak fit** to:

- jobs in general that require step-by-step procedures to be followed, reliance on team working, and where adherence to strict work hours and breaks is important
- customer-facing roles where considerable attention to the detail of customer needs and dealing with customer complaints are crucial
- safety-critical roles where safety procedures need to be followed strictly and where focusing on routine tasks for long periods of time is critical

1.12.5 Predictive Validity Evidence

Summary case-study data downloadable from the website.

1.13 Safety Attitude Survey

1.13.1 Publisher

Synergy Safety Systems
http://www.synergysafety.com.au/
http://www.synergysafety.com.au/what-we-offer/safety-attitude-survey-selection.html

1.13.2 Source Documents

Synergy SASCulturev2.pdf	1,378 KB	Adobe Acrobat Document
Synergy SASRecruitment3_1.pdf	1,094 KB	Adobe Acrobat Document
Synergy SuperBusinessv2.pdf	881 KB	Adobe Acrobat Document
Synergy who are we brochure.pdf	1,502 KB	Adobe Acrobat Document

1.13.3 Test Details

Administration Format: Questionnaire, web, paper and pencil.
No. of Items: unknown.
Duration: unknown.
Scoring: 3 major scale groups (10 factors) plus an overall Safety Attitude score.

Two versions of the test exist:

SAS for Workers
SAS for Supervisors (targeted at being a safety leader)

Attributes Assessed:

Attitudes and Perceptions:

- Pressure for Production
- Personal Commitment
- Management Commitment to Safety
- Attitudes to Rules and Regulation
- Incident Reporting
- Peer influence

Personality and Dispositions:

- Safety Locus of Control
- Risk Taking
- Impulse Control

Factors in Job and Workplace:

- Work/Job Items (satisfaction with safety measures, supervisor competency)

1.13.4 Results Format

1 profile page.

1.13.5 Predictive Validity Evidence

The following claims are made:

VALIDATION

SAS-Recruitment is grounded in and informed by strong evidence based research. The SAS is implicitly valid because it contains questions that directly tap into those 'risk' factors evidenced by the research to predict incidents and injury in the workplace.

The statistical analysis demonstrates that the SAS is a robust and valid measure of safety attitudes and predicts incidents and injury in the workplace. For those with a background in statistical analysis :

The SAS – Recruitment has a robust factor structure with strong internal consistency of .92. This means that the 10 factors are related to each other and capture the same characteristic: an individual's attitudes and perceptions towards safety in the workplace.

The SAS – Recruitment is related to incidents and injury in the workplace with a correlation of .34. A correlation of .34 is the industry standard for personality and attitudinal assessments and their ability to predict behavioural outcomes.

No details are provided.

1.14 Employee Safety Inventory (ESI, was ARM-Q)

1.14.1 Publisher

Vangent (Pearson) Inc. via Creative Organizational Design (Canada)
http://www.vangent-hcm.com/Solutions/SelectionAssessments/IndustrySpecificAssessments/
http://www.creativeorgdesign.com/tests_page.htm?id=97&title=Employee_Safety_Inventory_%28ESI%29_&_Employee_Safety_Inventory-Quality_%28ESI-Q%29

1.14.2 Source Documents

Predictive validity of ARM-Q.pdf	56 KB	Adobe Acrobat Document
Vangent_Employee Safety Inventory and ESI-Q webpage.pdf	60 KB	Adobe Acrobat Document
Vangent_ESI-1 Brochure.pdf	117 KB	Adobe Acrobat Document

1.14.3 Test Details

Administration Format: Questionnaire, no details.
No. of Items: 105.
Duration: 45 minutes.
Scoring: 6 scales scored - no other details.

Attributes Assessed:
Driver Attitudes: Measures the extent to which an individual is likely to drive safely
Risk Avoidance: Assesses the extent to which a respondent is likely to engage in high-risk, dangerous, and thrill-seeking Behaviour
Safety Control: Measures the extent to which an individual takes responsibility for maintaining a safe work environment
Stress Tolerance: Assesses the extent to which a person copes with stress
Quality Attitudes Supplement: Assesses an individual's propensity for delivering exemplary, error-free performance
Validity/Accuracy: Reflects the degree to which the person assessed understood and carefully completed the inventory
Validity/Candidness: Indicates the extent to which an individual responded to the inventory in a socially desirable manner

1.14.4 Results Format

No details

1.14.5 Predictive Validity Evidence

No details. The CreativeOrgDesign website states: "We're happy to provide sample questions, reports, validity, and pricing details upon request."

1.15 Personnel Selection Inventory (PSI)

1.15.1 Publisher

Vangent (Pearson) Inc.
http://www.vangent-hcm.com/Solutions/SelectionAssessments/GeneralAssessments1/PSI/
see also the API brochure and web-page at:
http://www.vangent-hcm.com/Solutions/SelectionAssessments/GeneralAssessments1/ApplicantPotentialInventory/

1.15.2 Source Documents

Vangent - Personnel Selection Inventory - web-page.pdf	76 KB	Adobe Acrobat Document
Vangent_Applicant Potential Inventory Brochure.pdf	98 KB	Adobe Acrobat Document
Vangent_PSI2 Brochure.pdf	92 KB	Adobe Acrobat Document

1.15.3 Test Details

Administration Format: Questionnaire, web, paper and pencil.
No. of Items: 64-144 (version dependent - no other information)
Duration: 15-70 minutes (version dependent)
Scoring: 18 scales, normative scoring, no other details.

Attributes Assessed:
Honesty - The likelihood that an applicant will not steal cash and merchandise from work.
Drug Avoidance - The likelihood that an applicant will not use or sell illicit drugs on the job.
Tenure - The likelihood that an applicant will not leave the organization prematurely.
Nonviolence - The likelihood that an applicant is not prone to violent or argumentative Behaviour that could adversely impact customers and coworkers.
Employee/Customer Relations - An applicant's tendencies for being courteous and cooperative with customers and coworkers.
Customer Service Attitude - An applicant's tendencies to be courteous, cooperative, friendly, and attentive toward customers.
Customer Service Aptitude - An applicant's understanding of effective practices in dealing with customers in a variety of situations.
Sales Aptitude - An applicant's drive and sales technique as well as sales interest and sense of responsibility for personal sales performance.
Stress Tolerance - An applicant's ongoing experience with stress and the ability to tolerate stress.
Risk Avoidance - An applicant's tendencies to engage in high-risk, dangerous, and thrill-seeking Behaviour.
Safety - An applicant's attitudes toward safety that may cause or prevent on-the-job accidents.
Supervision Attitudes - The likelihood that an applicant will do the work assigned and respond appropriately to supervision.
Work Values - An applicant's attitude toward work and productive on-the-job habits.
Responsibility - The likelihood that an applicant will not engage in counter-productive, careless, or irresponsible Behaviour in the workplace.
Productivity - The likelihood that an applicant has the potential to perform well on the job and become a productive member of your organization.
Math - Basic arithmetic ability as it relates to totaling orders, counting change, and figuring discounts.
Candidness - The extent to which an applicant is trying to present socially desirable responses instead of actual attitudes and opinions.
Accuracy - The degree to which an applicant understood and carefully completed the assessment.

1.15.4 Results Format

No details

1.15.5 Predictive Validity Evidence

No details. The Vangent website states: "The PSI assessment series is supported by over 100 validation studies - all of which are available upon request."

2. Academic Research

2.1 Hofmann, D.A., Stetzer, A. (1996). *A cross-level investigation of factors influencing unsafe Behaviours and accidents*. Personnel Psychology, 49, 307-339.

A cross-level investigation of factors Hofmann 1996.pdf 1,933 KB

2.1.1 Abstract

Several recent reviews of industrial accidents have given increased attention to the role of organizational factors as antecedents to the accident sequence. In the current study, three group-level factors (i.e., group process, safety climate, and intentions to approach other team members engaged in unsafe acts) and one individual-level factor (i.e., perceptions of role overload) were hypothesized to influence the frequency of reported unsafe Behaviours using a cross-level research strategy. Data were collected from 21 teams and 222 individuals in a Midwestern chemical processing plant. Both the individual and group-level variables were significantly associated with unsafe Behaviours, thereby supporting the cross-level hypotheses. There was also initial evidence suggesting that the group process-unsafe Behaviour relationship was mediated by intentions to approach other team members engaged in unsafe acts. At the team level of analysis, safety climate and unsafe Behaviours were significantly associated with actual accidents. Group process and approach intentions were marginally related to actual accidents ($p < .10$). The implications for a cross-level approach to safety and interventions is discussed.

2.1.2 Predictors

Perceptions of Role Overload

Perceptions of Work-Group Process

Perceptions of Safety Climate

Approach Intentions (likelihood of someone approaching a team member engaged in unsafe Behaviour)

2.1.3 Criteria Predicted

Self-Report 29 Unsafe Behaviours

e.g. Leaving a shovel on the floor, not wearing a hard hat in a hard hat area, using a tool to prop a door open, rushing a job etc.

Objective Recorded Accident Rate (injuries that require more than first-aid treatment)

2.1.4 Predictive Accuracy

Role Overload positively related to unsafe Behaviour frequency - r^2 =6%

Work Group Process negatively related to unsafe Behaviour frequency - r^2 =17%

Safety Climate Perceptions negatively related to unsafe Behaviour frequency - r^2 =42%

Approach Intentions negatively related to unsafe Behaviour frequency - r^2 =26%

Work Group Process negatively related to Accident Rate - r^2 =10%

Safety Climate negatively related to Accident Rate - r^2 =44%

2.2 Forcier, B.H., Walters, A.E., Brasher, E.E., & Jones, J.W. (2001). Creating a safer working environment through psychological assessment: a review of a measure of safety consciousness. Journal of Prevention & Intervention in the Community, 22, 1, 53-65.

A measure of safety consciousness - Forcier et al 2001.pdf 741 KB

2.2.1 Abstract

This article explores how organizations can prevent workplace accidents through the psychological assessment of employees. We present a model of employee safety consciousness consisting of personality and attitudinal variables associated with a higher risk of accident involvement. A safety conscious employee is described as one who: has an internal locus of control in matters related to workplace safety, has a high tolerance for work-related stress, and avoids engaging in high-risk, sensation-seeking activities. Relevant research is reviewed and applications of the safety consciousness construct to hiring, promotion and training are discussed.

2.2.2 Predictors

Safety Locus of Control: an individual with an external safety locus of control does not feel personally responsible for accidents and does not believe that he or she has the power to control them. It follows that such an individual would expend little energy in taking safety precautions, thereby posing a greater safety risk to themselves and their co-workers. Conversely, an individual with an internal safety locus of control will tend to feel personally responsible for their safety and take preventative steps to avoid accidents and injuries.

Risk Avoidance: Risk avoidance, on the other hand, is characterized by a lack of sensation-seeking tendencies. High risk avoidance individuals are more comfortable in highly structured environments and situations with relatively low stimulation levels. Because of their preference for structure, high risk avoidance individuals are also more likely to follow established safety protocols and are less susceptible to boredom.

Stress Tolerance: In times of peak job demands, individuals low in stress tolerance are more likely to become flustered or frantic and experience a reduction in both the quality and breadth of their focus and attention. Over time, they may even begin to exhibit recurring physical reactions (Jones, DuBois, & Wuebker, 1986). Conversely, individuals who have high stress tolerance are more likely to recover quickly from peak job demand periods, and are more able to remain cool, focused and attentive during times of increased pressure and stress.

Essentially, this is a review of the evidence supporting the use of the **Vangent ESI commercial test** (see Section 1.14)

2.2.3 Criteria Predicted

Employee Safety Accident Records, frequencies of recorded incidents, self-report unsafe driving Behaviours, self-report drug and alcohol use in students, supervisor ratings of safety knowledge and safe work Behaviours.

2.2.4 Predictive Accuracy

No figures presented - just qualitative descriptors of "good results".

2.3 Clarke, S., & Robertson, I.T. (2005) *A meta-analytic review of the Big Five personality factors and accident involvement in occupational and non-occupational settings*. The British Psychological Society, 78, , 355-376.

A meta-analytic review of the Big 5 personality factors Clarke 2005.pdf 162 KB

2.3.1 Abstract

Although a number of studies have examined individual personality traits and their influence on accident involvement, consistent evidence of a predictive relationship is lacking due to contradictory findings. The current study reports a meta-analysis of the relationship between accident involvement and the Big Five personality dimensions (extraversion, neuroticism, conscientiousness, agreeableness, and openness). Low conscientiousness and low agreeableness were found to be valid and generalizable predictors of accident involvement, with corrected mean validities of .27 and .26, respectively. The context of the accident acts as a moderator in the personality– accident relationship, with different personality dimensions associated with occupational and non-occupational accidents. Extraversion was found to be a valid and generalizable predictor of traffic accidents, but not occupational accidents. Avenues for further research are highlighted and discussed.

2.3.2 Predictors

Big Five factors (meta-analysis):

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience

2.3.3 Criteria Predicted

Rates of several kinds of accidents from 47 studies - mixture of archival and self-report data.

2.3.4 Predictive Accuracy

Scale	Raw r	Corrected r
Extraversion	.10	.16
Neuroticism	.13	.21
Low Conscientiousness	.16	.27
Low Agreeableness	.15	.26
Openness to Experience	.18	.32

* the figures in blue showed 90% credibility intervals which spanned negative as well as positive values. i.e. not trustworthy (situational sample-specificity producing very wide variation in effect size estimates)

2.4 Hansen, C.P. (1989) *A causal model of the relationship among accidents, biodata, personality, and cognitive factors*. Journal of Applied Psychology, 74, 1, 81-90.

Causal Model of Accidents Hansen 1989.pdf 1,056 KB

2.4.1 Abstract

The purpose of this research was to construct and test a causal model of the accident process. Data were gathered on 362 chemical industry workers. The causal model was analyzed and cross-validated using LISREL VI. It was proposed that social maladjustment traits, some characteristics of neurosis, cognitive ability, employee age, and job experience would have independent causal effects on the accident criterion, even when the effects of accident risk and involvement in counseling were controlled. Two rationally derived, content-validated scales based on MMPI items were created to measure social maladjustment and the aspects of neurosis that result in a state of distractibility. The results showed the causal model as a whole to be viable in the initial and cross-validation analyses, and the social maladjustment and distractibility variables were found to be significant causal parameters of accidents. This study developed a new direction for future accident research by its use of causal modeling and by the creation of two new scales for the assessment of employee accident potential.

2.4.2 Predictors

Cognitive Ability
Employee Age
General Social Maladjustment Scale (mainly a subselection of MMPI items)
Distractability
Job Experience
Involvement with psychological counseling
Accident Risk Rating (internal company job classification risk-rating)

2.4.3 Criteria Predicted

Accident Consistency (accident rate over 6 years combined with the number of discrete years in which the employee suffered an accident).

2.4.4 Predictive Accuracy

Overall SEM model r^2 = 18%

2.5 Wallace, J.C., & Chen, G. (2005) *Development and validation of a work-specific measure of cognitive failure: implications for occupational safety.* The British Psychological Society, 78, , 615-632.

Cognitive failure and occupational safety - Wallace and Chen 2005.pdf 142 KB

2.5.1 Abstract

Two studies were conducted to develop and validate a work-specific measure of cognitive failure, the Workplace cognitive failure scale (WCFS). In initial item development, content validity was gained via sorting. In Study 1, data were obtained from an employee sample that supported the factorial, construct, and criterion-related validity of the WCFS. In particular, results supported the expected relationships of workplace cognitive failure with facets of personality, role overload, components of self-regulation, and self-reported measures of safety outcomes. Study 2 examined the WCFS in two additional employee samples, and provided further criterion-related validity using objective measures of injury and supervisor ratings of safety behaviour. Overall, results supported the validity and utility of the new measure in assessing organizational safety behaviour and outcomes, more so than the general cognitive failure scale.

2.5.2 Predictors

Workplace Cognitive Failure scale

Broadbent Cognitive Failures scale: The 25-item (CFQ; Broadbent et al. (1982) was developed to assess one's proneness in everyday common life for committing failures in perception (e.g. Do you fail to see what you want in a supermarket although it's there?), memory (e.g. Do you find you forget people's names?), and motor function (e.g. Do you bump into people?: 1 = never; 5 = very often). Given we were interested in overall cognitive failure, the 25 items were averaged and summed into a single score, $\alpha = 0.91$.

Conscientiousness

Neuroticism

On-Task Behaviours

Role Overload

2.5.3 Criteria Predicted

Self-Report Accidents Rate over 3 years

Supervisor Ratings of Safety Behaviour

Objective Accident Rates

2.5.4 Predictive Accuracy

r^2 varied between 2% to15% over the various criteria.

2.6 Fallon, J.D., Avis, J.M.Kudisch, J.D., Gornet, T.P., & Frost, A. (2000) *Conscientiousness as a predictor of productive and counterproductive Behaviours*. Journal of Business and Psychology, 15, 2, 339-349.

Conscientiousness as a predictor Fallon et al 2000.pdf 55 KB

2.6.1 Abstract

This article extends the integrity testing literature by examining relationships between conscientiousness subscales and productive and counterproductive workplace Behaviours. Correlational analyses (n = 359 employees) indicated conscientiousness predicted overall performance, supervisors' willingness to rehire and employee attendance, but not integrity/safety ratings. Conscientiousness subscales differentially predicted criteria and were more parsimonious.

2.6.2 Predictors

Overall Conscientiousness: and 6 subscales: orderliness, self-control, hard work/dependability, impulsiveness, loyalty, consideration.

2.6.3 Criteria Predicted

Overall Job Performance Supervisor Ratings
Willingness to Rehire Ratings
General Performance Ratings
Safety and Integrity Ratings
Attendance Ratings

2.6.4 Predictive Accuracy

Criterion	Overall Conscientiousness r^2	Orderliness r^2	Hard Work/ Dependability r^2	Consideration r^2
Overall Job Performance	5%	2%	1%	-
Willingness to Rehire	2%	-	-	2%
General Performance	-	-	-	-
Safety and Integrity	-	-	-	-
Attendance Ratings	-	1%	-	-

2.7 Postlethwaite, B., Robbins, S., Rickerson, J., & McKinniss, T. (2009) *The moderation of conscientiousness by cognitive ability when predicting workplace safety Behaviour*. Personality and Individual Differences, 47, 711-716.

Conscientiousness, cognitive ability, workplace safety - Postlethwaite et al 2009.pdf 252 KB

2.7.1 Abstract

Research and industry practice emphasize the usefulness of personality-based assessment, particularly measures of conscientiousness, for predicting workplace rule compliance and safety Behaviour. However, recent research suggests that it may also be valuable to consider potential moderators of the personality – safety relationship. Accordingly, this study uses a field sample (N = 219) to examine the degree to which cognitive ability moderates conscientiousness when predicting workplace safety Behaviour. As hypothesized, we found that those individuals with higher levels of cognitive ability were more likely to demonstrate higher safety Behaviour regardless of level of conscientiousness. In contrast, conscientiousness was a stronger predictor of safety Behaviour for individuals with lower levels of cognitive ability. Implications for understanding the way cognitive ability and conscientiousness interact are discussed.

2.7.2 Predictors

Global Conscientiousness: measured using the WorkKeys Talent Assessment (WTA; ACT, 2007), a facet-level personality assessment designed to predict work-relevant outcomes. The WTA measures personality along 12 facets, with each mapping to one of the Big Five dimensions. The test is comprised of 165 self-descriptive statements to which respondents indicate their degree of agreement using a six-point scale ranging from Strongly Disagree to Strongly Agree. The WTA conscientiousness scale has been shown to correlate highly (r = .79) with the conscientiousness scale of John and Srivastava's (1999) Big Five Inventory, a well-established measure of the Big Five (Oh et al., 2009). Three WTA scales (***Carefulness***, ***Discipline***, and ***Order***) are facet level indicators of conscientiousness and used as predictors in their own right.

Cognitive Ability: Reading for information + Math Skills

2.7.3 Criteria Predicted

Supervisor Ratings of Safety Behaviour

2.7.4 Predictive Accuracy

Cognitive Ability correlates positively with safety Behaviour ratings - r^2 = 2%

Global Conscientiousness correlates positively with safety Behaviour ratings - r^2 = 4%

Carefulness correlates positively with safety Behaviour ratings - r^2 = 6%

Discipline correlates positively with safety Behaviour ratings - r^2 = 3%

In a very low cognitive ability subsample (I standard deviation below the mean of cognitive ability), global conscientiousness correlated positively with safety Behaviour ratings - r^2 = 18%; in a high ability group, the correlation was zero.

2.8 DePasquale, J.P., & Geller, E.S. (1999) *Critical success factors for Behaviour-based safety: a study of twenty industry-wide applications*. Journal of Safety Research, 30, 4, 237-249.

Critical success factor for safety DePasquale 1999.pdf 128 KB

2.8.1 Abstract

One-on-one interviews and focus-group meetings were held at 20 organizations that had implemented a Behaviour-based safety (BBS) process in order to find reasons for program success/failures. A total of 31 focus groups gave 629 answers to six different questions. A content analysis of these responses uncovered critical information for understanding what employees are looking for in a BBS program. A perception survey administered to individual employees (n=701) at these organizations measured a variety of variables identified in prior research to influence success in safety efforts. The survey data showed five variables to be significantly predictive of employee involvement in a BBS process:

1) perceptions that BBS training was effective;
2) trust in management abilities;
3) accountability for BBS through performance appraisals;
4) whether or not one had received education in BBS; and
5) tenure with the organization.

Also, employees in organizations mandating employee participation in a BBS process (n =8 companies) reported significantly higher levels of:

(a) involvement;
(b) trust in management;
(c) trust in coworkers; and
(d) satisfaction with BBS training than did employees whose process was completely voluntary (n =12 companies).

In addition, employees in mandatory processes reported significantly greater frequency of giving and receiving positive Behaviour-based feedback.

2.9 Dahlen, E.R., Martin, R.C., Ragan, K., & Kuhlman, M.M. (2005) *Driving anger, sensation seeking, impulsiveness, and boredom proneness in the prediction of unsafe driving*. Accident Analysis & Prevention, 37, 341-348.

Driving anger,sensation seeking,impulsiveness Dahlen 2005.pdf 97 KB

2.9.1 Abstract

The present study investigated the potential contribution of sensation seeking, impulsiveness, and boredom proneness to driving anger in the prediction of aggressive and risky driving. Two hundred and twenty-four college student participants completed measures of trait driving anger, aggressive and risky driving, driving anger expression, sensation seeking, impulsiveness, and boredom proneness. Findings provided additional support for the utility of the Driving Anger Scale (DAS; Deffenbacher, J.L., Oetting, E.R., Lynch, R.S., Development of a driving anger scale, Psychological Reports, 74, 1994, 83–91.) in predicting unsafe driving. In addition, hierarchical multiple regression analyses demonstrated that sensation seeking, impulsiveness, and boredom proneness provided incremental improvements beyond the DAS in the prediction of crash-related conditions, aggressive driving, risky driving, and driving anger expression. Results support the use of multiple predictors in understanding unsafe driving Behaviour.

2.9.2 Predictors

Sensation Seeking

Impulsiveness

Boredom Proneness

2.9.3 Criteria Predicted

Self-Report Aggressive and Risky Driving Behaviours.

2.9.4 Predictive Accuracy

Impulsiveness with Risky Driving - r^2=4%

Sensation Seeking with Risky Driving - r^2=4%

Sensation Seeking with Minor loss of control - r^2=4%

Boredom Proneness with 'Close Call' incidents - r^2=3%

2.10 Clarke, S., & Robertson, I. (2008) *An examination of the role of personality in work accidents using meta-analysis.* Applied Psychology: An International Review, 57, 1, 94-108.

Examination of role of personality in work accidents Clarke 2008.pdf 240 KB

2.10.1 Abstract

Personality has been studied as a predictor variable in a range of occupational settings. The study reported is based on a systematic search and meta-analysis of the literature, using the "Big Five" personality framework. The results indicated that there was substantial variability in the effect of personality on workplace accidents, with evidence of situational moderators operating in most cases. However, one aspect of personality, low agreeableness, was found to be a valid and generalizable predictor of involvement in work accidents. The implications of the findings for future research are discussed. Although meta-analysis can be used to provide definite estimates of effect sizes, the limitations of such an approach are also considered.

2.10.2 Predictors

Big Five factors (meta-analysis):

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience

2.10.3 Criteria Predicted

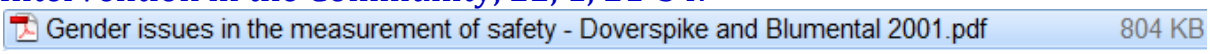
Rates of accidence over 2-3 years

2.10.4 Predictive Accuracy

Scale	Raw r	Corrected r
Extraversion	.01	.02
Neuroticism	.18	.30
Openness to Experience	.29	.50
Low Conscientiousness	.19	.31
Low Agreeableness	.26	.44

* the figures in blue showed 90% credibility intervals which spanned negative as well as positive values. i.e. not trustworthy (situational sample-specificity producing very wide variation in effect size estimates)

2.11 Doverspike, D., & Blumental, A. (2001) Gender issues in the measurement of physical and psychological safety. Journal of Prevention & Intervention in the Community, 22, 1, 21-34.



2.11.1 Abstract

Traditional methods of analyzing the physical and psychological demands of the job have been criticized as potentially biased against female sex-typed jobs. This poses a potential problem when information about the job is used to develop safety training programs or injury prevention programs. In this paper, the problem of measuring safety-related aspects of jobs is explored from a perspective which incorporates attention to gender issues. Potential problems are identified in the measurement of characteristics such as physical safety, responsibility for the physical safety of others, and psychological safety. A shortcoming in the literature deserving of further research is also identified in terms of the relative paucity of measures of responsibility for psychological safety. The failure to pay attention to gender issues may lead to problems in safety training, due to deficiencies in assessment, evaluation, and design.

{This is a discussion article highlighting potential gender issues - no empirical evidence}

2.12 Cellar, D.F., Nelson, Z.C., Yorke, C.M., & Bauer, C. (2001) *The five-factor model and safety in the workplace: investigating the relationships between personality and accident involvement.* Journal of Prevention & Intervention in the Community, 22, 1, 43-52.

Five Factor Model and Safety - Cellar et al 2001.pdf 582 KB

2.12.1 Abstract

Two hundred and two undergraduate participants (134 female, 68 male) completed both the Revised NEO Personality Inventory (NEO-PI-R) and self-report measures of prior workplace accident involvement. Significant inverse relationships were found between the factor of Agreeableness and the total reported number of work-related accidents and between the factor of Conscientiousness and the total reported number of not-at-fault work-related accidents alone, as well as the total reported number of work-related accidents. Further, regression analyses indicate that both Agreeableness and Conscientiousness factors may be useful for predicting certain types of workplace accidents. Implications and potential future directions for research are discussed.

2.12.2 Predictors

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience

2.12.3 Criteria Predicted

Self-report "Not at Work" and "At Work" accident rates over a 10 year duration.

2.12.4 Predictive Accuracy

Conscientiousness related to "Not at Work" accident rate - r^2=2%
Conscientiousness related to " at Work" accident rate - r^2=2%
Agreeableness related to total workplace accident rate - r^2=1%

2.13 Burke, M.J., Sarpy, S.A., Tesluk, P.E., & Smith-Crowe, K. (2002) *General safety performance: a test of a grounded theoretical model.* Personnel Psychology, 55, 429-457.

General safety performance Burke et al 2002.pdf 1,594 KB

2.13.1 Abstract

In this investigation, we report the results of 2 studies designed to (a) conduct confirmatory factor analytic tests of a model of general safety performance with performance ratings from 550 co-worker appraisals (Study 1), and (b) examine hypothesized relationships between indicators of breadth and depth of knowledge constructs and confirmed safety performance factors (from Study 1) with training history data and supervisory appraisals for 133 hazardous waste workers in 23 jobs and 4 organizations (Study 2). Confirmatory factor analytic results from Study 1 provided support for a 4-factor model of general safety performance with performance factors labelled Using Personal Protective Equipment, Engaging in Work Practices to Reduce Risk, Communicating Health and Safety Information, and Exercising Employee Rights and Responsibilities. In general, the results from Study 2 supported the hypothesized dominance of depth of knowledge over breadth of knowledge in the prediction of performance with respect to more routine, consistent safety tasks. Issues concerning the generalizability of these factors to other types of work and the human resource management implications of these results are discussed.

Mainly a review article of human factors/situational constraints on safety.

2.14 Wiegmann, D.A., Shappell, S.A. (2001) *Applying the human factors analysis and classification system (HFACS) to the analysis of commercial aviation accident data*. Presented at 11th International Symposium on Aviation Psychology. Columbus, OH: The Ohio State University. 2001.

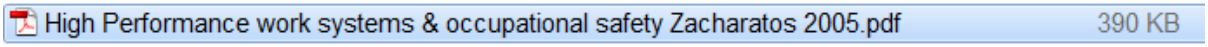
HFACS - Wiegmann and Shappell - 2001.pdf 51 KB

2.14.1 Abstract

The Human Factors Analysis and Classification System (HFACS) is a general human error framework originally developed and tested within the U.S. military as a tool for investigating and analyzing the human causes of aviation accidents. Based upon Reason's (1990) model of latent and active failures, HFACS addresses human error at all levels of the system, including the condition of aircrew and organizational factors. The purpose of the present study was to assess the utility of the HFACS framework as an error analysis and classification tool outside the military. Specifically, HFACS was applied to commercial aviation accident records maintained by the National Transportation Safety Board (NTSB). Using accidents that occurred between January, 1990 and December, 1996, it was demonstrated that HFACS reliably accommodated all human causal factors associated with the commercial accidents examined. In addition, the classification of data using HFACS highlighted several critical safety issues in need of intervention research. These results demonstrate that the HFACS framework can be a viable tool for use within the civil aviation arena.

Mainly a review article of human factors/situational constraints on safety.

2.15 Zacharatos, A., Barling, J., & Iverson, R.D. (2005) *High performance work systems and occupational safety*. Journal of Applied Psychology, 90, 1, 77-93.



2.15.1 Abstract

Two studies were conducted investigating the relationship between high-performance work systems (HPWS) and occupational safety. In Study 1, data were obtained from company human resource and safety directors across 138 organizations. LISREL VIII results showed that an HPWS was positively related to occupational safety at the organizational level. Study 2 used data from 189 front-line employees in 2 organizations. Trust in management and perceived safety climate were found to mediate the relationship between an HPWS and safety performance measured in terms of personal-safety orientation (i.e., safety knowledge, safety motivation, safety compliance, and safety initiative) and safety incidents (i.e., injuries requiring first aid and near misses). These 2 studies provide confirmation of the important role organizational factors play in ensuring worker safety.

Mainly a review article of human factors/situational constraints on safety.

2.16 Henning, J.B., Stufft, C.J., Payne, S.C., Bergman, M.E., Mannan, M.S., & Keren, N. (2009) *The influence of individual differences on organizational safety attitudes*. Safety Science, 47, , 337-345.

Individual differences & safety attitudes - Henning et al 2009.pdf 208 KB

2.16.1 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 Behaviour. 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.

2.16.2 Predictors

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience
Risk Propensity
Sensation Seeking
Promotion (maximizing productivity) Regulatory Focus
Prevention (maximizing quality or safety) Regulatory Focus
Fatalism concerning Accident Prevention
Type A Behaviour Pattern

2.16.3 Criteria Predicted

Six Safety Attitudes:
General Attitudes to Safety
What Workers should do
What Management should do
Safety as an expense and interference with Productivity
Compromising Safety in favour of Production
Safety Discipline

2.16.4 Predictive Accuracy

Agreeableness (b = .34, p = .000), prevention focus (b = .20, p = .011), and sensation-seeking (b = .16, p = .050) significantly contributed to the prediction of general safety attitudes.
Risk propensity (b = -.20, p = .038) and Type A personality (b = -.21, p = .016) significantly contributed to attitudes concerning safety as an expense and interference with productivity.
Risk propensity (b = -.31, p = .000) and fatalism (b = -.30, p = .000) were significant predictors of attitudes toward compromising safety in favour of production.
Finally, openness to experience (b = .16, p = .019), prevention focus (b = .21, p = .008), and fatalism (b = -.29, p = .000) predicted attitudes toward safety discipline.

2.17 Lawton, R., & Parker, D. (1998) *Individual differences in accident liability: a review and integrative approach*. Human Factors, 40, 4, 655-0.

Individual differences in accident liability - Lawton and Parker 1998.pdf

2.17.1 Abstract

This paper reviews research since 1970 on the relationship between accident liability and individual differences, focusing specifically on accidents at work. The history of research into accident liability and the methodological problems associated with the research are considered. The review goes on to examine work on the impact of personality factors, cognitive factors, and social factors on the likelihood of accident involvement at work. We suggest that research into individual differences in accident liability should consider two possible routes to accident involvement via errors and/or violations. Although errors are predominantly associated with cognitive factors, violations have their origins in social psychological factors. We also consider the role of stress in mediating the personality-accident association. It is contended that individuals differ in their reactions to stress, so that although some respond by an increase in risk-taking Behaviour, the effect on others is to increase the likelihood of suboptimal performance in terms of information processing. Actual or potential applications of this research include the development of a more sophisticated model of individual differences in accident liability, which should be useful to organizations attempting to promote safety.

p. 4 "Over the years, research on accident proneness has indicated a plethora of different personality characteristics that appear to be associated with accident repeaters. Glendon and McKenna (1995) argued that the search is almost certain to be fruitless as "being unable to produce any overall stable profile of the accident prone person, it is obviously not possible to use a reliable yardstick in establishing whether someone has an accident prone personality."

p. 5 "Considered overall, the findings in this area might indicate that personality is not systematically associated with accident likelihood, that personality is not well measured, or even that different personality factors are associated with accidents in particular industries and jobs."

2.17.2 Predictors

p. 6. "Shaw and Sichel's (1971a) data suggest that two personality types are most likely to have road traffic accidents:
sociopathic extroverts (self-centred, over confident, aggressive, irresponsible, resentful, intolerant, impulsive, antisocial, antagonistic to authority) and
anxious neurotics (tension ridden, unduly sensitive to criticism, indecisive, unable to concentrate, easily fatigued, depressed, emotionally labile, easily intimidated, and with feelings of inadequacy)".

Three main conclusions …

1. The occurrence of errors and violations, the immediate precursors of accidents, increases under stressful conditions.

2. Individuals at the extremes of the instability scale, either extroverts or introverts, have higher rates of accident involvement than others, particularly in response to stress. ***Unstable extroverts*** may be more likely than normals to respond to stress by showing risk-taking Behaviour (i.e., committing violations), whereas ***unstable introverts*** exposed to stress may show a tendency to make more errors. This is not to suggest that unstable extroverts never suffer from the performance decrements that give rise to errors or that unstable introverts never have the sorts of undesirable attitudes and motivations that promote the commission of violations.

3. ***Stress*** mediates the relationship between personality and accidents in two different ways.
First, a given situation may be differentially perceived as stressful according to personality type. Second, different personality types may respond to experienced stress in different ways. The suggestion that different personality factors may be associated with different types of accidents and that personality characteristics are likely to be mediated in their effect by performance and Behavioural factors may serve to account, at least in part, for the confusing array of results in this area of research. In fact, Sutherland and Cooper (1991) went so far as to suggest that the jobs people seek out may reflect their personality characteristics. They found a relatively high proportion of extroverts on drilling rigs, and Farmer (1984) found that pilots were more than normally aggressive and dominant. The risks associated with particular jobs, and the safety characteristics important for them, vary. In a setting where vigilance is required, errors may constitute the primary risk to system breakdown. In another setting, where the system is well defended against error, the primary risk may come from people adopting unofficial work practices in violation of safety procedures.

2.18 Clarke, S. (2010) *An integrative model of safety climate: linking psychological climate and work attitudes to individual safety outcomes using meta-analysis.* Journal of Occupational and Organizational Psychology, 83, , 553-578.

Integrative Model of Safety Climate & work attitudes- Clarke 2010.pdf 195 KB

2.18.1 Abstract

Meta-analytic path analysis was utilised to test an integrative model linking perceived safety climate to hypothesized organisational antecedents and individual outcomes. Psychological climate, especially the perception of organisational attributes, was found to be significantly associated with safety climate (both constructs measured at the individual level). A partial mediation model was supported. Within this model, the relationship between safety climate and safety behaviour was partially mediated by work-related attitudes (organisational commitment and job satisfaction), and the relationship between safety climate and occupational accidents was partially mediated by both safety behaviour and general health. Safety climate acted as a partial mediator in the relationship between psychological climate and safety behaviour, with direct effects from climate perceptions relating to the leader and organisational processes. Avenues for further research and practical implications are discussed.

More about human factors and safety climate factors than about individual attributes.

2.19 Mullen, J. (2004) *Investigating factors that influence individual safety Behaviour at work*. Journal of Safety Research, 35, , 275-285.

Investigating Factors that influence safety behavior Mullen 2004.pdf 165 KB

2.19.1 Abstract

A qualitative study was conducted to investigate the factors that influence individual safety Behaviour at work. Method: Semi-structured interviews were conducted with participants from a variety of occupations. Results: The analysis revealed several organizational and social factors that explain why individuals engage in unsafe work practices. Conclusions: The influence of organizational/social factors on safety Behaviour were discussed. The results suggest that important organizational factors, in addition to job design and engineering systems, may be overlooked when identifying the causes of workplace accidents. Such factors include early socialization, and the need to portray a positive image. Impact on Industry: The implications for management and industry are discussed.

More about human factors and safety climate factors than about individual attributes.

2.19.2 Predictors (identified by qualitative synthesis of semi-structured interviews)

Role Overload

Performance Demands over Safety

Socialization of Employees incorporating Unsafe Work Practices

Safety Attitude of Organization/Management

Maintaining Self-Image and Image of Competence/superior skill

Tough Person Syndrome

Avoiding (fear of) teasing by other workers (using safe methods)

Fear of losing a good position/saving "face".

2.20 Sutherland, V.J., & Cooper, C.L. (1991) *Personality, stress and accident involvement in the offshore oil and gas industry*. Personality and Individual Differences, 12, 2, 195-204.

Personality, stress, and accidents in oil & gas industry - Sutherland and Cooper 1991.pdf 913 KB

2.20.1 Abstract

The relationships between stress. personality and accident involvement were assessed in a I yr follow-up study among 360 personnel working on offshore drilling rigs and production platforms. Both the Type A coronary prone behaviour pattern and the 'neuroticism' dimension of personality were associated with increased accident involvement. reported job dissatisfaction, poor mental health. and higher levels of perceived stress at work and at home than among Type Bs and the more 'stable' personality types. Although more extraverts reported accidents, it was observed that many introverts and ambiverts had also been involved in incidents leading to personal injury. No significant differences in reported stress levels or stress manifestations (i.e. job satisfaction. mental health, alcohol or tobacco usage) were observed between introverts and extraverts. A Type-B predisposition existed in the offshore environment, and some self-selection into particular aspects of offshore work were evidenced. It is suggested that the use of personality assessment in the selection process would be beneficial to the industry. and might help to answer some of the questions about causality, raised from the findings of this survey.

2.20.2 Predictors

Type A Behaviour Pattern: high need for achievement, hard driving, competitiveness, impatience, and time-urgency

Extraversion

Neuroticism

2.20.3 Criteria Predicted

Self-report Stress

Self-report Alcohol and smoking Behaviour

Self-report Accident statistics

2.20.4 Predictive Accuracy

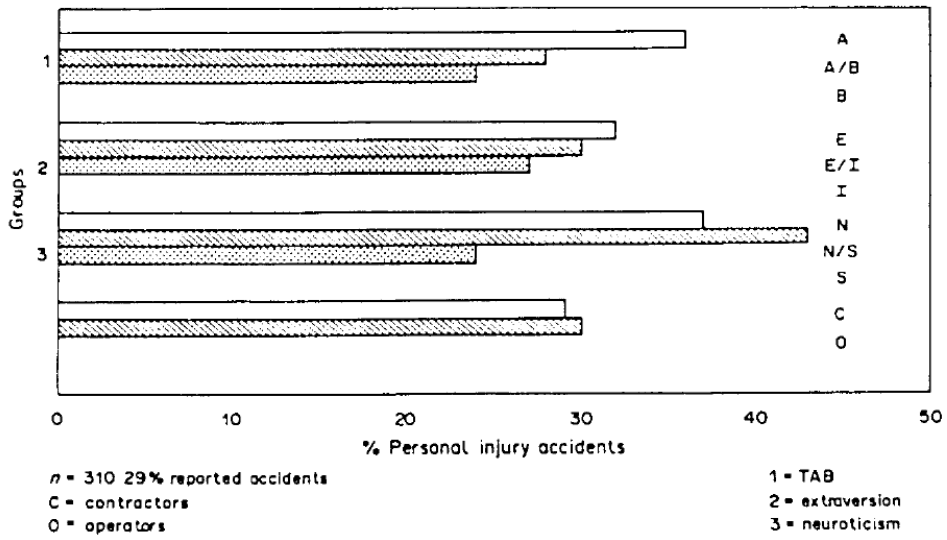


Fig. 1. Personality and behavioural style accident involvement.

2.21 Hayes, B.E., Perander, J., Smecko, T., Trask, J. (1998) *Measuring perceptions of workplace safety: development and validation of the work safety scale.* Journal of Safety Research, 29, 3, 145-161.

Measuring perceptions of workplace safety- Hayes et al 1998.pdf 132 KB

2.21.1 Abstract

A 50-item instrument that assesses employees' perceptions of work safety, the Work Safety Scale (WSS), was constructed and validated using three independent samples. The results showed that the WSS measures five factorially distinct constructs: (a) job safety, (b) co-worker safety, (c) supervisor safety, (d) management safety practices, and (e) satisfaction with the safety program. Each of these scales has a high degree of internal consistency across the three samples. Supervisor safety and management safety practices were the best predictors of job satisfaction. In addition, supporting previous research, supervisor safety and management safety practices were significantly correlated with reported accident rates. Co-worker safety and supervisor safety were strongly linked to employee's compliance with safety Behaviours. WSS subscales were logically related to job stress, psychological complaints, physical complaints, and sleep complaints.

This article is more about perceptions of work safety climate and associated variables rather than individual differences in propensity toward suffering accidents.

2.22 Lajunen, T. (2001) *Personality and accident liability: are extraversion, neuroticism and psychoticism related to traffic and occupational fatalities?* Personality and Individual Differences, 31, , 1365-1373.

Personality and accident liability Lajunen 2001.pdf 104 KB

2.22.1 Abstract

Workplace accidents cost organizations and the economy billions of dollars annually, disabling and The aim of the present study was to investigate the relationship between extraversion, neuroticism and psychoticism, and road traffic fatalities in a data set of 34 nations. In addition to traffic fatalities per 100,000 vehicles, work - related fatalities were included in the study. Results showed that extraversion had a positive relation to the number of traffic fatalities whereas neuroticism correlated negatively with road fatalities. Occupational fatalities were strongly related to deaths on the roads but not to personality dimensions. Countries with high extraversion scores had more traffic fatalities than countries with moderate or low extraversion scores. The need for well -designed studies investigating the link between personality factors and traffic accident liability via driver behaviour was expressed .

2.22.2 Predictors

Extraversion

Neuroticism

Psychoticism

2.22.3 Criteria Predicted

Road Traffic accident Rates in 34 nations (fatalities per 100,000 vehicles).

2.22.4 Predictive Accuracy

High scoring Extraverts and Low/High scoring Neurotics showed the largest effect sizes.

2.23 Hansen, C.P. (1988) *Personality characteristics of the accident involved employee*. Journal of Business and Psychology, 2, 4, 346-365.

Personality characteristics of employees Hansen 1988.pdf 1,378 KB

2.23.1 Abstract

The research relating personality traits to industrial and traffic accidents is reviewed. The research from the past 15 years is integrated with the multitude of studies preceding this period. All of the research is interpreted in terms of the "differential accident liability" concept, rather than the discredited "accident proneness" theory. The need to control for the confounding effects of age~ experience, sex, and accident risk is discussed. It is concluded that the personality traits of extroversion, locus of control, impulsivity, aggression, social maladjustment, and some aspects of neurosis are related to the occurrence of accidents. Finally, the need to develop causal models of the personality-accident process and to identify causal influences through time series designs is proposed.

2.23.2 Predictors

The personality traits of extraversion, locus of control, impulsivity, aggression, social maladjustment, and some aspects of neurosis are related to the occurrence of accidents.

2.24 Clarke, S. (2006) *The relationship between safety climate and safety performance: a meta-analytic review*. Journal of Occupational Health Psychology, 11, 4, 315-327.

Relationship between safety climate and safety performance Clarke 2006a.pdf 74 KB

2.24.1 Abstract

The current study used meta-analysis to examine the criterion-related validity of the relationships between safety climate, safety performance (participation and compliance), and occupational accidents and injuries. Support was found for the study's hypotheses linking organizational safety climate to employee safety compliance and participation, with the latter demonstrating the stronger relationship; however, the subsequent links to accident involvement were found to be weak, suggesting limited support for a fully mediated model. The relationship between safety climate and accident involvement was found to be moderated by the study design, such that only prospective designs, in which accidents were measured following the measurement of safety climate, demonstrated validity generalization. The implications of the findings and suggestions for further research are discussed.

This paper is largely about safety climate and the effects on employee safety compliance.

2.24 Arthur, W. Jr., & Doverspike, D. (2001) *Predicting motor vehicle crash involvement from a personality measure and a driving knowledge test.* Journal of Prevention & Intervention in the Community, 22, 1, 35-42.

Predicting motor vehicle crash involvement Arthur 2001.pdf 464 KB

2.24.1 Abstract

Typically, safety-related driver education programs are aimed at changing knowledge of vehicle operation rules and regulations. However, vehicle crashes are as likely to be related to driver personality variables as they are to the knowledge of vehicle operation and rules and regulations. In a study with 48 licensed drivers, crashes were found to be significantly correlated with conscientiousness, a five-factor model personality dimension, but not with scores on a driving knowledge test. It would appear that prevention efforts should also be directed at changing conscientiousness-related Behaviours, including an emphasis on goal-setting, and following rules and regulations.

2.24.2 Predictors

Conscientiousness: Goal setting, following rules, detail-oriented, order.

Emotional Stability: emotionality, distractability, energy.

2.24.3 Criteria Predicted

Self Report Number of crashes over a three year period.

2.25.4 Predictive Accuracy

TABLE 1. Descriptive Statistics and Correlations Among Study Variables

VARIABLES	1.	2.	3.	4.	5.	6.	7.
1. Conscientiousness	--						
2. Emotional Stability	.23	--					
3. Driving Knowledge Test	−.06	.13	--				
4. At-Fault Crashes	−.17	−.12	−.19	--			
5. Not-At-Fault Crashes	−.39**	−.03	−.03	.12	–		
6. Total Crashes	−.40**	−.08	−.13	.65***	.83***	–	
7. Moving Violations	−.11	−.19	−.03	.51	.25*	.48***	--
Mean	3.59	3.40	28.46	0.56	0.56	1.13	1.00
SD	0.34	0.47	4.02	0.71	0.97	1.27	1.52

Note: *p < .05, **p < .01, ***p < .001 (one-tailed).

Conscientiousness with "Total Crashes" r^2=16%.

2.26 Clarke, S. (2006) *Safety climate in an automobile manufacturing plant The effects of work environment, job communication and safety attitudes on accidents and unsafe behaviour*. Personnel Review, 35, 4, 413-430.

Safety climate in an automobile manufacturing plant Clarke 2006b.pdf 109 KB

2.26.1 Abstract

Purpose – The study aims to examine the safety attitudes of workers, supervisors and managers in a UK-based car manufacturing plant, and their relationship with unsafe behaviour and accidents.
Design/methodology/approach – A questionnaire methodology is used to measure safety attitudes and perceptions. The data are analysed using factor analysis and hierarchical multiple regression.
Findings – The factor structure of the safety climate at the plant comprised three factors: managers' concern for safety; workers' response to safety; conflict between production and safety, which correspond to those found in previous studies in the UK manufacturing sector. Whilst safety climate did not predict accident involvement at the plant, workers' response to safety and conflict between production and safety significantly predicted unsafe behaviour. Perceptions of the work environment had important effects as a significant predictor of both accidents and unsafe behaviour. However, job communication failed to predict either safety outcome. There was little difference in the strength of the safety climate perceived across hierarchical levels.
Research limitations/implications – It is recommended that future research should examine the direct effects of organisational factors beyond the strictures of the "safety culture" framework.
Practical implications – Safety interventions need to focus on how individuals perceive their immediate work environment, as well as improving safety policy and procedures, as these perceptions have most direct influence on safety outcomes.
Originality/value – This paper offers new direction for researchers and advice for those designing safety interventions aimed at reducing accidents.

This paper is largely about safety climate and human factors influences on safety Behaviours.

2.27 Stuhlmacher, A.F., Briggs, A.L., & Cellar, D.F. (2009) *Workplace safety and personality*. In Philip J. Corr and Gerald Matthews (Eds.). The Cambridge Handbook of Personality Psychology (Chapter 44, pp. 764-777). Cambridge University Press.

Workplace safety and personality - Stuhlmacher et al 2009.pdf 1,947 KB

2.27.1 Abstract

The human and financial cost of accidents in the workplace is staggering. Although no reliable estimates exist on the extent of human suffering related to accidents, one assessment places accidents and work-related diseases as costing 4 per cent of the world's gross domestic product (International Labor Organization 2006). In 2005, in the United States alone, over four million non-fatal injuries and illnesses and 5,000 fatal work-related injuries were reported in the private sector (Bureau of Labor Statistics 2005). This chapter examines the role that personality plays in safety behaviour and accidents in the workplace. We discuss traits that have been proposed to constitute an 'accident prone' personality, the strength and direction of various dispositional predictors of accidents, and how personality fits with other variables in explaining safe and unsafe behaviour. The traits of individuals with safe and unsafe behaviour are one factor in the prediction of safety and risk; personality differences need to be put in context of other issues. Although safety can also be addressed through behaviours, the physical work environment (e.g., equipment design) or interpersonal factors (e.g., supervision, work climate), the role of personality in accidents and safety has been of interest across decades of research and is worthy of review. In particular, a review at this point can direct future research and improve safety applications by clarifying the evidence for various dispositions, integrating current thinking on broad versus narrow trait definitions, and speculating what dispositions connect to safe behaviour patterns.

2.27.2 Predictors and Directionality

Impulsivity (more = less safety)
Distractibility (more = less safety)
Sensation-Seeking (more = less safety)
Risk-Taking Orientation (more = less safety)
Boredom Proneness (more = less safety)
Locus of Control (more external = less safety)
Extraversion (more = less safety)
Conscientiousness (less = less safety)
Agreeableness (less = less safety)

p. 770 "Of concern are the relatively low correlations and small amount of common variance accounted for in the studies of personality and safety."
p. 771 "Current attempts to make sense of findings involve looking at a combination of factors rather than a trait in isolation."

Context-specificity p. 771 "The potential for narrow versus broad factors has been supported in some safety research (e.g., Ashton 1998; Dorn and Matthews 1995; Westaby and Lowe 2005). Narrow measures of responsibility and risk-taking had higher relations with workplace delinquency than the five factor dimensions (Ashton 1998). In particular, unsafe behaviour had stronger correlations with the facets of self-esteem .22), risk-taking .24) and responsibility (r= -.20) than any of the five factor dimensions (r's = .17 to .12). Similarly, Westaby and Lowe (2005) reported that a specific measure (risk-taking at work, r= .30) was a better predictor of work injury than global risk-taking .07). "

2.28 Wuebker, L.J. (1986) *Safety locus of control as a predictor of industrial accidents and injuries.* Journal of Business and Psychology, 1, 1, 19-30.

Safety locus of control - Wuebker 1986.pdf 1,446 KB

2.28.1 Abstract

This article describes the underlying theory, development, and initial validation of the Safety Locus of Control Scale. This paper-and-pencil inventory assesses levels of safety consciousness among employees. Initial research suggests that the inventory is a reliable predictor of employees' accidents, injuries, and driving safety. Potential uses for the inventory are discussed, and future research is suggested.

2.28.2 Predictors

Safety Locus of Control

2.28.3 Criteria Predicted

1. **Low Accident Risk** (N = 103). Employees in this group include: (1) employees with no on-the-job accidents or injuries recorded in their files; and (2) employees who typically had one minor accident with a superficial injury (e.g., bruise, cut, etc.) recorded in their file, and for which there was no lost time or medical costs involved.

2. **High Accident Risk** (N = 17). Employees in this group include: (1)4 employees terminated due to their inability to perform jobs in a "safe and productive manner"; and (2)13 employees who typically had one or more serious accidents at work (e.g., broken bone, cut requiring stitches, etc.) that resulted in lost work-time and costly medical bills.

2.28.4 Predictive Accuracy

The Low Accident Risk group obtained a mean safety scale score of + 0.16 (SD = 6.20), and the High Accident Risk group obtained a mean scale score of -4.00 (SD = 5.90). A t-test for means of independent samples revealed that the difference between the two criterion groups was statistically significant (t [118] = 2.56, p < .02). Eta-square = 5%.

2.29 Kamp, J., Krause, T.R. (1997) *Selecting safe employees: a Behavioural science perspective.* Professional Safety, 42, 4, 24-28.

Selecting safe employees,behavioural science perspective Kamp 1997.pdf 944 KB

2.29.1 Abstract

This article describes how effective employee selection can contribute to overall efforts to increase safe Behaviour in the workplace and, thus, prevent employee injuries. The goal is not to advocate employee selection as a U quick fix" for safety problems, but rather to illustrate how the process can promote workplace safety. To see how employee selection complements other methods, let's begin with an analysis of the broad issue of worker safety Behaviour, its causes and how it can be influenced. {This paper is simply a magazine review article - no additional findings except it concentrates on ***Impulse Control*** as a positive safety factor}

2.30 Cox, S., & Cox, T. (1991) *The structure of employee attitudes to safety: a European example*. Work & Stress, 5, 2, 93-106.

Structure of Employee Attitudes Cox & Cox 1991.pdf 886 KB

2.30.1 Abstract

This paper concerns organizational safety culture and the structure or architecture of employee attitudes to safety as part of that culture. It begins by reviewing the somewhat scant literature relevant to this area, and then reports a study, conducted in a European company, which collected and factor analysed data on employee attitudes to safety. The framework provided for the study was that offered by Purdham (1984), and the results suggested that employees' attitudes to safety, within this company (across occupation/occupational level and country), could be mapped by five orthogonal factors: personal scepticism, individual responsibility, the safeness of the work environment, the effectiveness of arrangements for safety, and personal immunity. The theoretical and practical implications of these findings are discussed, and attention is drawn to their subsequent use in an intervention to enhance safety culture within the organization by attacking supervisors' attitudes to safety.

2.30.2 Factors Describing Employee Attitudes to Safety

Table 5. Safety factors: a description.

Factor	Variable	Loading	Statement
F1 Personal scepticism			
	A.3	0·68	Safety works until we are busy.
	A.12	0·66	If I worried about safety I would not get my job done.
	A.6	0·60	There is no point in reporting a near-miss.
	A.7	0·59	Not all accidents are preventable.
	B.6	0·55	Safety equipment requirements are unrealistic.
F2 Individual responsibility			
	A.4	0·76	Safety equipment should always be worn.
	A.5	0·75	Individual should encourage colleagues to work safely.
	A.1	0·48	Individual shares responsibility for safety.
F3 Safeness of work environment			
	B.2	0·73	Less chance of having an accident at work than when working at home.
	B.1	0·73	The company is a safer place to work than other companies.
	B.5	0·58	People with minor injuries that have been treated should be asked to come to work.
	B.3	0·45	Depot Safety Committee is effective.
F4 Effectiveness of arrangements for safety			
	A.10	0·57	Safety equipment should always be worn.
	A.2	0·56	Company should be as concerned for safety as for profits.
	A.11	0·53	Safety audits are a valuable exercise.
	B.4	0·48	People understand company's operating procedures.
	B.3	0·40	Depot Safety Committee is effective.
F5 Personal immunity			
	A.9	0·82	People who work to procedures will always be safe.
	A.8	0·64	Accidents only happen to other people.

2.31 Zohar, D. (2010) *Thirty years of safety climate research: reflections and future directions*. Accident Analysis and Prevention, 42, , 1517-1522.

Thirty years of safety climate research - Zohar 2010.pdf 287 KB

2.31.1 Abstract

Looking back over 30 years of my own and other safety-climate scholars' research, my primary reflection is that we have achieved an enormous task of validating safety climate as a robust leading indicator or predictor of safety outcomes across industries and countries. The time has therefore come for moving to the next phase of scientific inquiry in which constructs are being augmented by testing its relationships with antecedents, moderators and mediators, as well as relationships with other established constructs. Whereas there has been some significant progress in this direction over the last 30 years (e.g. leadership as a climate antecedent), much more work is required for augmenting safety climate theory. I hope this article will stimulate further work along these lines.

Really just an up-to-date review of safety-climate research and the effects of human factors interventions on safety outcomes.

2.32 Casillas, A., Robbins, S., McKinniss, T., Postlethwaite, B., & In-Sue Oh (2009) *Using narrow facets of an integrity test to predict safety: a test validation study*. International Journal of Selection and Assessment, 17, 1, 119-125.

Using narrow facets of an integrity test Casillas et al 2009.pdf 74 KB

2.32.1 Abstract

This paper describes the development and validation of an integrity test, the WorkKeys Performance Assessment, designed specifically to measure two domains: employee risk reduction (i.e., safety Behaviour) and general work attitudes. These domains were hypothesized to differentially predict multiple work outcomes, including task performance, organizational citizenship, counterproductive Behaviour, and safety. The study used a large sample of workers whose performance was rated by their supervisors. Results suggest that both integrity domains predict employee Behaviour, with risk reduction providing incremental validity over general work attitudes when predicting counterproductive and safety Behaviour. The findings support the value of measuring both domains of integrity.

2.32.2 Predictors

Attitudes to Work and the Work Environment (GWA: mainly Conscientiousness, Agreeableness, and Emotional Stability)

Attitudes to Compliance with Safety Rules and Procedures (RR: and absence of physical and verbal aggression)

2.32.3 Criteria Predicted

Supervisor Ratings of Employee Safety

2.32.4 Predictive Accuracy

A gain in predictive accuracy of 8% (above the GWA scale prediction) is obtained when using the RR scale as a predictor of Supervisor Safety Ratings (using corrected validity coefficients - measurement error and range restriction).

2.33 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, 5, 1103-1127.

Workplace safety,a meta-analysis Christian 2009.pdf 738 KB

2.33.1 Abstract

Recent conceptual and methodological advances in Behavioural safety research afford an opportunity to integrate past and recent research findings. Building on theoretical models of worker performance and work climate, this study quantitatively integrates the safety literature by meta-analytically examining person- and situation-based antecedents of safety performance Behaviours and safety outcomes (i.e., accidents and injuries). As anticipated, safety knowledge and safety motivation were most strongly related to safety performance Behaviours, closely followed by psychological safety climate and group safety climate. With regard to accidents and injuries, however, group safety climate had the strongest association. In addition, tests of a meta-analytic path model provided support for the theoretical model that guided this overall investigation. The implications of these findings for advancing the study and management of workplace safety are discussed.

2.33.2 Predictors

Extraversion
Neuroticism
Conscientiousness
Propensity for Risk Taking
Locus of Control

2.33.3 Criteria Predicted

Accident Rates and Injuries - a composite measure
Safety Compliance and Safety Participation Behaviours

2.33.4 Predictive Accuracy

Table 5
Results for Meta-Analysis of Person- and Situation-Related Factors With Accidents and Injuries Composite

Construct	k	N	M_r	SD_r	M_ρ	SE_{M_ρ}	95% conf. int. L	95% conf. int. U
			Person-related factors					
Proximal								
Safety knowledge	3	461	−.07	.14	**−.11**	.11	−.33	.12
Distal								
Conscientiousness	4	852	−.22	.13	**−.26**	.07	−.40	−.11
Neuroticism	12	5,129	.15	.16	**.19**	.06	.08	.31
Extraversion	5	2,083	−.06	.10	**−.07**	.05	−.17	.04
Locus of control	4	2,446	−.20	.04	**−.26**	.03	−.32	−.21
Risk taking	3	820	.16	.16	**.20**	.11	−.02	.41
Job attitudes	9	20,078	−.13	.04	**−.17**	.02	−.20	−.13

M_ρ = mean corrected meta-analytic correlation

Table 4
Results for Meta-Analysis of Person- and Situation-Related Factors With Safety Performance Composite, Safety Participation

Construct	k	N	M_r	SD_r	M_ρ	$SE_{M\rho}$	95% conf. int. L	95% conf. int. U
			Person-related factors					
Proximal								
Safety knowledge	9	2,893	.47	.16	**.61**	.06	.50	.72
Compliance	8	2,803	.46	.17	.60	.05	.50	.71
Participation	4	1,815	.45	.11	.61	.08	.46	.76
Safety motivation	5	1,393	.50	.24	**.57**	.11	.36	.78
Compliance	4	868	.47	.15	.44	.12	.20	.68
Distal								
Conscientiousness	5	1,317	.15	.11	**.18**	.06	.06	.28
Locus of control	9	2,858	.28	.16	**.35**	.07	.22	.48
Compliance	4	1,685	.19	.11	.25	.08	.10	.41
Participation	3	622	.33	.06	.43	.04	.34	.51
Risk taking	4	1,173	−.23	.07	**−.28**	.04	−.37	−.19
Participation	3	622	−.19	.08	−.24	.06	−.36	−.12
Job attitudes	4	924	.20	.07	**.25**	.04	.16	.33
Compliance	3	624	.24	.04	.30	.03	.25	.35

p. 1122 "our findings regarding particular individual differences suggest where to focus personnel assessments (e.g., on ***conscientiousness*** in personnel selection contexts). "

2.34 Nicholson, N., Soane, E., Fenton-O'Creevy, M., & Willman, P. (2005). *Personality and domain-specific risk taking*. Journal of Risk Research, 8, 2, 157-176.

Personality and domain-specific risk-taking- Nicholson et al 2005.pdf 279 KB

2.34.1 Abstract

The concept of risk propensity has been the subject of both theoretical and empirical investigation, but with little consensus about its definition and measurement. To address this need, a new scale assessing overall risk propensity in terms of reported frequency of risk behaviours in six domains was developed and applied: recreation, health, career, finance, safety and social. The paper describes the properties of the scale and its correlates: demographic variables, biographical self-reports, and the NEO PI-R, a Five Factor personality inventory (N=2041). There are three main results. First, risk propensity has clear links with age and sex, and with objective measures of career-related risk taking (changing jobs and setting up a business). Second, the data show risk propensity to be strongly rooted in personality. A clear Big Five pattern emerges for overall risk propensity, combining high extraversion and openness with low neuroticism, agreeableness, and conscientiousness. At the subscale level, sensation-seeking surfaces as a key important component of risk propensity. Third, risk propensity differs markedly in its distribution across job types and business sectors. These findings are interpreted as indicating that risk takers are of three nonexclusive types: stimulation seekers, goal achievers, and risk adapters. Only the first group is truly risk seeking, the others are more correctly viewed as *risk bearers*. The implications for risk research and management are discussed.

2.34.2 Predictors

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience

2.34.3 Criteria Predicted

Risk Propensity

2.34.4 Predictive Accuracy

The analysis of the data leads toward the following conclusion that just as risk taking is not one thing, neither are risk takers a single group. They are driven by one or more of three sets of forces, for these are not mutually exclusive:

1. Stimulation seekers. These are people for whom risks are intrinsically exciting. They raise thresholds of stimulation to levels that make the individuals feel psychologically gratified. They bear risk as a pleasure to be consumed. They are a minority group, but of significant proportions – as all the casinos and dangerous sports clubs of the world can testify!

2. Goal achievers/Loss avoiders. These are people whose drive for success, popularity, prominence, or gain leads them to be prepared to bear major risk in order to get what they want, for in many areas of life risk and return are positively linked. The personality profile we drew for them shows that their willingness to bear risk is a combination of emotional coolness, toughness, activity and a tendency to casualness about control and rules. There is also an opposite group – as identified by prospect theory (Kahneman and Tvesrky, 1979) – of those people who will bear major risk to avoid a likely loss. In either case, the individuals would be happier not to have to bear the risk, but have strong enough motives to do so.

3. Risk adaptors. Finally, there are those people whose risk taking is quite specific to areas of endeavour and activity. A combination of dispositions, skills and interests lead them towards roles and organizations that reinforce their risk preferences, and in many cases train them to be willing risk bearers in particular domains. Thus it is that people will take health risks as part of the landscape of media professions, and finance specialists take risks as an occupational requirement. The latter is especially true of the trading environment, where an explicit part of the formal training and informal socialisation is to bear major risks in order to perform.

The authors advocate a "risk attribute-profile" approach for predictive purposes rather than a simple "sum-score" risk index.

2.35 Clarke, S. (2006). The relationship between safety climate and safety performance: a meta-analytic review. Journal of Occupational Health Psychology, 11, 4, 315-327.

Relationship between safety climate and safety performance Clarke 2006a.pdf 74 KB

2.34.1 Abstract

The current study used meta-analysis to examine the criterion-related validity of the relationships between safety climate, safety performance (participation and compliance), and occupational accidents and injuries. Support was found for the study's hypotheses linking organizational safety climate to employee safety compliance and participation, with the latter demonstrating the stronger relationship; however, the subsequent links to accident involvement were found to be weak, suggesting limited support for a fully mediated model. The relationship between safety climate and accident involvement was found to be moderated by the study design, such that only prospective designs, in which accidents were measured following the measurement of safety climate, demonstrated validity generalization. The implications of the findings and suggestions for further research are discussed.
