

# The effect of working conditions and safety climate on the impact of personality on injury involvement. A longitudinal study in two male-dominated occupations

Results from MARS  
Men, Accidents, Risk and Safety

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MARS  
MEN | ACCIDENTS | RISK | SAFETY

# Background



# Background

- The five factor model of personality ('Big five') provides coherent taxonomy of personality
  - **Agreeableness** (kind, sympathetic, tolerant, helpful and generally easy to get along with)
  - **Conscientiousness** (efficient, careful, organized, dependable and think before they act)
  - **Extraversion** (energetic behaviour and are outgoing and talkative)
  - **Neuroticism** (high in anxiety, hostility, self-consciousness and impulsiveness)
  - **Openness to experience** (active imaginations, a preference for variety and intellectual curiosity)

# Background

- Conflicting results in reviews and meta-analysis:
  - Salgado (2002): no relation between Big Five personality factors and work accidents (9 studies from 1990-1999)
  - Clarke and Robertson (2008): low agreeableness is only valid and generalizable predictor (24 studies spanning more than 50 years)
  - Christian et al (2009): conscientiousness and neuroticism weakly related to safety outcomes (90 studies primarily from 1990-2008)

# Background

- Conflicting results might be explained by missing situational moderators in previous research
  - Working conditions
  - Safety climate



# Aim

- Examine whether working conditions and safety climate modified the effect of the Big Five personality traits on involvement in occupational injuries.
- Hypothesis:
  - The interplay of working conditions (standardized versus complex) and safety climate (high versus low) will create different working environments that modify the association between the specific personality traits and injury involvement.

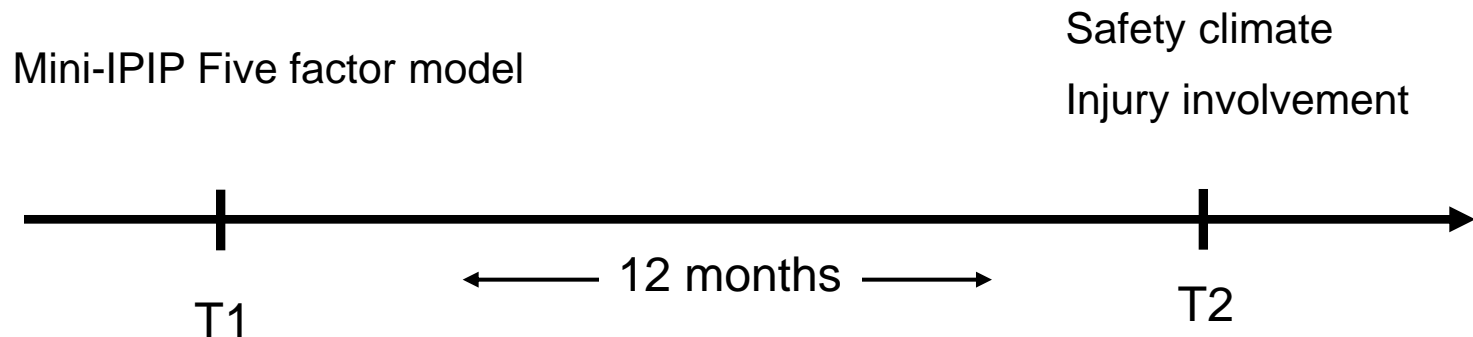
# Two different work environments



# Methods and material

## Cohort study:

- Ambulance workers from a Danish rescue service company (N = 3.888)
- Random sample of members of the biggest union organizing industrial slaughterhouse workers in Denmark (N = 2.500)



n = 1.085 Ambulance workers (all male, response rate 62% and 73%)

n = 757 Slaughterhouse workers (all male, response rate 53% and 66%)



# Results

## Characteristics of the study populations

		Ambulance workers (N = 1,085) Mean (SD)	Slaughterhouse workers (N = 757) Mean (SD)
<b>Sociodemographic variables*</b>			
Age	Range: 17-67	42.5 (11.0)	42.9 (10.8)
Seniority (in years)	Range: 0-51	17.3 (12.4)	18.5 (11.2)
<b>Personality traits*</b>			
Agreeableness	Range: 4-20	15.5 (2.0)	14.5 (2.2)
Conscientiousness	Range: 4-20	15.1 (2.6)	14.7 (2.9)
Extraversion	Range: 4-20	13.1 (2.6)	12.4 (3.0)
Neuroticism	Range: 4-20	9.4 (2.4)	10.3 (2.7)
Openness	Range: 4-20	12.7 (2.8)	12.1 (2.6)
<b>Safety climate**</b>	Range: 1-5	3.2 (0.9)	3.3 (1.1)
<b>Injury involvement (%)**</b>	Range: 0-1	0.14 (0.3)	0.15 (0.4)

\* t1

\*\* t2



# Results (odds ratio)

Total sample  
(n = 1,842)

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	All
Agreeableness	1.00
Conscientiousness	0.99
Extraversion	1.07*
Neuroticism	1.08**
Openness	1.13***

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All estimates are adjusted for other personality factors and age

(\*)  $.10 > p > 0.05$

\*  $.05 > p > .01$

\*\*  $.01 > p > .001$

\*\*\*  $p \leq .001$



# Results (odds ratio)

Total sample  
(n = 1,842)

	All	Low SC	High SC
Agreeableness	1.00	1.03	0.99
Conscientiousness	0.99	1.03	0.96
Extraversion	1.07*	1.08(*)	1.07
Neuroticism	1.08**	1.12**	1.04
Openness	1.13***	1.15***	1.13**

All estimates are adjusted for other personality factors and age

(\*) .10 > p > 0.05

\* .05 > p > .01

\*\* .01 > p > .001

\*\*\* p ≤ .001



# Results (odds ratio)

	Total sample (n = 1,842)			Complex working conditions (n = 1,085)		
	All	Low SC	High SC	All	Low SC	High SC
Agreeableness	1.00	1.03	0.99	1.02	0.98	1.07
Conscientiousness	0.99	1.03	0.96	0.98	1.04	0.92
Extraversion	1.07*	1.08(*)	1.07	1.07(*)	1.10(*)	1.05
Neuroticism	1.08**	1.12**	1.04	1.16***	1.28***	1.06
Openness	1.13***	1.15***	1.13**	1.13**	1.17**	1.11*

All estimates are adjusted for other personality factors and age

(\*) .10 > p > 0.05

\* .05 > p > .01

\*\* .01 > p > .001

\*\*\* p ≤ .001



# Results (odds ratio)

	Total sample (n = 1,842)			Complex working conditions (n = 1,085)			Standardized working conditions (n = 757)		
	All	Low SC	High SC	All	Low SC	High SC	All	Low SC	High SC
Agreeableness	1.00	1.03	0.99	1.02	0.98	1.07	1.00	1.12	0.91
Conscientiousness	0.99	1.03	0.96	0.98	1.04	0.92	1.01	1.02	1.01
Extraversion	1.07*	1.08(*)	1.07	1.07(*)	1.10(*)	1.05	1.06	1.04	1.09
Neuroticism	1.08**	1.12**	1.04	1.16***	1.28***	1.06	1.01	0.97	1.04
Openness	1.13***	1.15***	1.13**	1.13**	1.17**	1.11*	1.14**	1.15*	1.13*

All estimates are adjusted for other personality factors and age

(\*) .10 > p > 0.05

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\*\*\* p ≤ .001

# Discussion

- The results of the current study is at odds with some of the previous results and in agreement with others
  - Not a surprise given the lack of a coherent research field
  - However, in concordance with the few other existing studies that has taken a somewhat similar approach (e.g. Christian et al., 2009; Iverson & Erwin, 1997).
  - Association not simple trait-to-injury-involvement relation => need to incorporate more complex and detailed models of the accident causation chain

# Discussion

- Self-selection might be an issue...
  - Highly neurotic individuals would be aware of the fact that that they do not thrive under complex conditions – and thus would not hold these types of jobs.
- ... but not an effective prevention strategy
  - Important to (reliably) identify individual level factors that might cause a higher risk of injuries due to a mismatch between job characteristics and individual behavioural preferences
  - However, prevention is not just a matter of choosing the right people, but also about creating the right working conditions and safety climate

# Limitations

- Injuries
  - Self-reported injury data
  - Does not distinguish between at-fault and not-at-fault injuries
- Big5
  - Short measure
- Analysis
  - Single traits instead of risk profile
  - Safety climate used as an dichotomous individual-level construct instead of a continuous group-level construct
  - Lack of proper test of effect modification
- All-male sample



# Conclusion

- Individual level psychological differences are associated with higher injury involvement
  - Openness was consistently associated with higher injury involvement
  - Working conditions and the level of safety climate modified the association between injury involvement and neuroticism and extroversion
- Future research need to explore the relationship between personality, working conditions, safety climate and injury involvement further



# Thank you for your attention!

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