

Safety Culture Transformation – The impact of training on explicit and implicit safety attitudes



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Agenda

1. Introduction

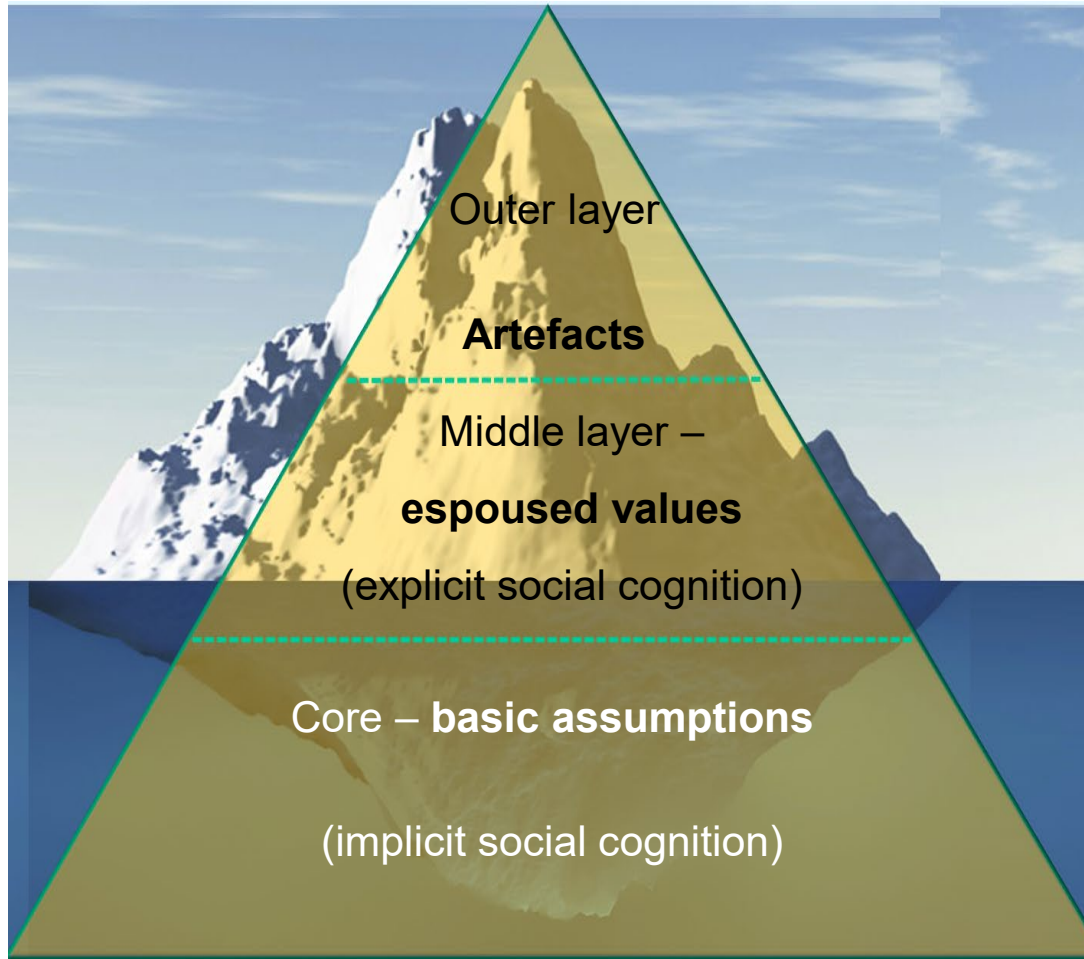
2. Empirical Study

- 2.1 Method

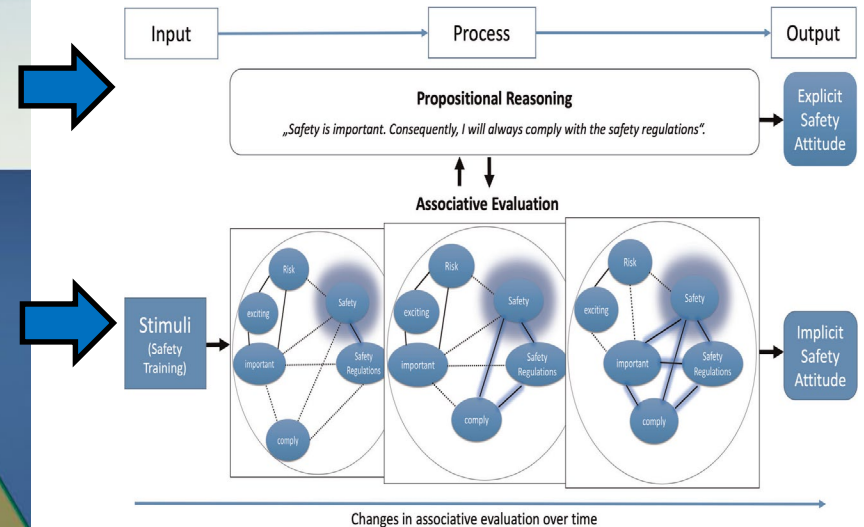
- 2.2 Results

3. Conclusion

1. Introduction

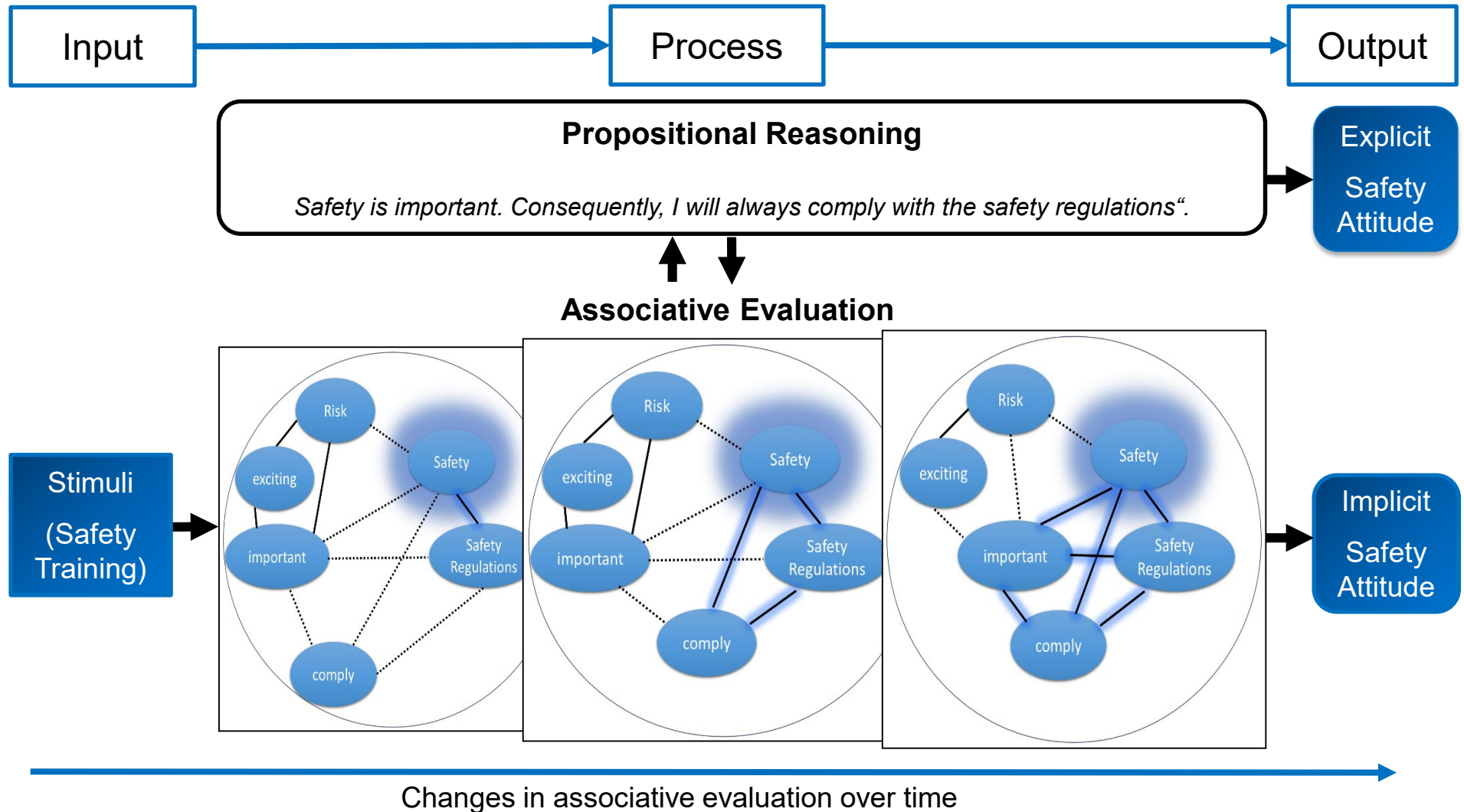


Implicit Social Cognition Model of Safety Culture
(Marquardt et al., 2012, p. 215)



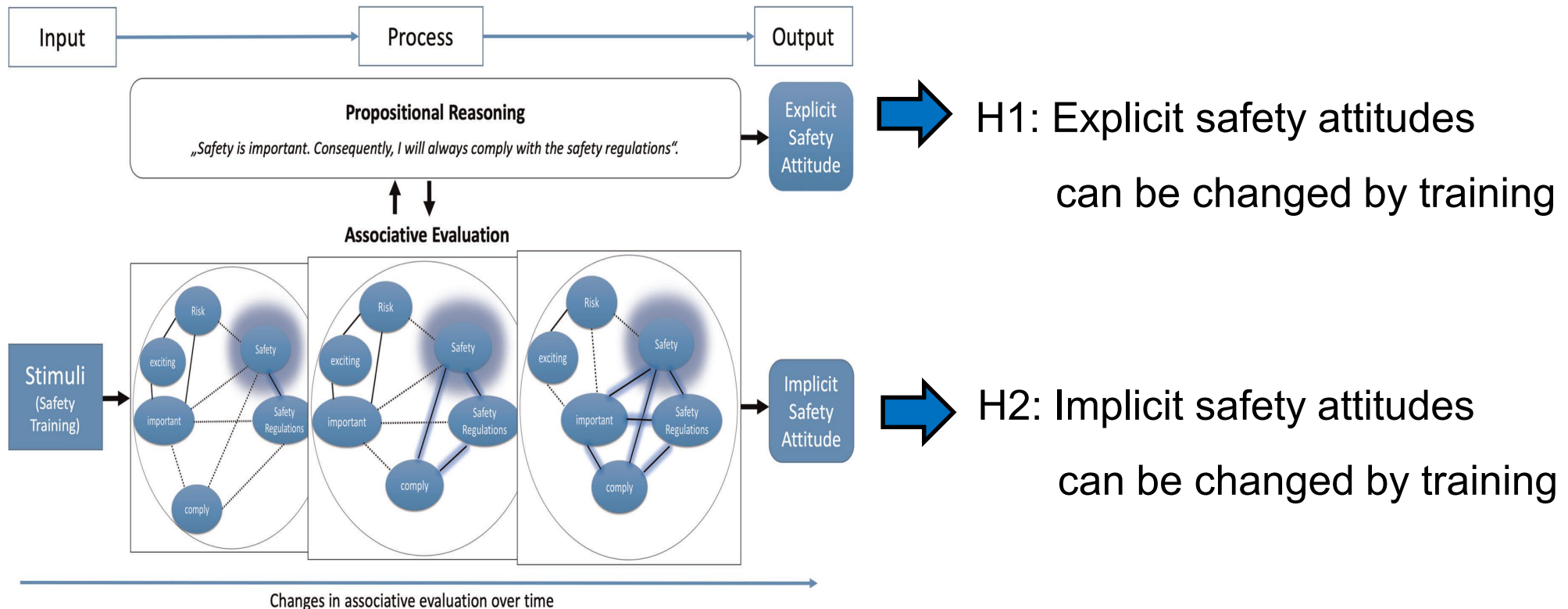
Explicit and Implicit Safety Attitude Change (EISAC) model
(Marquardt et al., 2021, p. 194)

1. Introduction



1. Introduction

Hypotheses:



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2. Empirical Study

	Study 1	Study 2	Study 3
Time frame for attitude change (intervall between pre-post-measurement)	Short term (1 week)	Medium term (8 weeks)	Long term (12 months)
Training duration	Short (2 hours)	Medium (2 days)	Long (12 weeks)
Domain (Safety context)	Chemical laboratory	Automotive production unit	Safety Ethics study program
Type of training	Safety Training	Crew Resource Management (CRM) Training	Safety Ethics Training
Research design	Pre-Post-Design	Pre-Post-Design	Solomon-Four-Group-Design
Explicit attitude measure	Explicit Safety Attitudes Scale (ESAS)	Complacency Scale	Semantic Differential Scale
Implicit attitude measure	Safety Attitude-IAT (SA-IAT)	Safety Culture-IAT (SC-IAT)	Safety Ethics-IAT (SE-IAT)
	 N = 15	 N = 81	 N = 134

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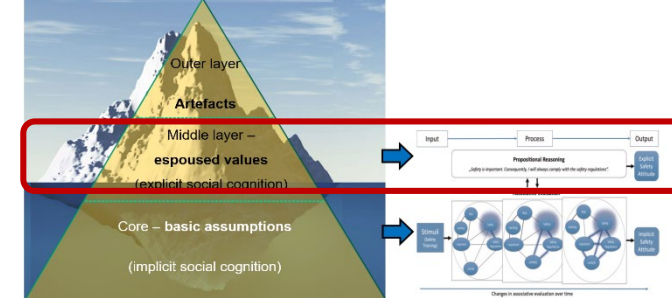
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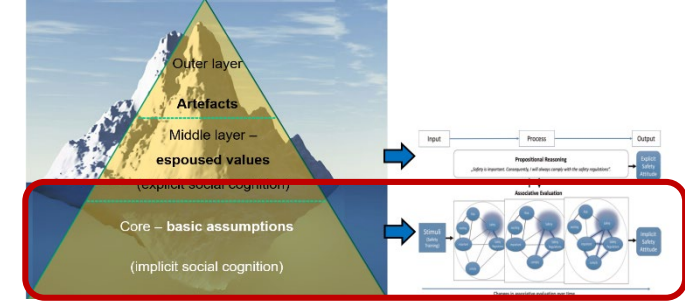


Explicit Safety Attitude Scale (ESAS)

Explicit Safety Attitudes Scale

	strongly disagree	disagree	neutral	agree	strongly agree
I rarely care about dangers in my work environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is too time consuming to think about risk prevention in my daily work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think it is always better to comply with the safety regulations, even when time is short.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have a lot to do, it makes sense to compromise safety standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carefully following safety instructions takes time away from more important things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety is the most important issue in hazardous work environments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Efficiency is more important than safety.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I always pay attention to risk factors in my work environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My motto is always "safety first".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working with high risks makes tasks more interesting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

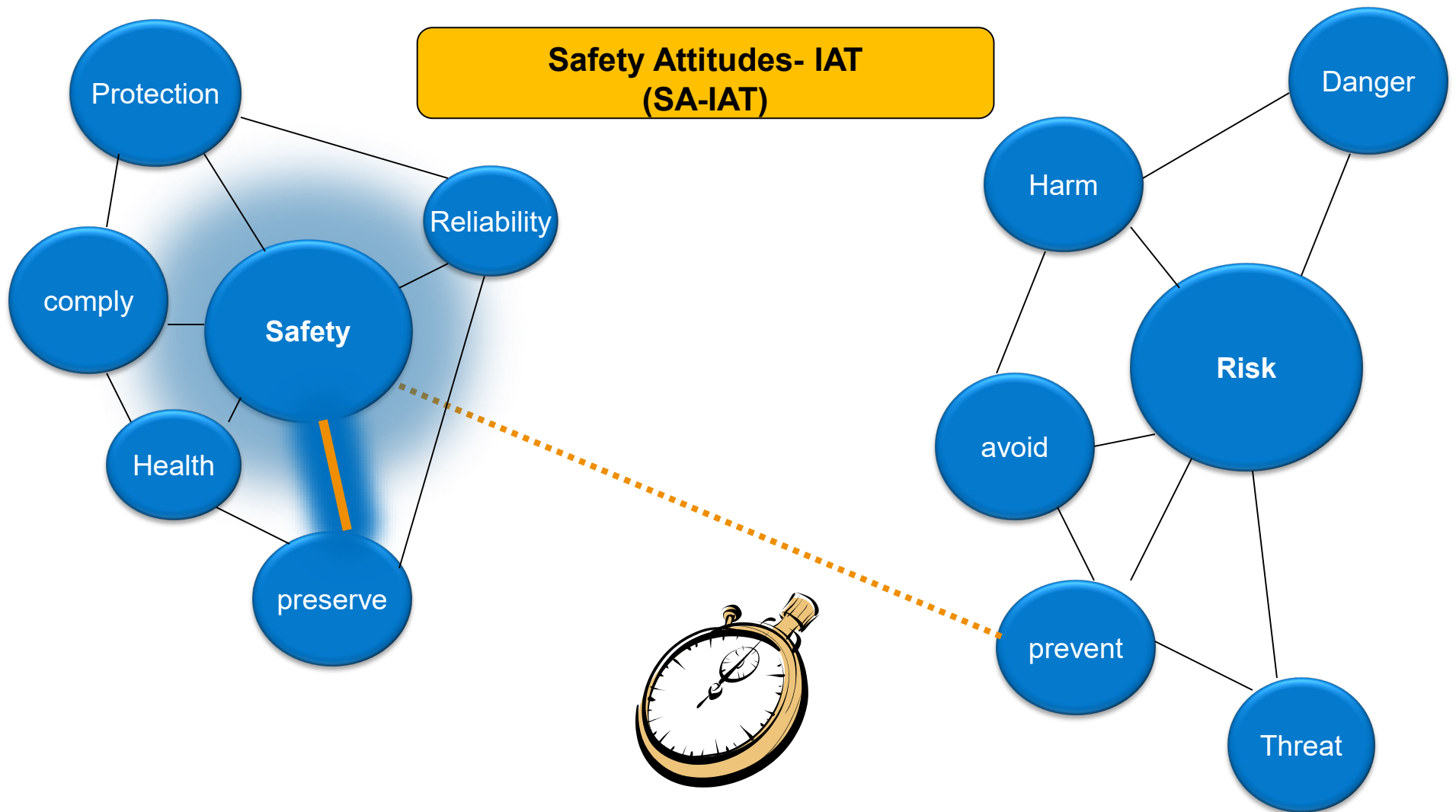
2.1 Method



Safety Attitudes- IAT (SA-IAT)

Block	Number of Trials	Task	Left Key “A”	Right Key “L”
1	20	Discriminating object categories	Safety	Risk
2	20	Discriminating attributes	preserve	prevent
3	20	Initial combined task	Safety + preserve	Risk + prevent
4	40	Initial combined task	Safety + preserve	Risk + prevent
5	20	Discriminating inverted object categories	Risk	Safety
6	20	Inverted combined task	Risk + preserve	Safety + prevent
7	40	Inverted combined task	Risk + preserve	Safety + prevent

2.1 Method



2.1 Method

**Safety Attitudes- IAT
(SA-IAT)**

Health

**Safety
preserve**

**Risk
prevent**

2.1 Method

**Safety Attitudes- IAT
(SA-IAT)**

Danger

**Safety
preserve**

**Risk
prevent**

2.1 Method

**Safety Attitudes- IAT
(SA-IAT)**

Threat

**Risk
preserve**

**Safety
prevent**

2.1 Method

**Safety Attitudes- IAT
(SA-IAT)**

Safety

**Risk
preserve**

**Safety
prevent**

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2.2 Results

Study	Group	Explicit Attitude Pre-measure		Explicit Attitude Post-Measure		Implicit Attitude Pre-measure		Implicit Attitude Post-Measure		Hypothesis	df	t F	Effect size η^2	p	
		M	SD	M	SD	M	SD	M	SD						
Study 1 (short term)	Training group 	3.65	0.50	3.88	0.64	0.58	0.63	0.73	0.28	H1	14	2.31	0.73	0.04	
										H2	14	-0.94	0.18	0.37	
Study 2 (medium term)	Training group 	2.15	0.51	1.99	0.51	0.36	0.32	0.40	0.31	H1	60	3.15	-0.38	0.00	
										H2	45	-0.80	0.10	0.43	
Study 3 (long term)	Training group (G 1)	2.37	1.51	3.39	1.41	0.75	0.30	0.76	0.29	H1 (a)	1, 43	41.53	0.49	0.00	
	Control group (G 2)	1.68	1.20	3.63	1.05	0.80	0.25	0.78	0.30	H1 (b)	1, 43	0.35	0.01	0.56	
	Training group (G 3)			2.99	1.48			0.65	0.43	H1 (c)	3, 130	2.38	0.05	0.07	
	Control group (G 4)			2.70	1.57			0.64	0.46	H2 (a)	1, 43	0.01	0.00	0.92	
										H2 (b)	1, 43	0.25	0.01	0.62	
										H2 (c)	3, 130	0.94	0.02	0.42	

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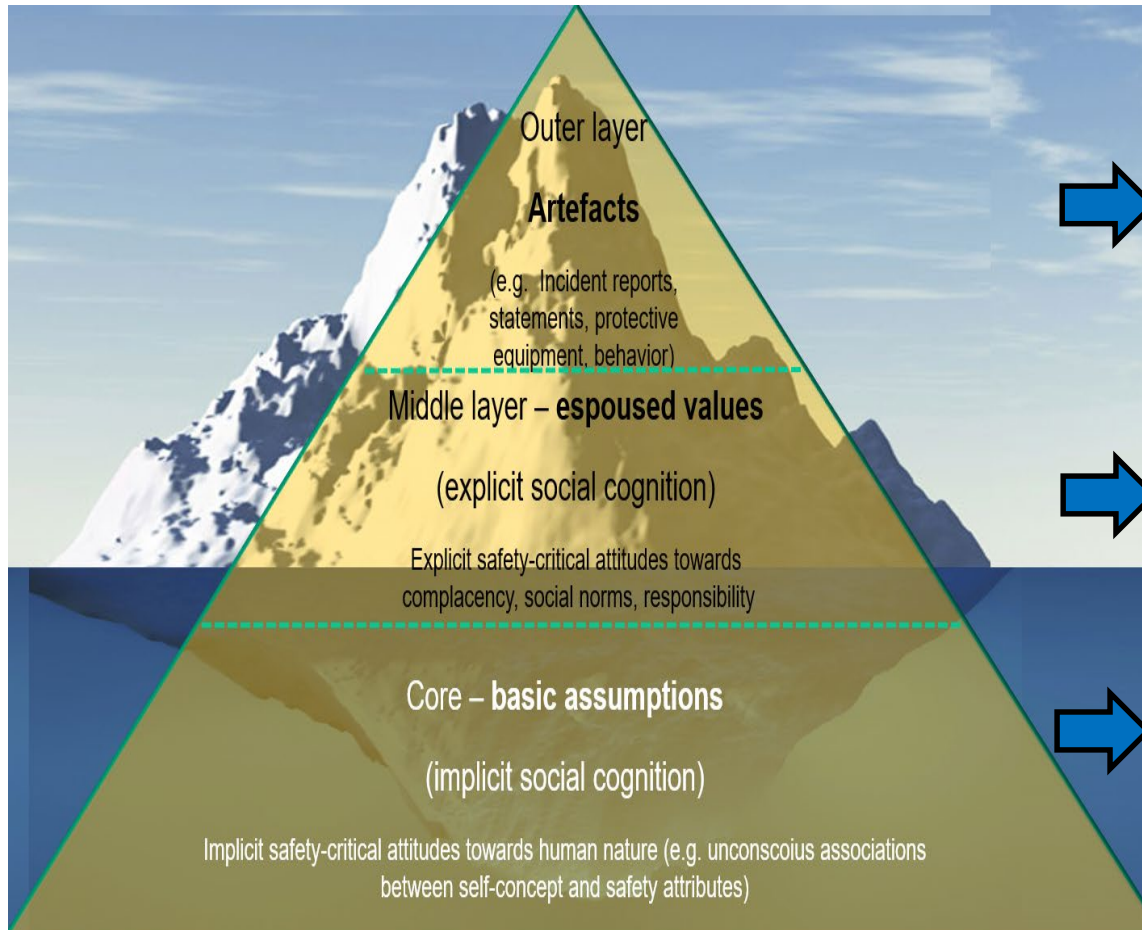
3. Conclusion

Discussion of results

- Explicit safety attitudes can be changed by safety training. Significant small effects (Study 2), medium effects (Study 1), and even large effects (Study 3) were observed
- None of the three studies revealed significant changes in the implicit safety attitudes after the training
- Implicit safety attitudes are more stable unconscious dispositions which cannot be easily changed like explicit ones
- Duration of safety training (e.g., 2 h, 2 days, or even 12 weeks) has no effect on the implicit attitudes

3. Conclusion

Practical Implications



Safety Culture Transformation methods:

➡ Behavior modeling

➡ Debriefs/
group discussions

➡ Implementation intentions

Thank you for your attention

References

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