First validation of the INSPIRE Resilience Scale (IRS):
a new screening instrument to improve military selection

EDA ESM4: Ad Hoc Category B project proposal

EDA

Ministerie van Defensie

POLITIE
● Politieacademie

A. Arnold, NL MoD
M. Cremers, NL MoD
W. Huybens, BE MoD
G. Kreim, GE MoD
E. Oprins, TNO
C. Six, TNO
J. Ungerer, GE MoD
W. Venrooij, TNO
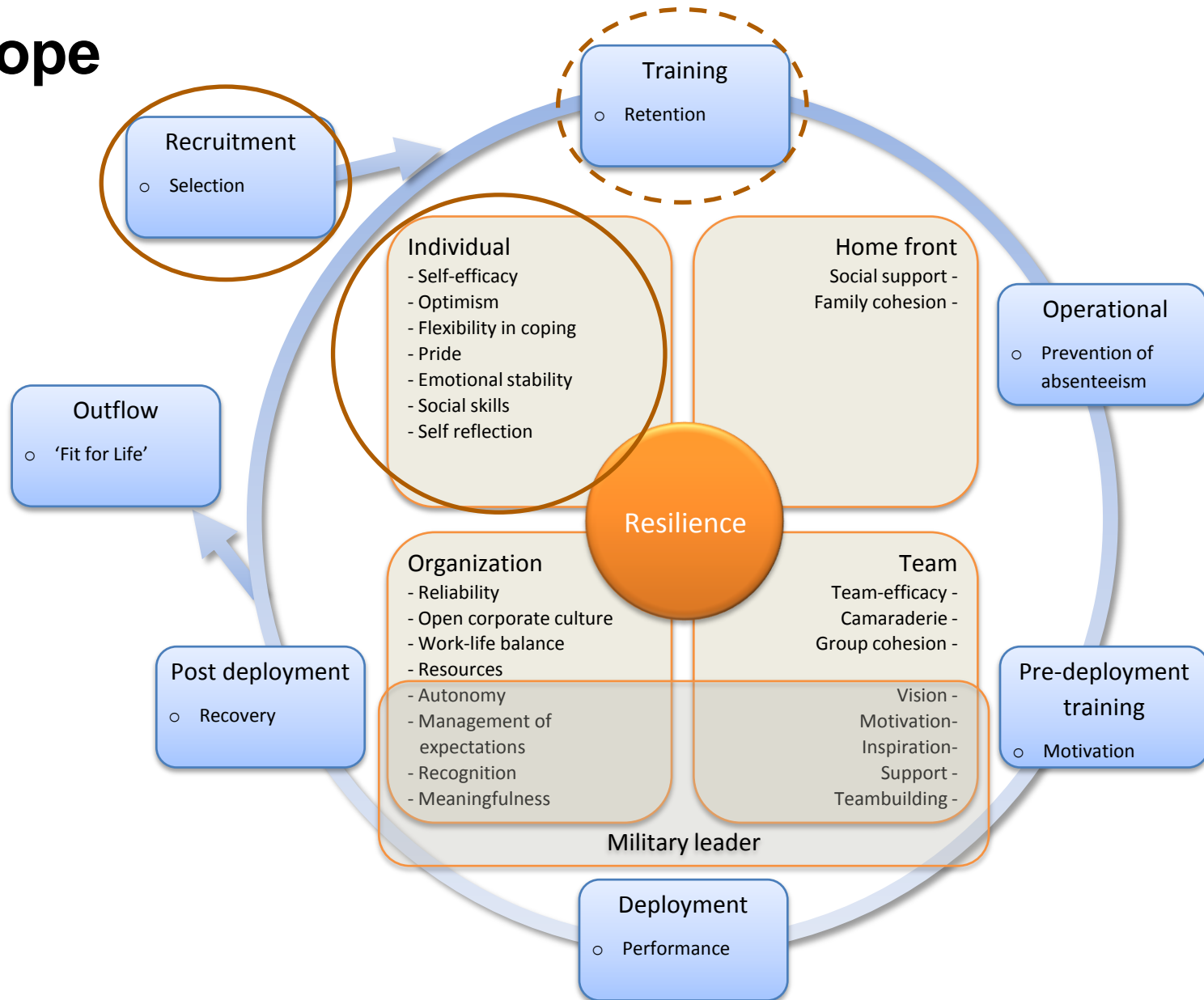G. Visser, NL PA
L. Westerveld, NL PA

Conceptual design process IRS

1
- Scope

2
- Criterion

3
- Predictors

4
- Measurement instrument

5
- Scoring and judgement

6
- First validation

Scope

Training
- o Retention

Recruitment
- o Selection

Individual
- Self-efficacy
- Optimism
- Flexibility in coping
- Pride
- Emotional stability
- Social skills
- Self reflection

Home front
Social support -
Family cohesion -

Operational
- o Prevention of absenteeism

Outflow
- o 'Fit for Life'

Resilience

Organization
- Reliability
- Open corporate culture
- Work-life balance
- Resources
- Autonomy
- Management of expectations
- Recognition
- Meaningfulness

Team
Team-efficacy -
Camaraderie -
Group cohesion -
Vision -
Motivation-
Inspiration-
Support -
Teambuilding -

Post deployment
- o Recovery

Pre-deployment training
- o Motivation

Military leader

Deployment
- o Performance

Criterion: military resilience

The capability of maintaining optimal performance during stressful circumstances, shocking events, and adversity, recovering positively afterwards, both in the short and in the long term, while sustaining motivation for the military profession and the accompanying goals.

1) Stress resistance
2) Recovery
3) Motivation

Predictors (1): literature research

Suitable instruments & relevant resilience scales:

› Existing instruments resilience (selection, employment, etc).
› Evidence on reliability & validity per instrument

Instrument	Concepts (Scales)	Reference
Dispositional Resilience Scale (DRS)	Challenge Control Commitment	Bartone, 1989
CD-RISC	Personal competence Adaptability Acceptance Control Spirituality	Connor & Davidson, 2003
Resilience Scale (RS)	Personal competence Acceptance	Wagnild & Young, 1993
Traumatic Resilience Scale (TRS)	Supportive relationships Optimism Problem solving Spirituality	Madsen & Abell, 2010
Resilience in Midlife Scale (RIM)	Self-efficacy Social networks Perseverance Internal locus of control Adaptation	Ryan & Caltabiano, 2009
Resilience Scale for Adults (RSA)	Personal competence Personal structure Social competence Family coherence Social support	Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005
Brief Resilient Coping Scale (BRCS)	Problem solving Self-efficacy	Sinclair & Wallston, 2004
Brief Resilience Scale (BRS)	Self-efficacy	Smith, Dalen, Wiggins, Tooley, Christopher &

Predictors (2): benchmark NL, BE, GE

Gap analysis predictors resilience with existing selection instruments:

› Expert judgments: most important predictors
› Main gap for coping flexibility, self-reflection

Predictors	Source	Self-efficacy	Coping flexibility	Optimism	Social competence	Pride	Emotional stability	Self-reflection	Learning ability	Extra (e.g. predictor)	Resilience (overall)
Achievement motivation	PMT	x							x		
Achievement motivation	PMO	x							x		
Achievement motivation	LEQ	x							x		
Achievement striving	NEO	x							x		
Competence	NEO	x							x		
Independence	CPI	x									
Self-esteem	NPV	x									
Self-satisfaction	NPV	x									
Flexibility	CPI		x								
Rigidity	NPV		x								
Positive Emotions	NEO			x							
Agreeableness	NEO				x						
Capacity for Status	CPI				x						
Dominance	CPI				x						
Empathy	CPI				x						
Extraversion	NEO				x						
Hostility	NEO				x						
Inadequacy	NPV				x						
Leadership	PMO				x						
Leadership	LEQ				x						
Modesty	NEO				x						
Sociability	NEO				x						
Sociability	CPI				x						
Social Inadequacy	NPV				x						
Social Presence	CPI				x						
Social skills	LEQ				x						
Teamwork	PMO				x						
Teamwork	LEQ				x						
Anxiety	NEO						x				

Measurement instrument IRS

Sources	Predictors	N items
Coping style questionnaire (Venrooij & Delahaij, 2014)	Coping flexibility	36
Military Resilience Monitor (Delahaij et al., 2014)	Optimism Self-efficacy Social competence	6 12 9
Self-reflection and insight scale (Grant, Franklin & Langford, 2002)	Self-reflection	20
Impression management (Paulus, 2006)	*Social desirability*	20
Interview BARS scales (newly designed)	Coping flexibility Self-reflection	4 5
General judgment psychologist	Resilience Learnability	1 1

Validation research of IRS

Selection

Reliability &
Concurrent validity

Resilience predictors (IRS)

Resilience:
- 360 (self-assessment, supervisors)
- Objective data (e.g. stress symptoms)

Training &
employment

Performance (more general):
- 360 (self-assessment, supervisors)
- Grades
- Objective data (e.g. dropouts)

Predictive
validity

Incremental
validity
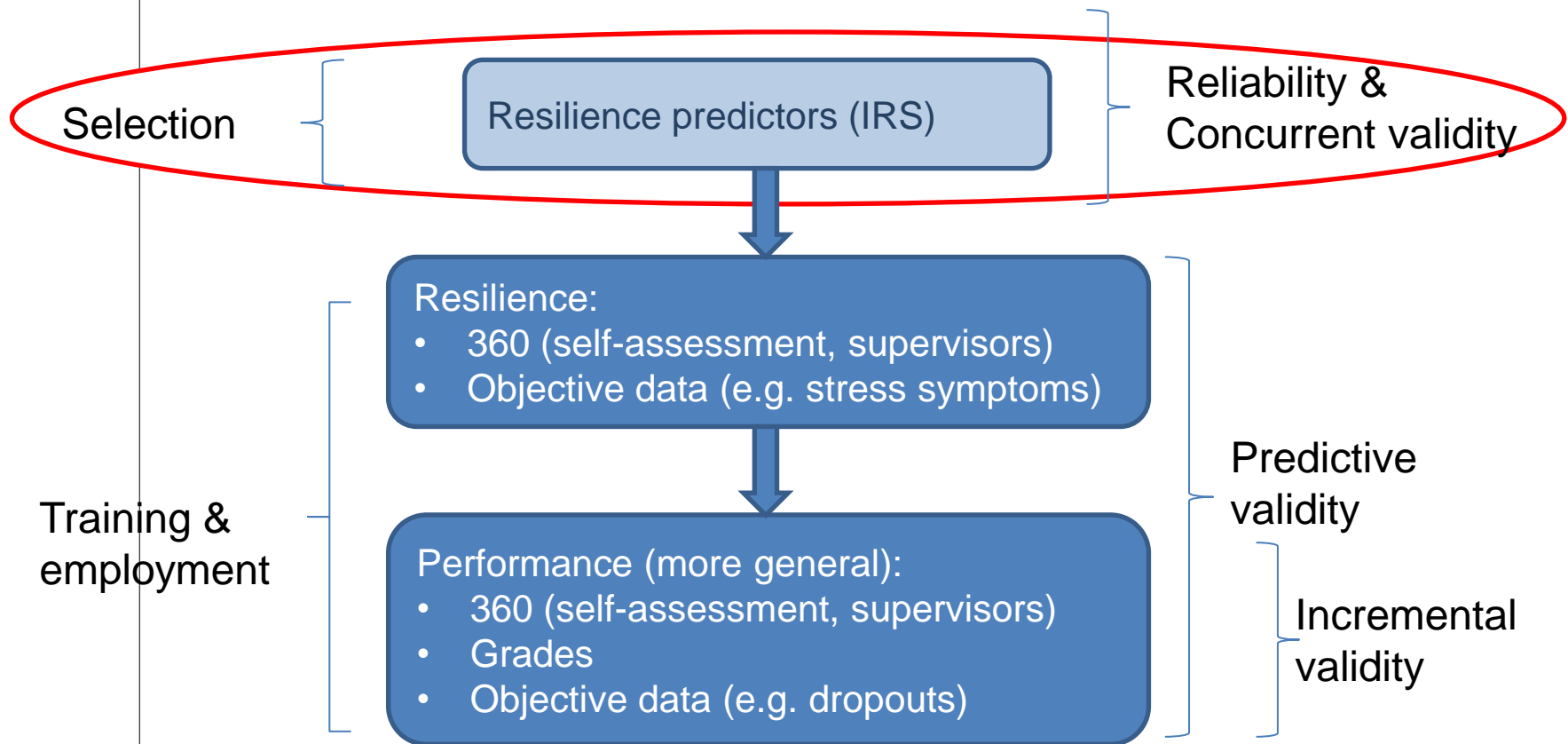
Set-up first validation study

Organisation	Questionnaire	Interview	N
NL MoD	X	X	232
BE MoD	X		579
GE MoD	X		79
NL PA	X		693
Total			**1583**

Period: April – August 2014
Participants: selection candidates

Various types of functions (e.g. from soldiers to officers)
Various educational levels

Research questions

What is the *reliability* of the IRS scales?

› Internal consistency, factor analysis, intercorrelations

What is the *construct* validity of the IRS (NL MoD)?

› Correlations with subjective judgments of psychologists

What is the *concurrent* validity of the IRS?

› Correlations with other instruments: NL PA, NL MoD, BE MoD

What are differences between organisations?

› Score distributions, analyses of variance (ANOVA)

Research questions

What is the *reliability* of the IRS scales?
› Internal consistency, factor analysis, intercorrelations

What is the *construct* validity of the IRS (NL MoD)?
› Correlations with subjective judgments of psychologists

What is the *concurrent* validity of the IRS?
› Correlations with other instruments: NL PA, NL MoD, BE MoD

What are differences between organisations?
› Score distributions, analyses of variance (ANOVA)

Reliability scales IRS – questionnaire (1)

Scales	Alpha	N items	Sub scales	N items	Alpha
Optimism	.69	6	Optimism	3	.57
			Pessimism	3	.67
Self-efficacy	.85	12	Functioning	4	.67
			Recovery	4	.72
			Task	4	.74
Social competence	.70	9	Binding	3	.72
			Help seeking	3	.71
			Intercultural skills	3	.63
Emotional stability	.73	16	Dependence	4	.69
			Anxiety	4	.53
			Sentiment	4	.58
			Fear	4	.51
Self-reflection	.85	20	Insight	8	.77
			Need	6	.79
			Engagement	6	.76

N=1583

Factor analysis showed clear subscales for the original MRM scales (*self-efficacy*, *optimism, social competence*) and also for original *self-reflection* (2 scales instead of 3), but not for *emotional stability*.

Reliability scales IRS – questionnaire (2)

Scale	Sub scales	N items	Alpha
Coping flexibility	Acceptance	3	.69
	Distraction	3	.85
	Growth	3	.64
	Humor	3	.73
	Analysis	5	.75
	Positive reappraisal	4	.67
	Support	5	.85

N=1583

From factor analysis (Varimax rotation) and reliability analysis, it was decided to select 7 out of the original 12 coping styles (see table) with a re-arrangement of items for *Analysis* and *Support.*

Items will be added to increase the number of items and alpha's.

Reliability scales interview: BARS scales (NL MoD)

Rotated Component Matrix[a]

	Component 1	Component 2
SELFREFL3	,845	
SELFREFL4	,802	
SELFREFL1	,785	
SELFREFL2	,770	
SELFREFL5	,751	
COPFLEX4		,873
COPFLEX3		,831
COPFLEX2		,790
COPFLEX1		,747

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

N=232
Explained variance: 72,7%

Scale	Cronbach's alpha
Self-reflection	.90
Coping flexibility	.89

Correlations

		COPFLEX (assessor judgment)	SELFREFL (assessor judgment)
COPFLEXtot (calculated scale)	Pearson Correlation	,923[**]	,663[**]
	Sig. (2-tailed)	,000	,000
	N	222	229
SELFREFLtot (calculated scale)	Pearson Correlation	,602[**]	,915[**]
	Sig. (2-tailed)	,000	,000
	N	222	229

**. Correlation is significant at the 0.01 level (2-tailed).

Intercorrelations BARS + questionnaire (NL MoD)

Correlations		Optimism	Self-efficacy	Social competence	Self-reflection	Emotional stability
Coping flexibility (BARS)	Pearson Correlation	,194**	,192**	,167*	,247**	-,051
	Sig. (2-tailed)	,003	,003	,011	,000	,437
	N	232	232	232	232	232
Self-reflection (BARS)	Pearson Correlation	,235**	,089	,116	,222**	-,055
	Sig. (2-tailed)	,000	,175	,077	,001	,406
	N	232	232	232	232	232
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

As expected, *self-reflection* in BARS and quest. are sign. correlated. *Emotional stability* does not correlate with BARS scales at all.

Impression management: correlations IRS

Correlations						
		Optimism	Self-efficacy	Social competence	Emotional stability	Self-reflection
Impression management	Pearson Correlation	,200**	,288**	,216**	,159**	,283**
	Sig. (2-tailed)	,000	,000	,000	,000	,000
	N	1531	1529	1531	1531	1531

Correlations								
		Acceptance	Distraction	Growth	Humor	Analyse	Pos Appraisal	Support
Impression management	Pearson Correlation	,010	-,052*	,255**	-,098**	,278**	,160**	,135**
	Sig. (2-tailed)	,688	,043	,000	,000	,000	,000	,000
	N	1531	1531	1531	1531	1531	1531	1531

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

No correlation above .40/.50: no significant influence of social desirability

Research questions

What is the *reliability* of the IRS scales?
› Internal consistency, factor analysis, intercorrelations

What is the *construct* validity of the IRS (NL MoD)?
› Correlations with subjective judgments of psychologists

What is the *concurrent* validity of the IRS?
› Correlations with other instruments: NL PA, NL MoD, BE MoD

What are differences between organisations?
› Score distributions, analyses of variance (ANOVA)

Correlations IRS with assessor judgments (NL MoD)

Correlations		Coping flex (BARS)	Self-reflection (BARS)	Optimism	Self-efficacy	Social competence	Emotional stability	Self-reflection
RESILIENCE	Pearson Correlation	,642**	,524**	,122	,214**	,082	,100	,108
	Sig. (2-tailed)	,000	,000	,066	,001	,218	,130	,103
	N	229	229	229	229	229	229	229
LEARNABILITY	Pearson Correlation	,262**	,353**	,046	,017	-,063	,071	-,011
	Sig. (2-tailed)	,000	,000	,485	,793	,342	,280	,873
	N	231	231	231	231	231	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Very high (inter)correlations between own assessors' judgments of interview (BARS) scales but are own judgements.

Hardly any correlations between assessors' judgments and IRS scales.

Research questions

What is the *reliability* of the IRS scales?
› Internal consistency, factor analysis, intercorrelations

What is the *construct* validity of the IRS (NL MoD)?
› Correlations with subjective judgments of psychologists

What is the *concurrent* validity of the IRS?
› Correlations with other instruments: NL PA, NL MoD, BE MoD

What are differences between organisations?
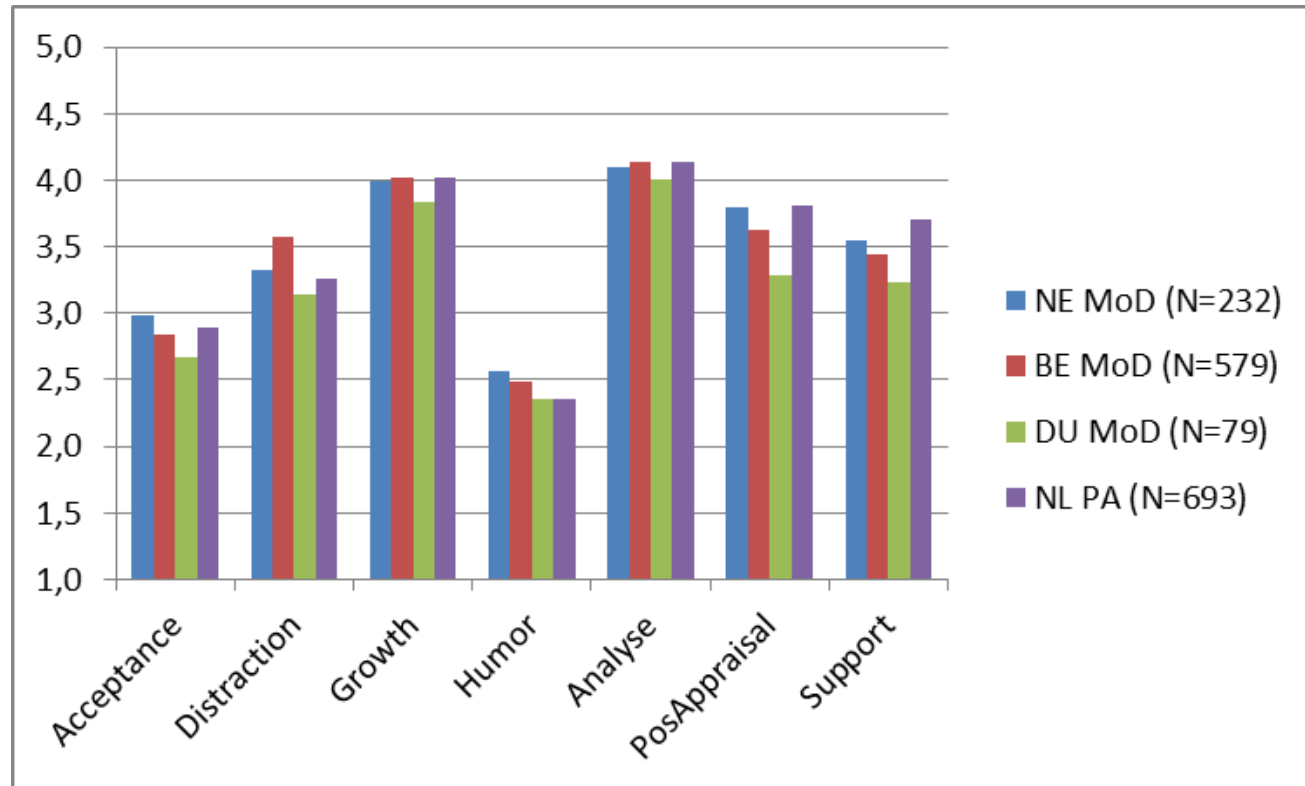› Score distributions, analyses of variance (ANOVA)

Differences between organisations (total) - 1
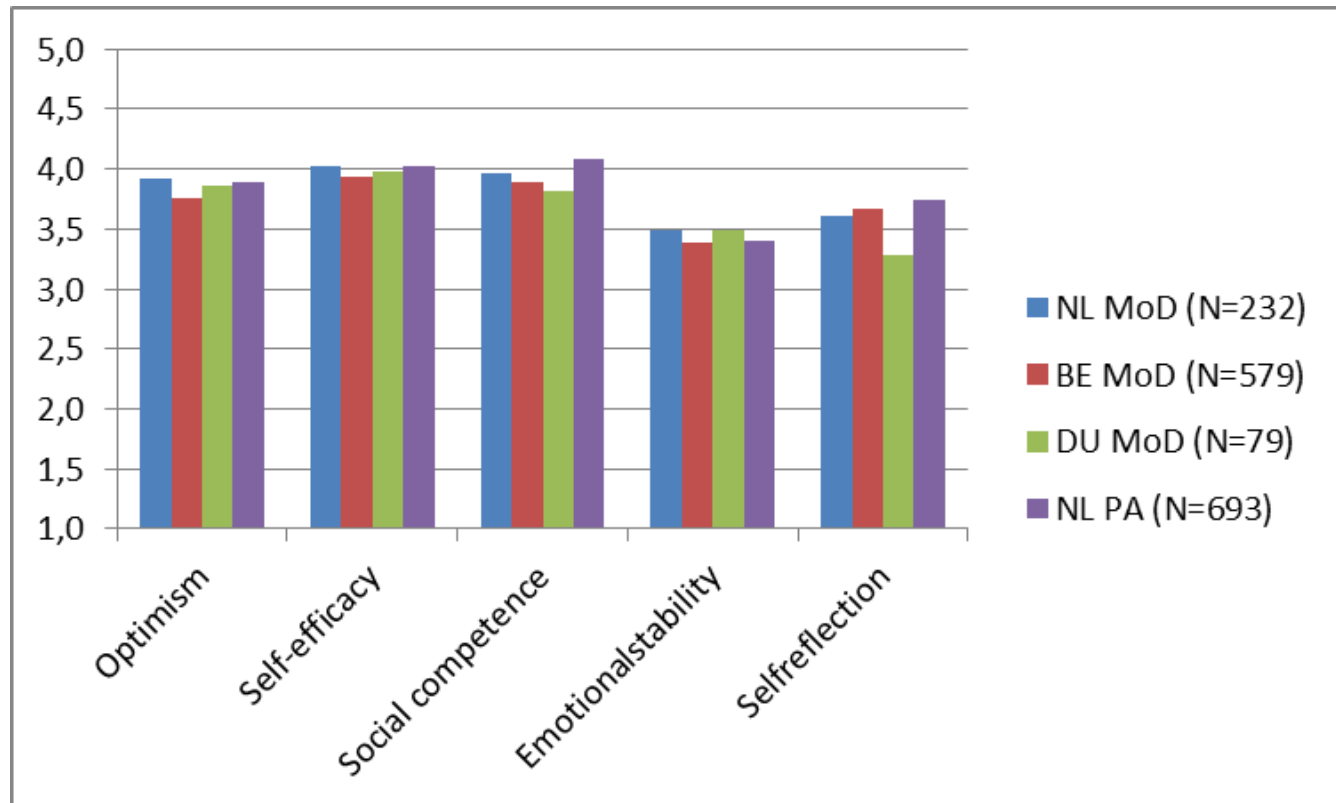
Significant results (ANOVA) for all
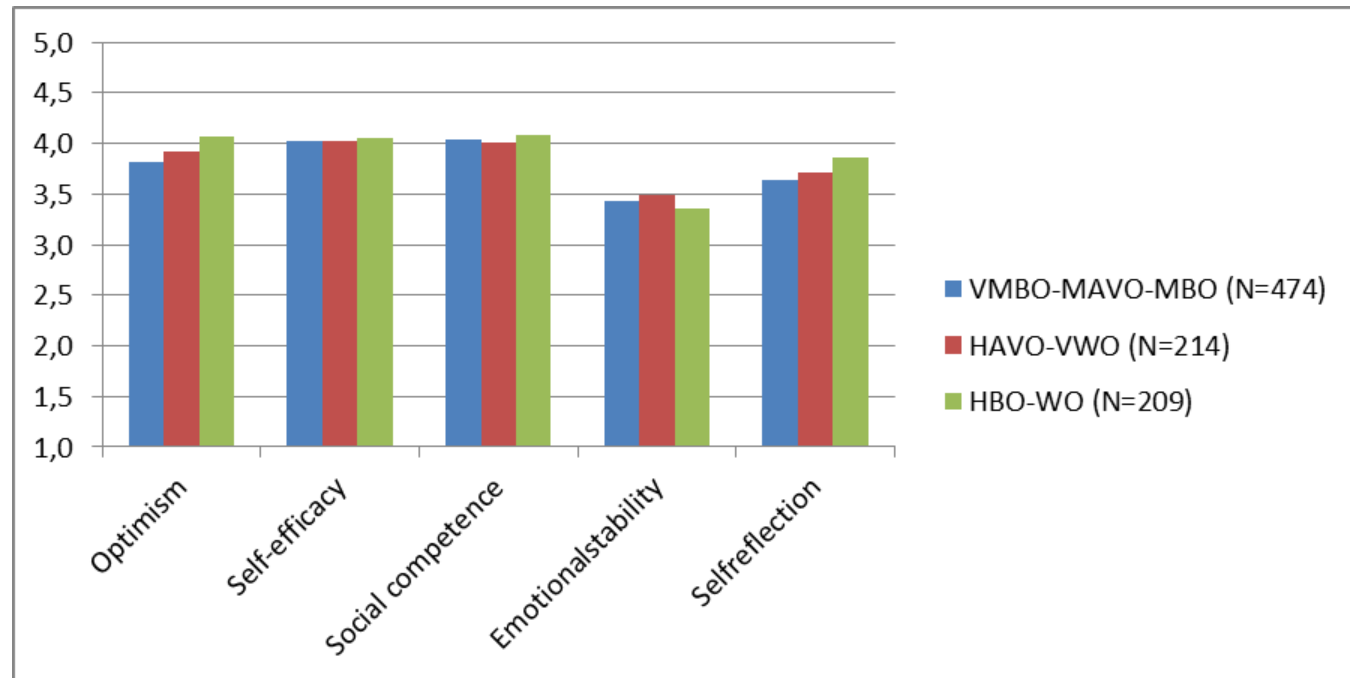NL PA: generally the highest scores for all scales, followed by NL MoD

Differences between organisations (total) - 2

Significant results (ANOVA) for all
Again, NL PA relatively highest results on all coping styles
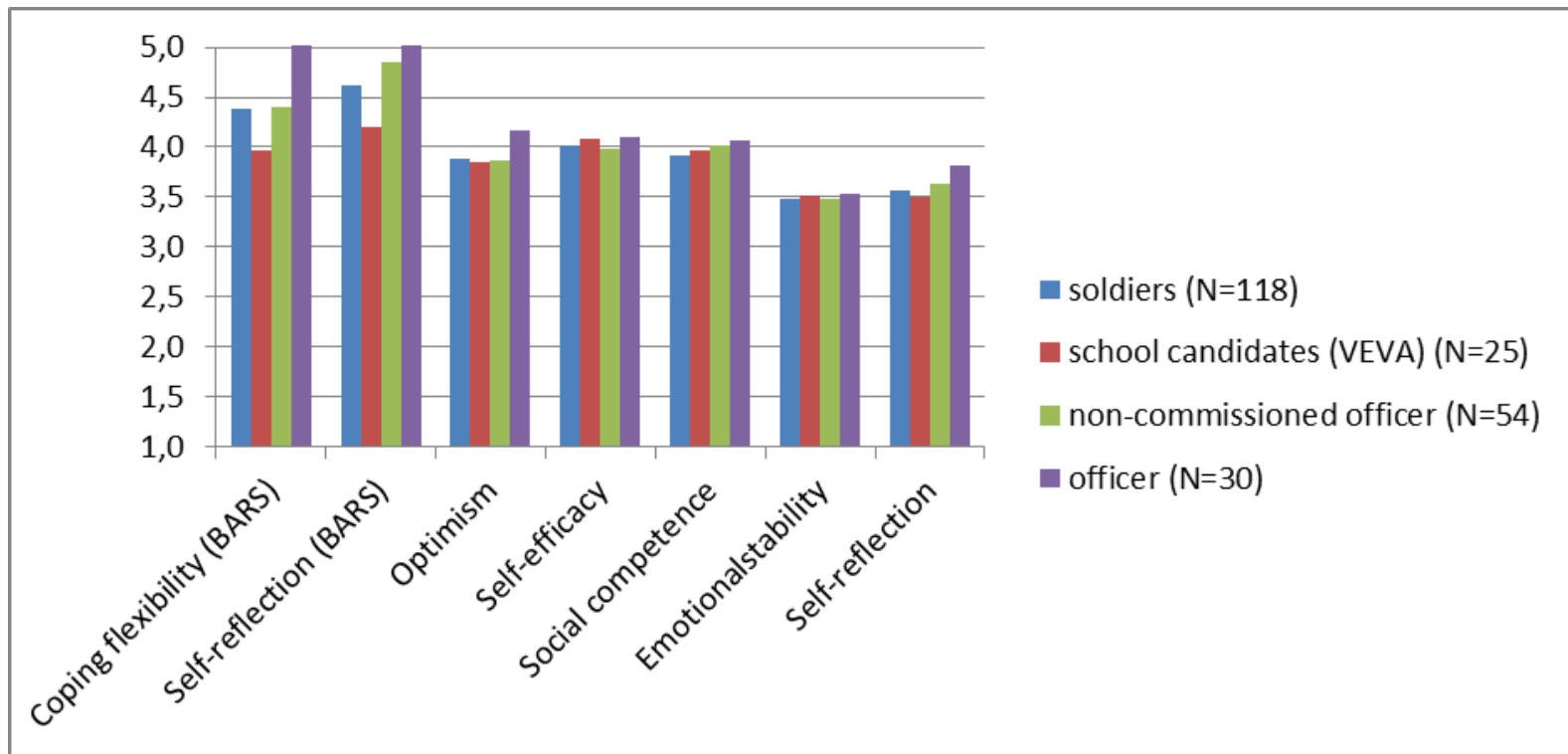Many variations between coping styles e.g. *humor* vs. *analysis*

Differences for education (NL MoD + PA) - 1

Significant results (ANOVA) for all, except for *self-efficacy, social competence.* However, very small differences, not clearly higher results for higher education.

Differences between functions (NL MoD) - 1

Significant results (ANOVA) for all, except for *self-efficacy, social competence, emotional stability.*
Remarkable higher results for (non-commissioned) officers in interview

Overall conclusions first validation of IRS

> Reliability:
> > Maintain overall scales questionnaire except for *coping flexibility* (7 out of 12); *emotional stability* to be re-considered.
> > Maintain two BARS scales as they are, very high reliability
> > No influence of social desirability; scale could be removed

> Construct validity:
> > To be investigated further based on selection decisions

> Differences between organisations:
> > Dependent on population (e.g. functions, education)

Overall conclusions & future research

› Overall conclusions:
  › Reliability: in general OK, some adaptations of (sub) scales for *coping flexibility*, *emotional stability*.
  › Construct/concurrent validity: some contradictory results, to be investigated further (also) based on selection decisions
  › Differences between organisations: variety of populations due to functions, education levels, age, target group etcetera.

› Future research:
  › Predictive validity with updated IRS based on training and deployment performance measures (2015 – 2018)