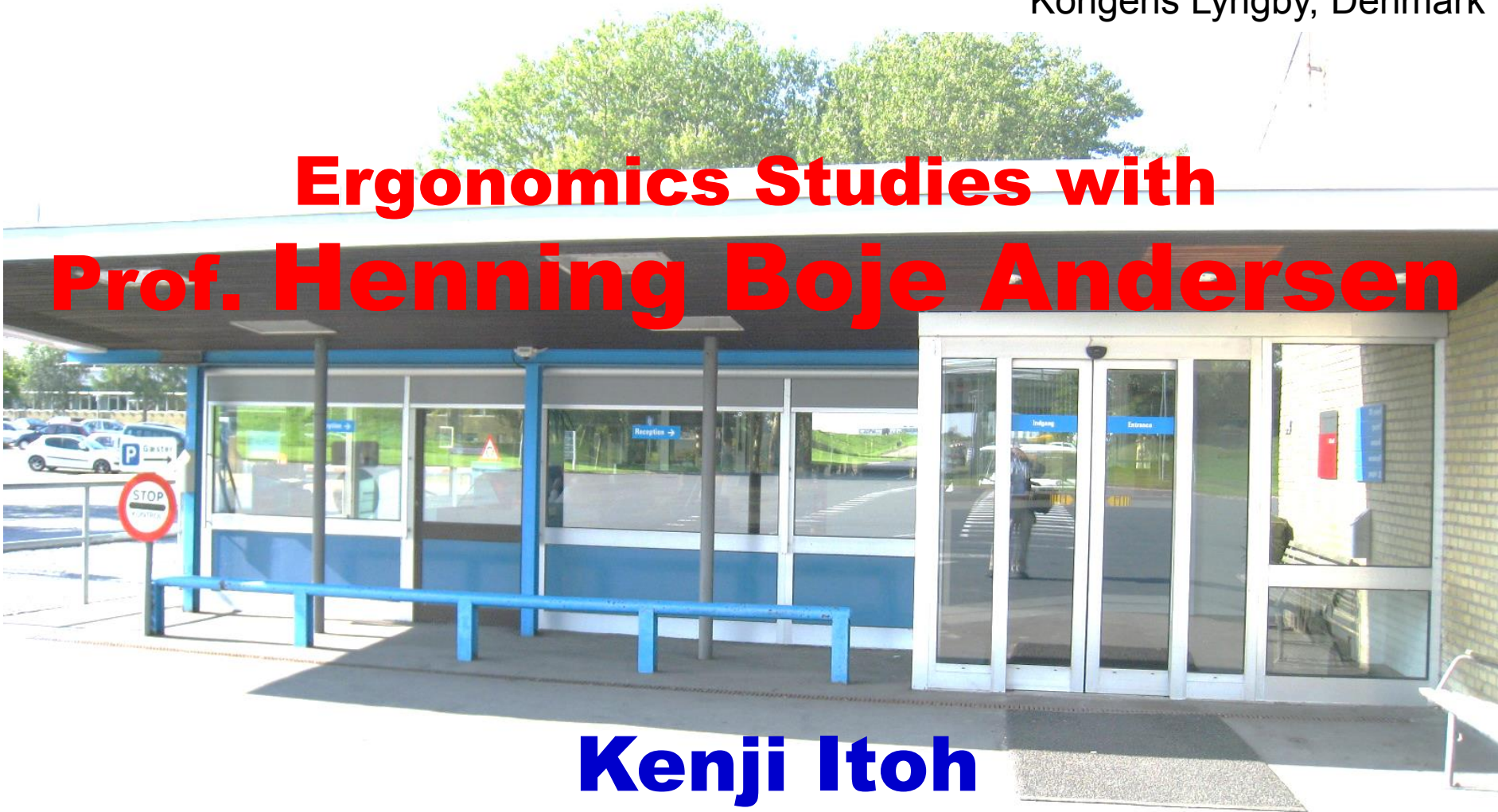


November 14, 2018
Technical University of Denmark,
Kongens Lyngby, Denmark

Ergonomics Studies with Prof. Henning Boje Andersen

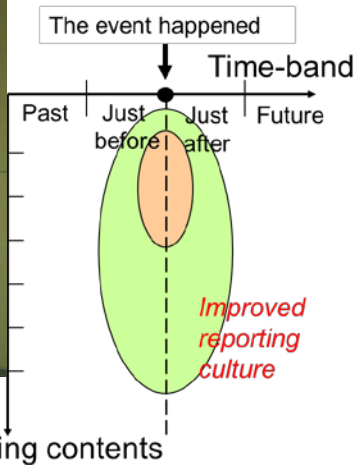
Kenji Itoh

(Tokyo Institute of Technology)



Joint Projects with Henning

Safety culture in railway



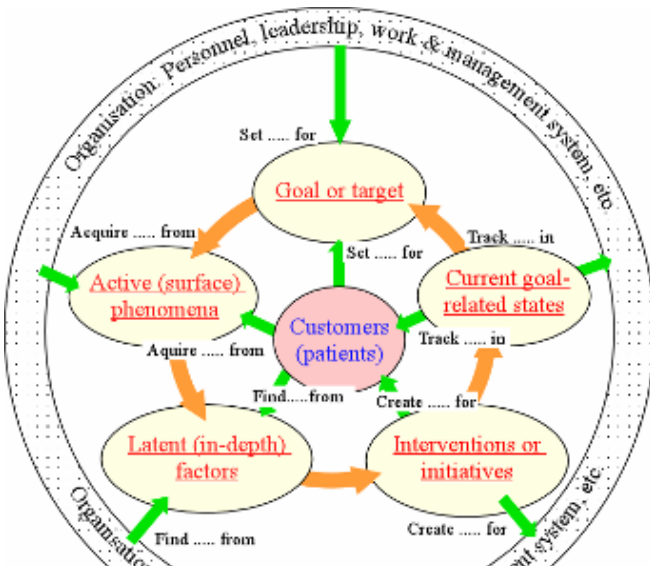
Human error taxonomy

Safety culture/climate in healthcare

- Communication
- Power distance
- Blame-free atmosphere

Staff attitudes to error reporting

Patient views of safety-related issues



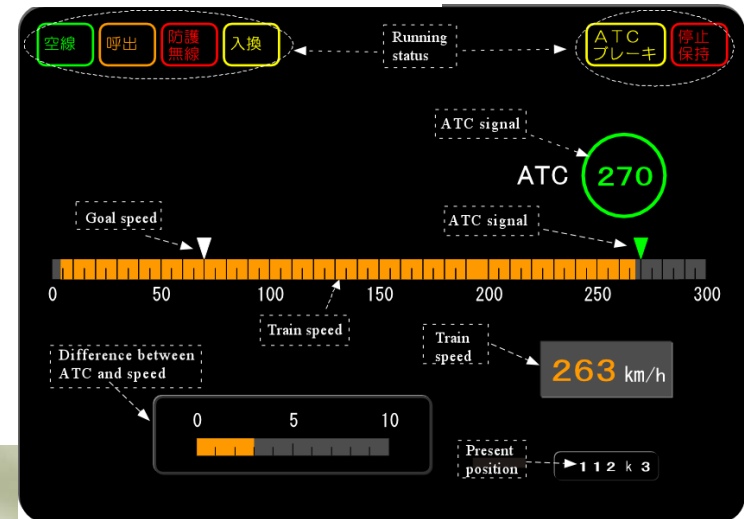
Cockpit interface in bullet train



Task observation



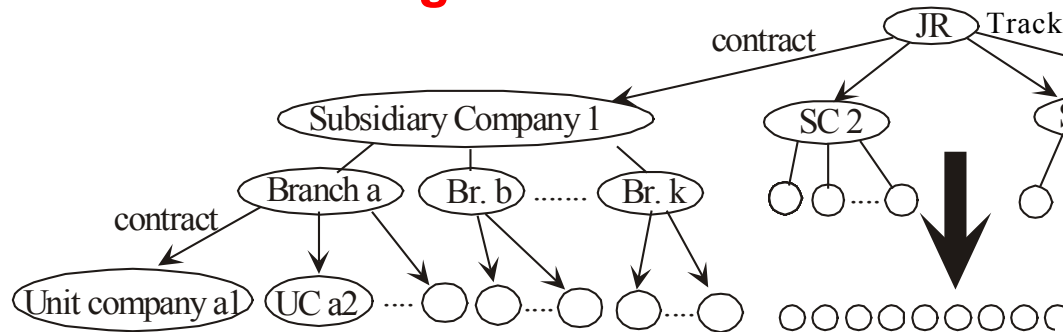
Interface design



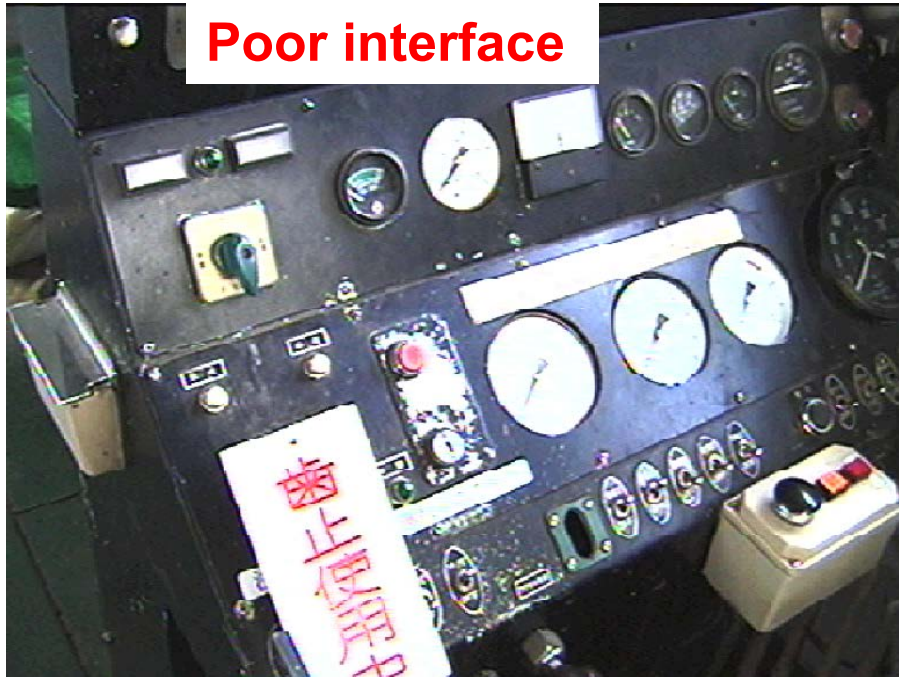
Simulator experiments

Operations and organisation for track maintenance trains

Hierarchical structure of track maintenance organisation



Stressful conditions of train operations

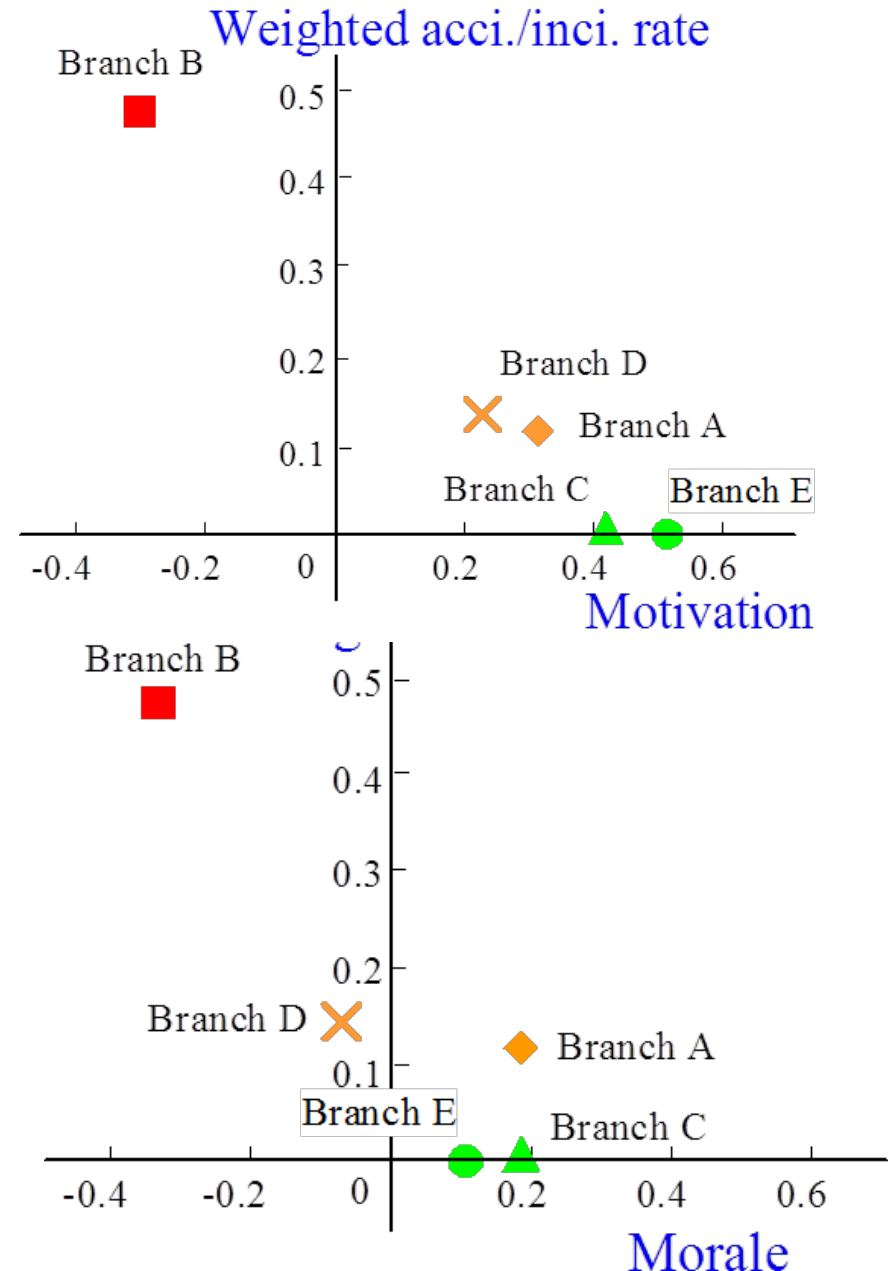
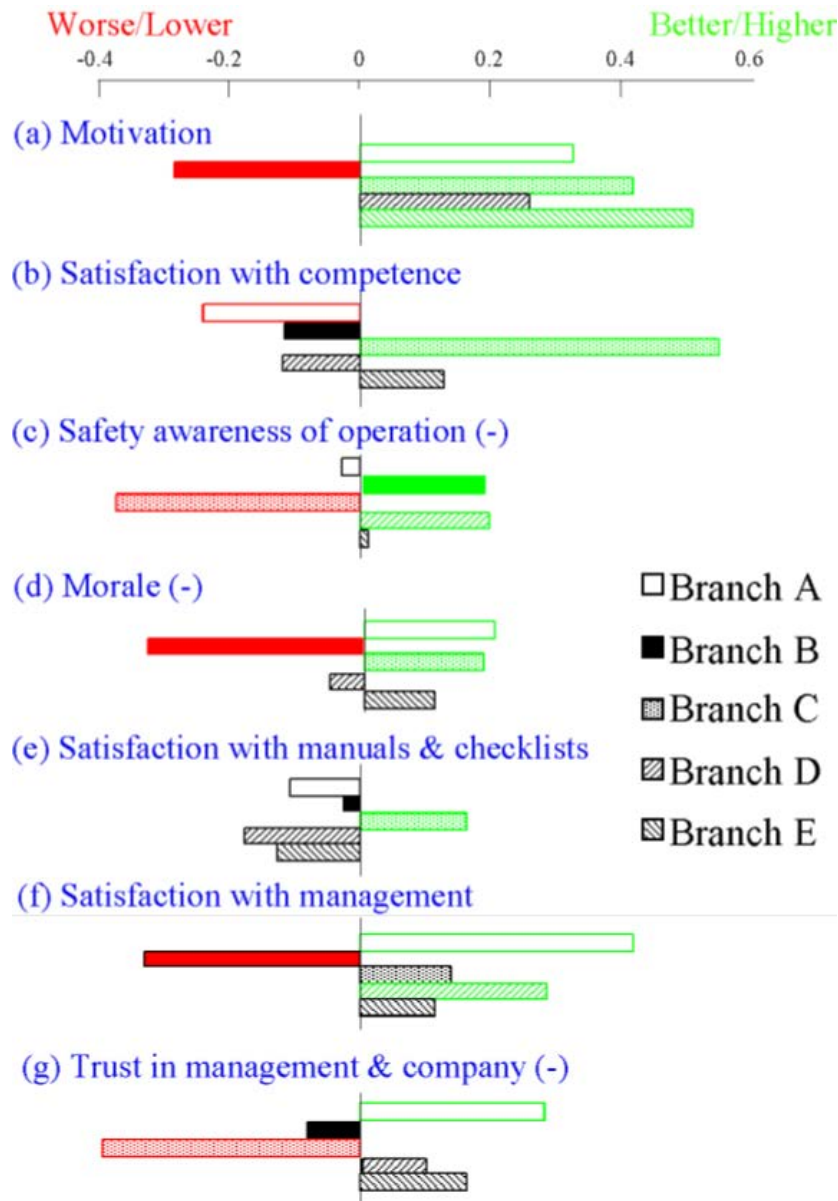


Poor interface



Safety climate in railway

(Itoh & Andersen, 1999; Itoh et al., 2001; 2004)



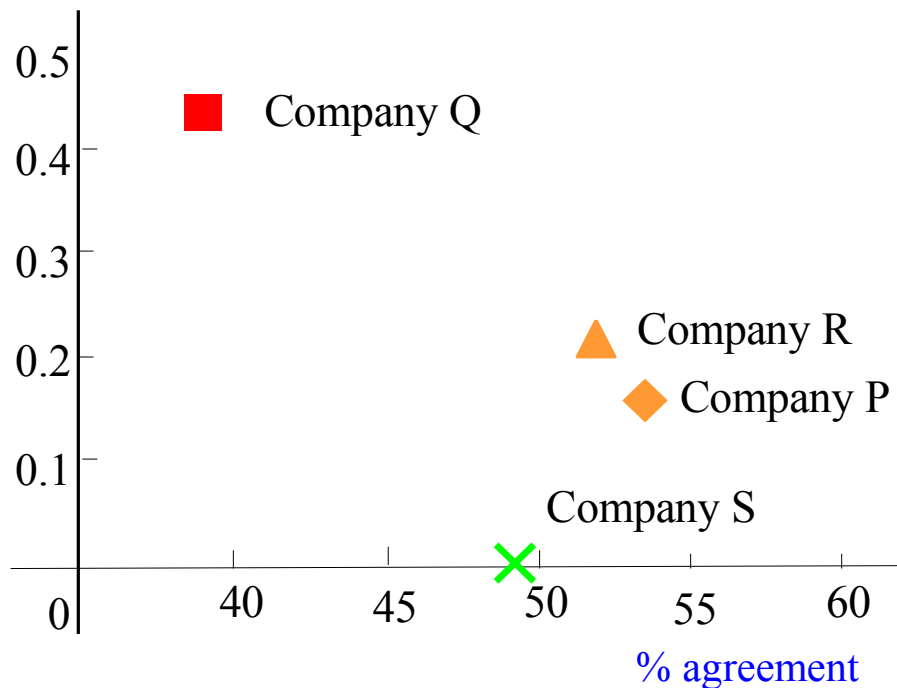
Contributions of motivation & morale to safety outcomes

--- Company-based analysis ---

(Itoh et al., 2001; 2004)

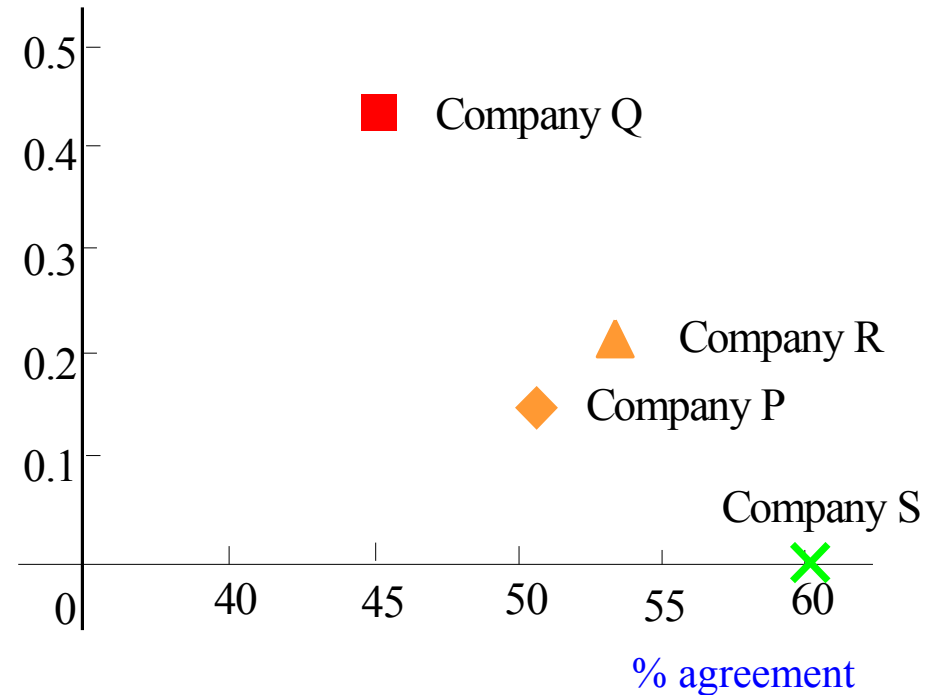
(a) Motivation

Weighted acci./inci. rate (/100km x year)



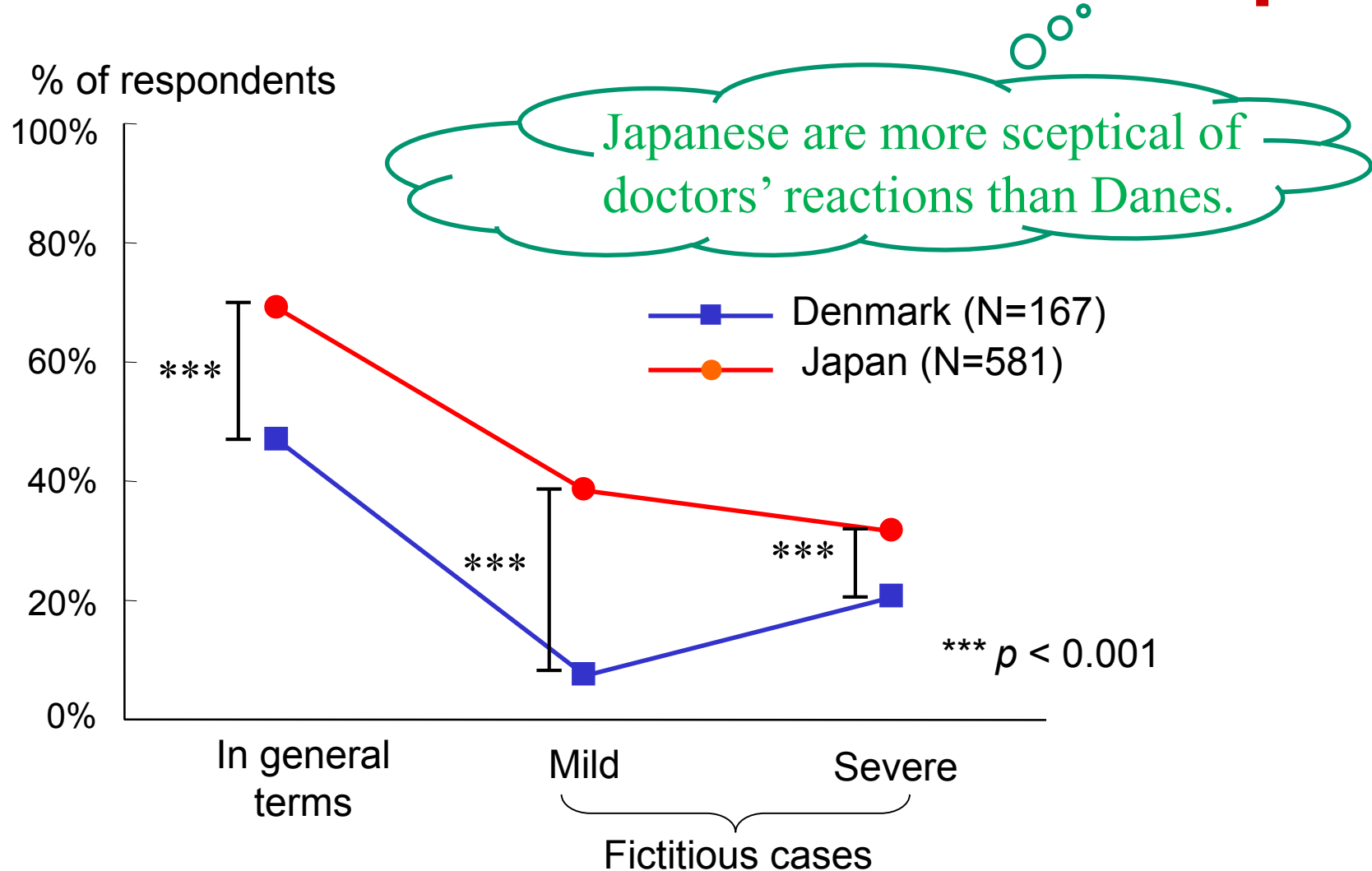
(b) Morale

Weighted acci./inci. rate (/100km x year)



Cross-cultural comparisons: JP vs. DK

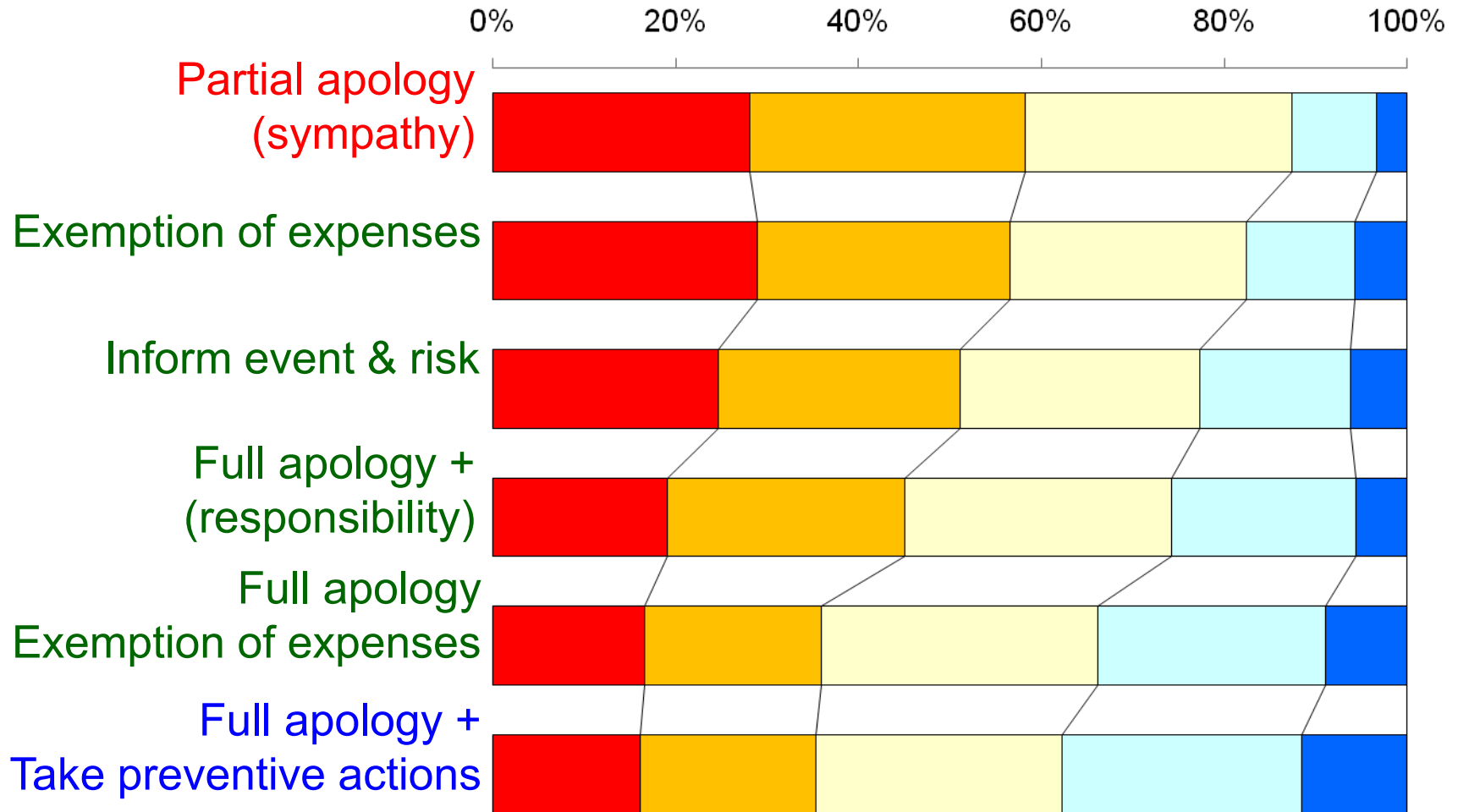
Dr. does NOT inform about event & risk to pt.



Pt. acceptance to Dr. apology

I will come to this hospital again, if Dr. would....

(Itoh & Andersen, 2009)



■ Definitely not ■ Probably not ■ Neutral ■ Yes, probably ■ Yes, definitely

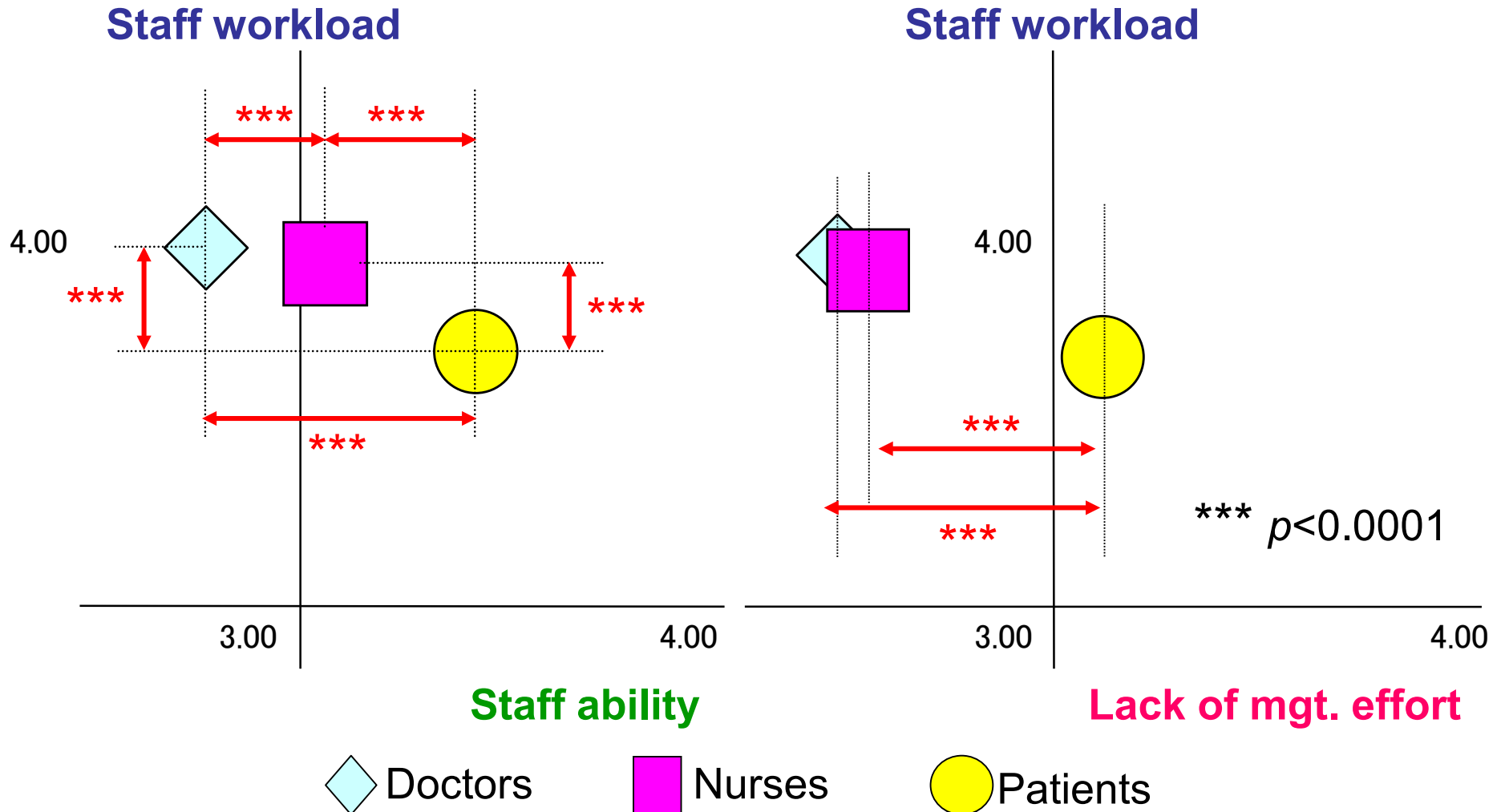
Identical structure of error causes

--- perceived by Pt., Dr. & Ns. ---

(Itoh & Andersen, 2007)

Items	Staff workload			Staff ability			Lack of mgt. effort		
	Pt.	Dr.	Ns.	Pt.	Dr.	Ns.	Pt.	Dr.	Ns.
● Working great workload	0.60	0.76	0.57	-0.13	-0.04	-0.05	-0.05	0.05	0.04
● Fewer nurses than required	0.86	0.62	0.79	0.09	0.18	-0.04	0.13	0.10	0.15
● Fewer doctors than required	0.71	0.66	0.66	-0.04	0.11	0.04	0.14	0.10	0.14
● Not responsible for task	-0.21	-0.03	-0.12	0.64	0.74	0.71	0.29	0.03	0.18
● Not sufficiently competent	-0.07	0.08	-0.03	0.82	0.79	0.74	0.23	0.22	0.13
● Inexperienced staff left	0.23	0.23	0.30	0.45	0.40	0.34	0.34	0.11	0.16
● Bad doctors allowed to work	0.01	0.14	0.06	0.47	0.44	0.37	0.59	0.38	0.41
● Mgt. do too little for safety	-0.03	0.02	0.08	0.29	0.06	0.21	0.74	0.81	0.84
● Few resources allocated	0.16	0.18	0.29	0.13	0.23	0.12	0.45	0.62	0.53
Variance accounted for	34%	19%	30%	24%	33%	22%	10%	14%	11%
Cronbach's alpha	0.75	0.72	0.71	0.72	0.67	0.62	0.71	0.66	0.68

Figures: Factor loadings



Major barriers against reporting

shared by JP & DK

(Itoh & Andersen, 2004)

*Identical construct
elicited in Iceland, New
Zealand & Nigeria*

Fear of sanctions
& disrepute

Lack of encourage.
& motivation

Reasons for not reporting

DK

JP

I

II

I

II

The medical licensing board	0.813	-0.337	0.825	-0.226
The press might start writing	0.681	-0.292	0.810	-0.249
My career might suffer	0.811	-0.265	0.794	-0.230
I might get a reprimand	0.855	-0.261	0.763	-0.293
The patient may file a complaint	0.779	-0.176	0.718	-0.272
Fear of appearing incompetent	0.769	-0.020	0.715	-0.063

Lack of trust in our department	0.632	0.319	0.630	0.348
Too cumbersome	0.524	0.489	0.579	0.422
Would not help the patient	0.391	0.120	0.564	0.391
Will lead not improvement in our ward	0.494	0.436	0.489	0.541
Don't know who is responsible	0.468	0.461	0.439	0.451
No tradition in department/ward	0.533	0.488	0.359	0.535
When I'm busy I forget it	0.352	0.415	0.341	0.582

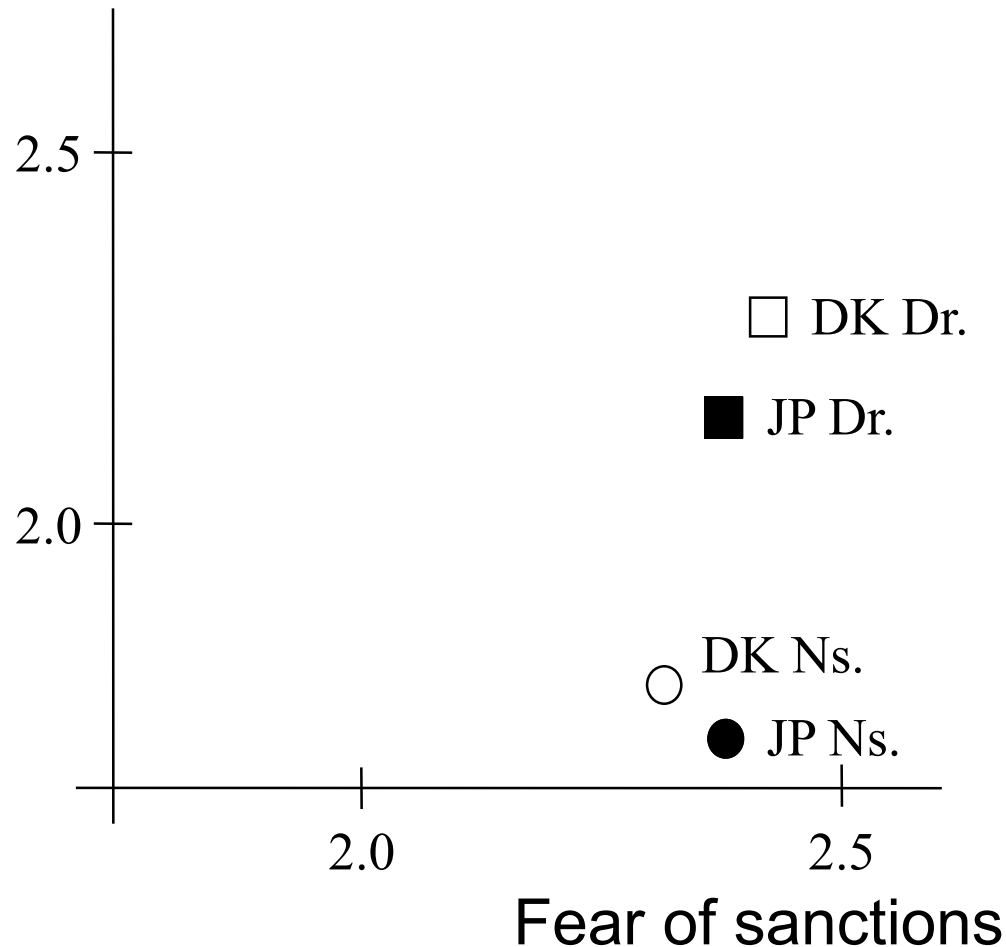
Cronbach's alpha	0.894	0.756	0.890	0.801
Variance accounted	45%	11%	44%	13%

Stronger barriers for DK & JP

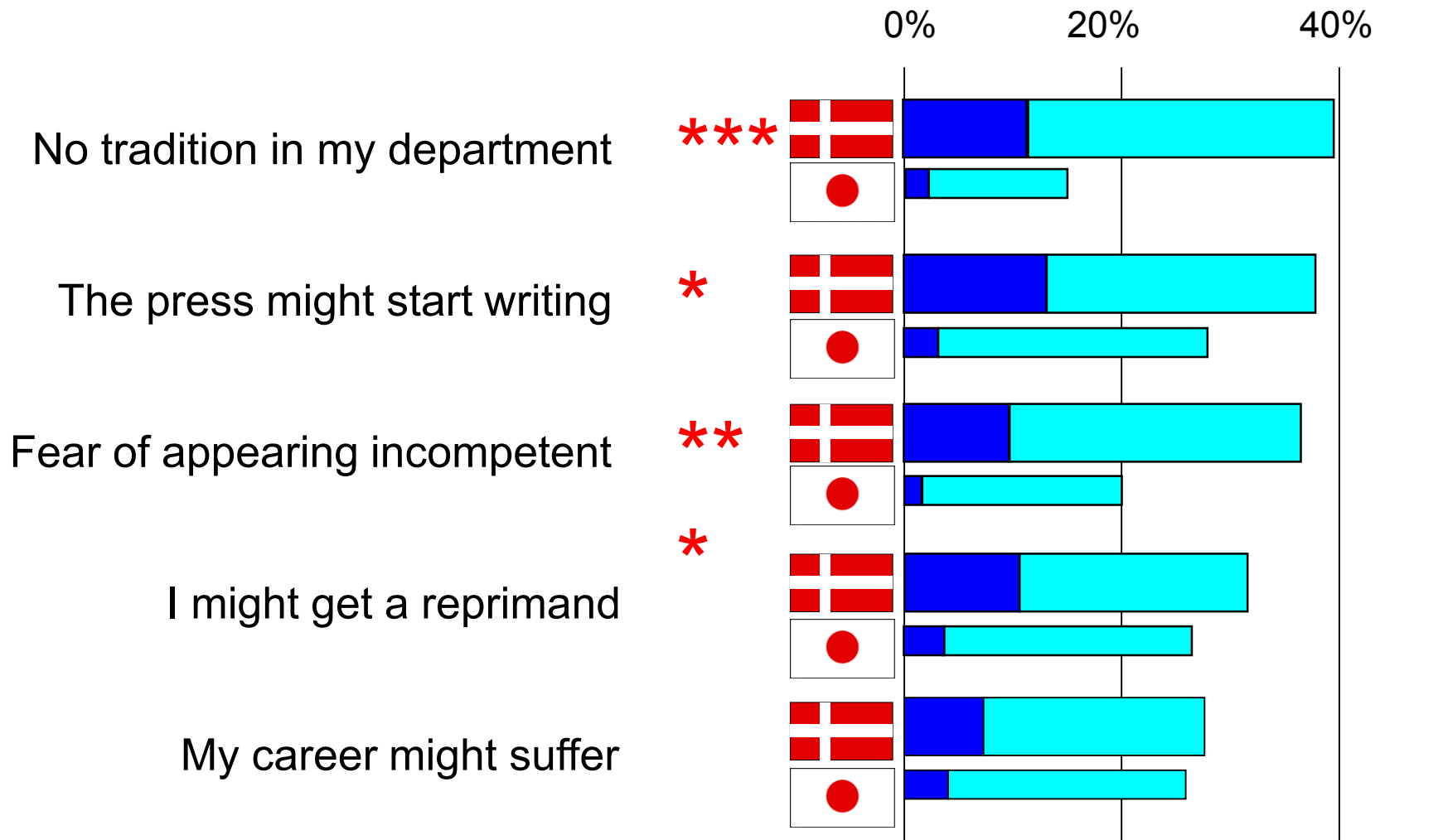
--- Fear of sanctions is greater obstacle against reporting

(Itoh & Andersen, 2004)

Lack of encouragement



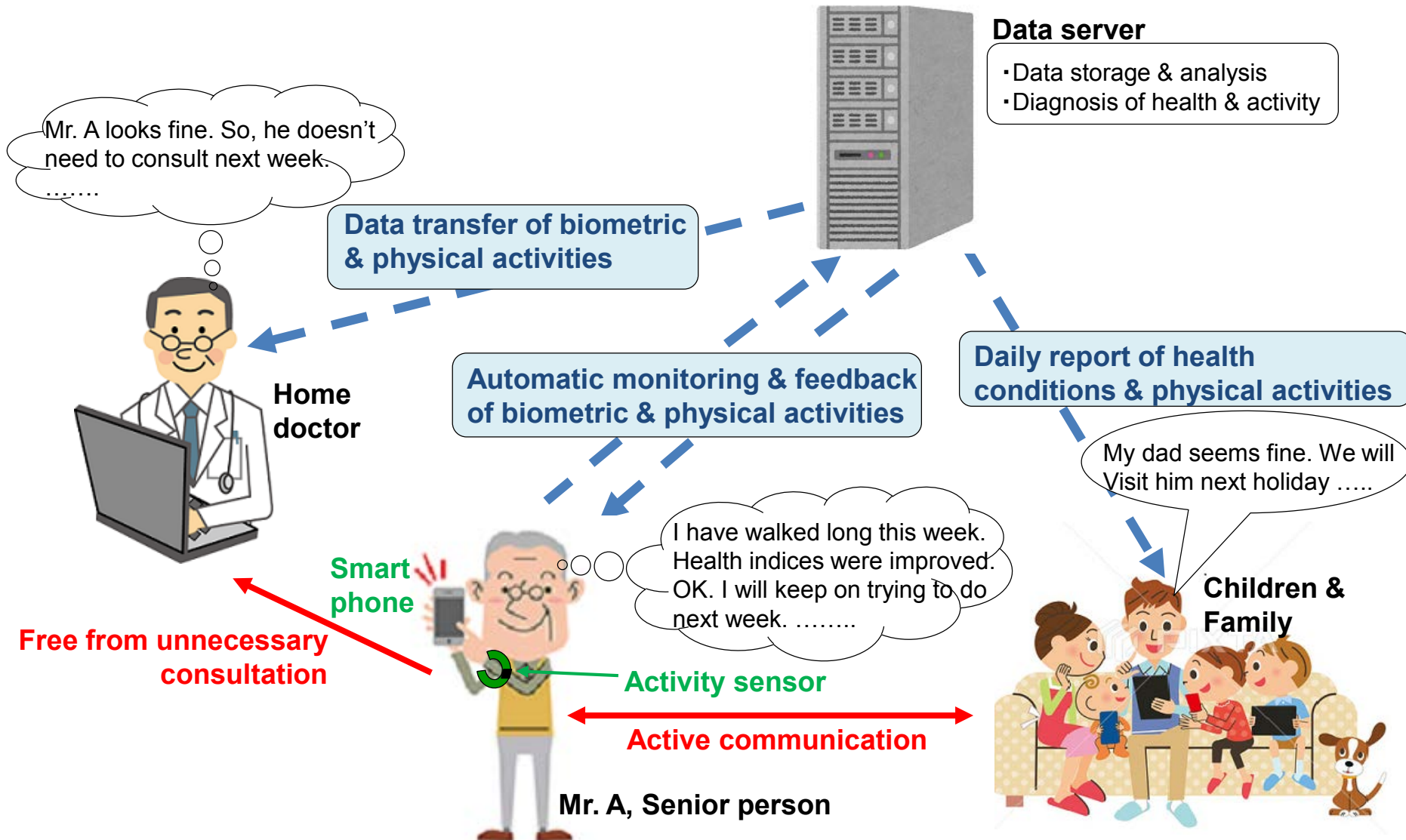
Main reasons for Danish doctors



Mann-Whitney test * : $p < 0.05$ *** : $p < 0.001$

■ Agree strongly ■ Agree slightly

Current Joint Project with Henning: Daily Life Support by IT& Sensor Technology in Aging Society



A photograph of two men standing on a gravel path in front of a large, turquoise lake. In the background, there are steep, rocky mountains with patches of snow. The man on the left is wearing a light blue button-down shirt, dark jeans, and brown shoes. The man on the right is wearing a light blue button-down shirt, dark trousers, and brown shoes. Both men are smiling at the camera. The sky is overcast with grey clouds.

**Thank you, Henning,
for your long-term cooperation!**

I hope we are collaborating further.

References

- Itoh, K. and Andersen, H.B. (1999). Motivation and Morale of Night Train Drivers Correlated with Accident Rates. *Proceedings of the International Conference on Computer-Aided Ergonomics and Safety*, Barcelona, Spain, May 1999 (CD ROM).
- Itoh, K. and Andersen, H.B. (2004). Reasons for Not Reporting Adverse Events: The Views of Danish and Japanese Healthcare Staff. Paper presented in the *9th European Forum on Quality Improvement in Health Care*, Copenhagen, Denmark, May 2004.
- Itoh, K. and Andersen, H.B. (2007). Causes of Medical Errors as Perceived by Patients and Healthcare Staff. *Proceedings of the European Safety and Reliability Conference 2007 -- ESREL 2007*, Stavanger, Norway, June 2007 (In T. Aven and J.E. Vinnem (Eds.), *Risk, Reliability and Societal Safety*, Vol. 1: Specialisation Topics, pp.179-185, Taylor & Francis, London).
- Itoh, K. and Andersen, H.B. (2009). Patient Reactions to Staff Apology after Adverse Event and Changes of their Views in Four Year Interval. *Proceedings of the Working Conference on Human Error, Safety and Systems Development*, pp.16-30, Brussels, Belgium, September 2009.
- Itoh, K., Andersen, H.B. and Seki, M. (2004). Track Maintenance Train Operators' Attitudes to Job, Organisation and Management and Their Correlation with Accident/Incident Rate. *Cognition, Technology & Work*, 6(2), 63-78.
- Itoh, K., Andersen, H.B., Seki, M. and Hoshino, T. (2001). Safety Culture of Track Maintenance Organizations and Its Correlation with Accident/Incident Statistics. *Proceedings of the 20th European Annual Conference on Human Decision Making and Manual Control*, pp.139-148, Copenhagen, Denmark, June 2001.