Validation of the ISA 360 & IASC

ISA 360°
growing safer leaders

IASC
thriving safely

Creating thriving organisations

Background

Over time, the theories and practice of safety management have evolved to address the changing landscape of work. In the early days, the focus of safety was on establishing regulations and governing institutions to ensure working conditions were fair, reasonable and safe for workers. Over time, the emphasis shifted between the focus on individual behaviour on the one hand and working conditions and the system design on the other. Generally, through each progression, safety performance improved up to a point and then levelled off, soon followed by another shift in focus and more incremental progress.

If we stand back and look at the development of safety practice over time, we see that each progression represented a partial truth, a piece of the safety puzzle, which is valid but not the whole story. Our intent is to bring together the best of what has been done over the history of safety into an integrated view.

Our assessment tools reflect our commitment to represent the best of safety practice, and to use assessment itself as a way to help people reflect on where they are at in their safety journey and design where to go next.

Our safety assessment tools reflect our understanding of the most current thinking in safety research and practice while at the same time appreciating the contributions of the past. The original research that led to the development of these tools was based on a discovery of the common threads that linked divergent safety practices together. Two of those threads were the important roles of Safety Leadership and Culture. We found that whether safety practice focused on individual contributions to safety performance or the process (or systemic) factors, both culture and leadership were key. They were the catalysts and glue that both moved the needle forward and held the course steady.

The 7 Safety Practices

As a result of the study of the history of safety developments, it became clear that many of the highest performing organizations had several common factors. These factors were distilled into 7 Practices that represented what researchers around the world were discovering.

The 7 Safety Practices were developed to encapsulate both Personal and Process safety hazards. Building on principles in advanced safety culture (James Reason) and high reliability organisations (Karl Weick), the 7 Safety Practices have been identified as safety practices critical to safe and reliable performance. These include:

- Listening to people.
- Reporting without fear of blame.
- Mobilising people.
- Renewing practices, processes & procedures.
- Building overlapping layers of protection.
- Active caring.
- Engaging people in a vision.

Similarities between both Reason and Weick's theory are clear, with the addition of Active caring and Engaging people in a vision relatively new to safety culture literature (Strycker, 2010). Each practice aims to create an environment where group members ensure the safety and longevity of other group members, through accurately identifying and eliminating both personal and organisational hazards (Strycker, 2010).

For a more detailed explanation of the 7 Safety Practices, please see "Looking for a 21st Century Solution for Safety Performance: Integrating Personal and Process Safety".

Other relevant research underlying the 7 Practices

- Weick and Suttclife: Managing the Unexpected
- James Reason: The Human Contribution
- Edgar Schein: Organizational Culture and Leadership
- Resilience Engineering: Eric Hollnagel, David Woods, Nancy Leveson
- Failure to Learn: The BP Texas City Refinery Disaster: Andrew Hopkins
- The Field Guide to Understanding Human Error: Sidney Dekker
- Ronald Heifetz: Leadership Without Easy Answers
- Gellar, Active Caring

Generative Culture

The importance of safety culture has been a focus of researchers for more than 20 years, and many of the 7 Practices were explicitly linked to Westrum's construct, called Generative Culture (Westrum, 2004). In the original research, Westrum noted that the way groups dealt with safety related information indicated a cultural orientation, and from this observation, he created a typology of cultures that included Toxic, Bureaucratic, and Generative. For the safety researchers that followed Westrum's approach, only Generative was held to be a safety culture (Reason, Weick, Hollnagel).

Toxic	Bureaucratic	Generative
Power Oriented Characterized by low cooperation, blame, hiding incidents. Information is often withheld for personal gain. It is not safe to speak up, especially if doing so might be embarrassing. Messengers are shot, responsibilities are shirked. When things go wrong, a scapegoat is found and punished. There is no real learning from failure.	*Rule Oriented* Focused on positions, hierarchy, span of control. Responsibilities are compartmentalized by departments that seek to preserve their own existence and power. Information must flow through standard channels or procedures, in order to preserve status quo. Messengers are neglected, responsibilities are narrowed. When things go wrong, there is a process to produce retribution. Learning is institutional	*Purpose Oriented* The hallmarks are good information flow, high cooperation and trust, bridging across teams, and conscious inquiry. Psychological safety creates openness, curiosity, care, and systemic learning. There is awareness of the importance of getting the right information to the right people, in the right form at the right time. When things go wrong, people look for a systemic cause and for systemic solutions, a recognition of the interrelated parts of the organization. Messengers are trained.

For this reason, the 7 Practices of high-performance safety are seen as practices that support and reflect a Generative Safety Culture.

Validity and Reliability

To support development toward high performing safety, Datadrivesinsight.com set out to create an assessment tool based on the 7 practices, and Generative Culture. The approach was designed to help companies see where they were currently, discover gaps, adapt the practices to their own unique work environments, and set a course of development.

To do this, a set of survey questions were created, validated through standard statistical processes, and the ISA and IASC assessment tools were born.

RELIABILITY refers to the consistency or stability of the survey results—across items within a scale, between raters who are describing the same person, and over time as appropriate. The 3 most common methods of demonstrating reliability are:

- *Internal Consistency Reliability* (homogeneity within scales – the extent to which the responses to items within a single scale are answered in a consistent way)
- *Interrater Reliability* (agreement among raters – the extent to which respondents who are describing the same person provide similar descriptions)
- *Test-retest Reliability* (stability over time – the extent to which the results are stable over time, where length of time depends on the nature of the construct and the time frame along which it is expected to remain unchanged)

Datadrivesinsight.com uses Internal Consistency and Interrater reliability as tests of its reliability.

ISA Reliability Results: Internal Consistency.

Reliability

The internal consistency of the ISA scales has been examined using Cronbach's alpha.

In our study of 460 respondents, alpha coefficients for the four scales range from .877 to .937. Coefficient alpha's of above .70 are the recommended minimum (Osborne, Costello & Kellow, 2008); thus, these findings provide strong support for the internal consistency of the ISA scales and that the scale scores on the ISA are meaningful and justifies the computation of scale scores.

Internal Consistency Results	
Domain	Coefficient alpha (N = 460)
Purposeful	.928
Curious	.877
Caring	.880
Connecting	.937

Validity refers to the extent to which the scale measures what it is designed to measure or being used to measure.

Various tests have been conducted on the ISA.

- Construct validity refers to the extent to which different measures of the same construct empirically converge (i.e., convergent validity) and measures of different constructs can be empirically differentiated (discriminant validity).
- Criterion-related validity refers to the extent to which the domains are related to other constructs or outcomes.

ISA Validity Results: Construct Validity

Assessment of construct validity involves using factor analysis with loadings of above 0.3 (Tabachnick & Fidell, 2012), demonstrated that the 33 items provide measures of four behavioural and thinking orientations: Purposeful, Curious, Caring, Connecting. These distinctions are consistent with the conceptual framework underlying the ISA.

	Domain			
	Purposeful	**Curious**	**Caring**	**Connecting**
Item 1	0.871			
Item 2	0.831			
Item 3	0.761			
Item 4	0.713			
Item 5	0.610			
Item 6	0.425		0.331	
Item 7	0.388			
Item 8	0.377			
Item 9	0.310			

Item 10				
Item 11		0.719		
Item 12		0.695		
Item 13		0.633		
Item 14		0.577		
Item 15		0.483	0.475	
Item 16	0.324	0.355		
Item 17		0.315		
Item 18				
Item 19			0.623	
Item 20	0.316		0.555	
Item 21			0.521	0.328
Item 22				0.907
Item 23				0.820
Item 24				0.805
Item 25				0.783
Item 26				0.716
Item 27				0.622
Item 28				0.572
Item 29				0.569
Item 30		0.336		0.417
Item 31				0.329
Item 32				0.324
Item 33				0.311

Thus, the ISA can effectively distinguish between the four domains (i.e., the four domains are somewhat distinct from each other, and that the clusters measure the cluster to which they are purported).

Criterion-related validity

Correlation or regression coefficients were found to be significant at the p<.05 level in a positive or negative direction consistent with the theoretical framework. For example, Purposeful domain was found to be positively associated with staff feel included; the Curious domain was found to be positively associated with staff feel listened to and supported to share; Caring domain was positively associated with staff feeling supported to report; and Connecting was positively associated with staff feeling included and that they can stop the job.

In addition, internal studies by Veraison have shown that the domains are related to staff impact relating to psychological safety.

Additional studies: ISA relationship between each of the 4 Safety Leadership Capability Areas and the way staff behave at work (measured by the 10 impact questions).

The study:

A random sample of 460 participants, mostly in operational or supervisor positions in an industrial or commercial organisation completed the ISA and additional Impact questions.

The findings:

A series of regression analyses were conducted to explore the relationship between each capability area and each of the impact measures. The results showed that each of the 4 Safety Leadership Capability Areas did have a positive impact on the way staff behave at work. Specifically:

Figure 1.

| Purposeful	$r(457) = +.74$, p, $< .001$
Curious	$r(457) = +.76$, p, $< .001$
Caring	$r(457) = +.75$, p, $< .001$
Connecting	$r(457) = +.75$, p, $< .001$

Additional studies: ISA - compare the impact of top and bottom performing leaders in the ISA 360 on their staff.

The study:

A random sample of 460 participants, mostly in operational or supervisor positions in an industrial or commercial organisation completed the ISA and additional Impact questions.

The findings:

A multivariate analysis of variance (MANOVA) was conducted to compare the bottom 10% of performers in the ISA 360 (group 1) to the top 10% (group 2). The results revealed a significant difference between the two groups across four impact areas ($p < 0.001$), while the remaining six impact questions did not produce a significant result. The differences are represented in the following:

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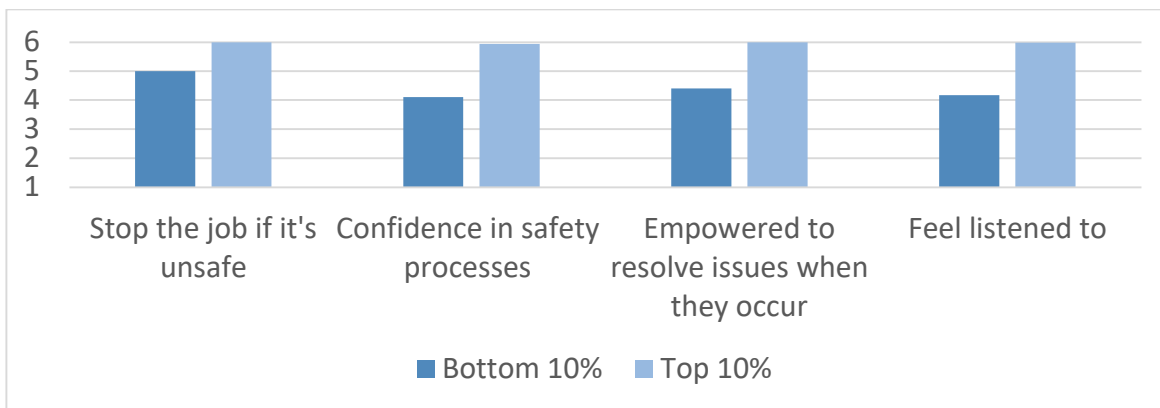
Head Office
10B, 151 – 153 Herdsman Parade,
Wembley, Perth
Western Australia 6014
+61 8 9287 1041

info@datadrivesinsight.com
datadrivesinsight.com

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