

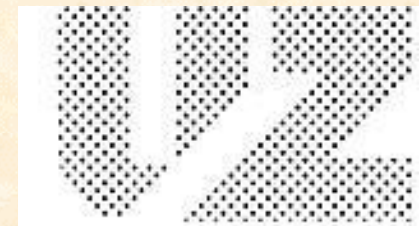
STEMPROBLEMEN IN EN DOOR HET WERK

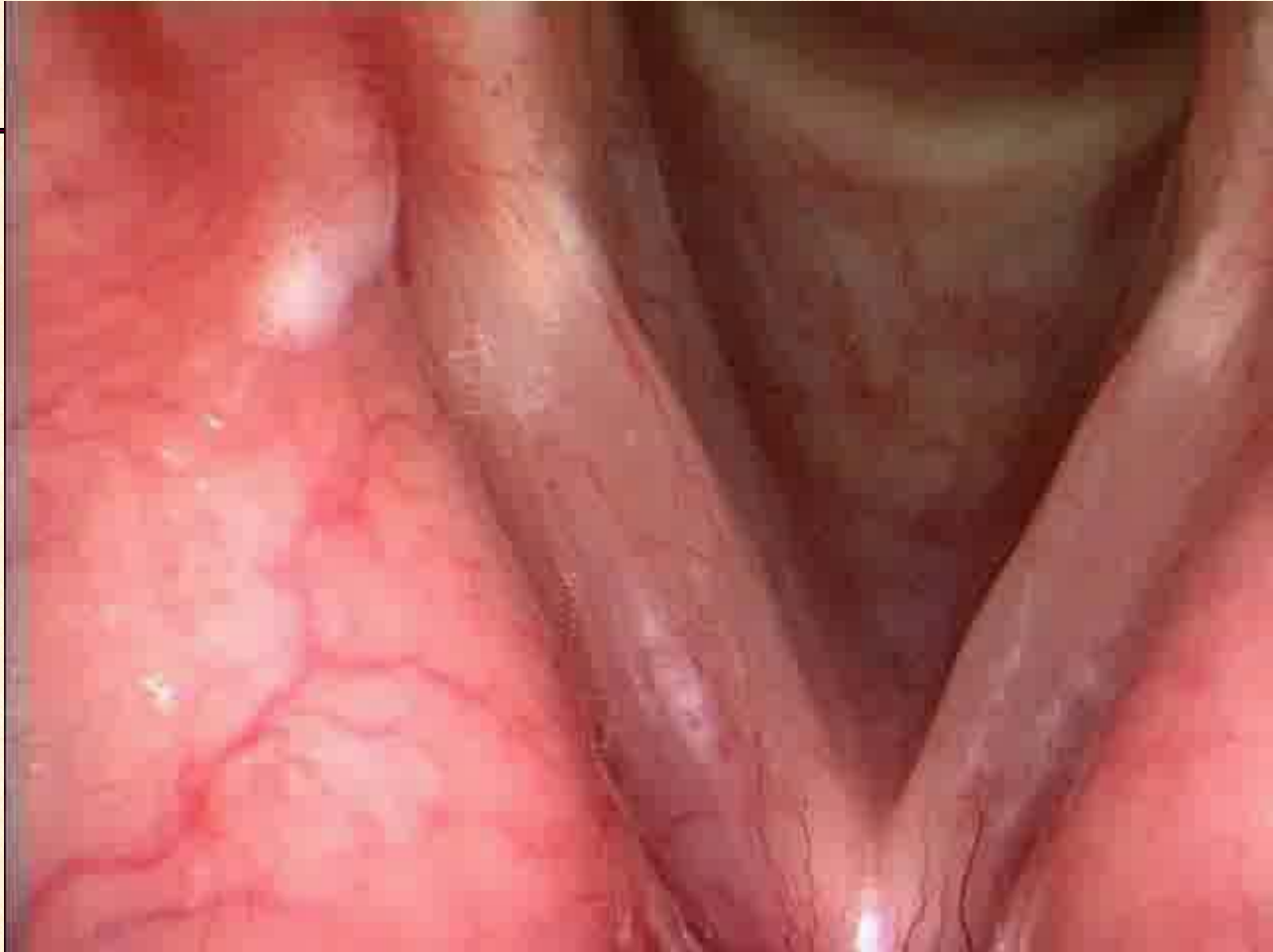
etiologie – diagnostiek – advisering

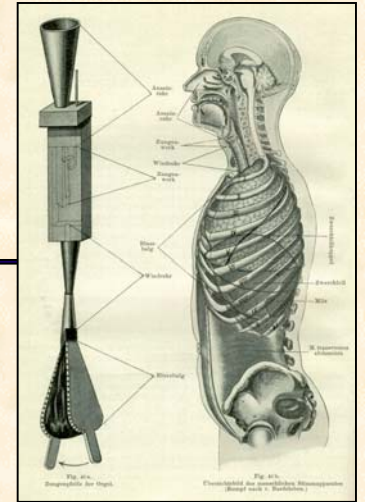
Prof. Dr. Felix I.C.R.S. de Jong

Afdeling KNO
UMC St.- Radboud Nijmegen

Afdeling NKO-Gelaat- en Halschirurgie
Universitaire Ziekenhuizen KULeuven







The whole body is a vocal instrument and not only the vocal cords.

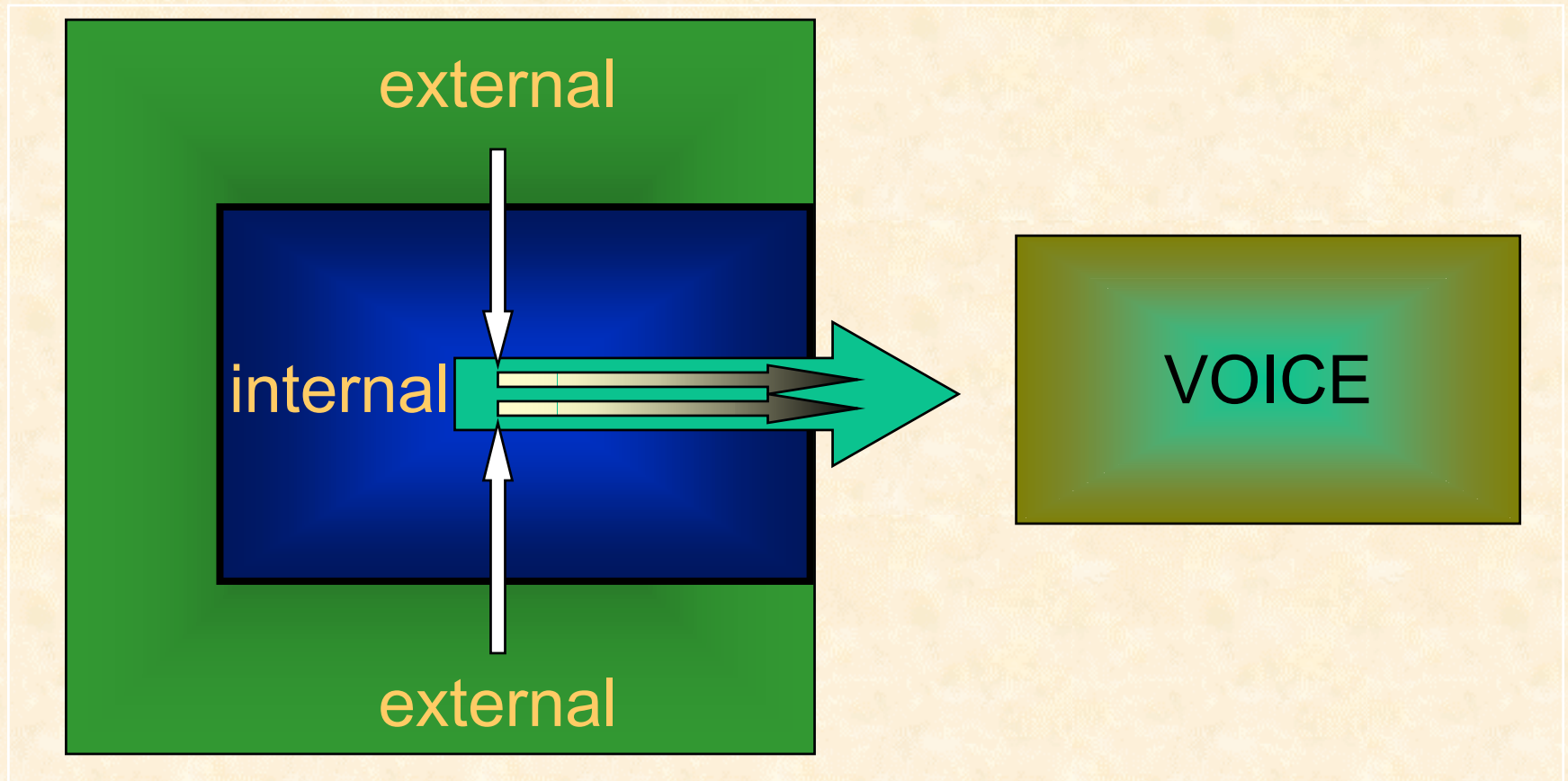
Morrison

*Voice is more than a mechanical
or acoustic phenomenon.*

*It is a mirror of personality,
a carrier of personality,
a carrier of moods and
emotions,
a key to neurotic and psychotic
tendencies.*

Brodnitz

voice



determination

characterisation

internal factors that determine voice

- morphology of the voice apparatus
- functional capacities of the voice apparatus
- vocal behaviour
- musicality
- laryngeal position, body posture
- general somatic condition, age
- psycho-emotional factors
- personality / character
- neuromuscular condition
-

external factors that determine voice

- vocal demands
- psychological stressors
- environmental aspects
-

characteristics of voice

- intensity
- pitch
- quality
- tempo
- variations
- interaction with expressions and gestures
- intelligibility
- endurance
-

**What means occupational
voice?**

occupational voice

- essential for occupation
- if insufficient
 - disorders, absence of work
 - occupation not possible

Titze 1997

occupational voice

great (specific) demands on

- morphology and functioning of the voice apparatus
- general health
- psyche

occupational voice

- intense psychomotoric act

occupational voice

voice



vocal performance

occupational voice

- physical effort
- mental effort

physical effort

- muscular activity: larynx, extralaryngeal, chest, abdomen, diaphragm, posture
- fine tuning of muscular activity
- cardiopulmonary system
- skeletal system
- mucosa
- metabolism
-

physical overstraining

- diminished quality
- pitch breaks
- F_0 increase
- creaky onset
- loss of intensity
- (voice) fatigue
- aphonic periods
- pain, discomfort
- throat clearing
- morphological changes

-

mental effort

- ambitions
- drive
- tight control
- perfectionism
- occupational speaking demand
- self-demand
-

mental overstraining

- discomfort
- eustress >>> distress
- depressive mood
- incapability for work
-

What is an occupational voice disorder?

occupational voice disorder

occupational disease

=

caused by practise
of the profession

occupational disease

uni-factorial >>> multi-factorial

occupational disease

work-related diseases are multifactorial
multifactorial diseases in which the
work environment plays a partial role
in causation

El Batawi 1984

occupational disease

- work >>> individual
 - *why is the work pathogenic?*

- individual >>> work
 - *why is the individual getting ill?*

occupational disease

Course depends on

- personal
- cultural
- socio-economic

factors.

occupational dysphonia

poor

- definition
- classification
- registration

occupational dysphonia

relation

load, demands < > complaints, disorder

?

occupational dysphonia

There may be complaints without
objective

- physical
- physiological

abnormalities.

occupational voice

specific characteristics?

- personality
- emotions, stress
- demands

occupational dysphonia

prediction

- how to know the (future) voice demands at the time of examination?

occupational dysphonia

dilemma of prediction

- constitutional poor voice
(wrong choice of occupation)
- occupational dysphonia
- combination

Buekers 1998

occupational dysphonia

different occupations have different demands

quantification of voice load

importance of occupational voice disorders

occupational voice

increase of

- occupational voice users
- occupational voice disorders
- absence due to occupational voice disorders

occupational voice

need for

- prediction, early recognition
- prevention
- quick, adequate treatment
- reintegration

Orr 1999, de Jong 2001

occupational voice

need for

- investigations of causes of voice disorders
- development of educational programs for prevention

Russell 1997, Mattiske 1998, Buekers 1998

occupational voice

need for

- voice care workshops

Bistrizki 1981, Comins 1992,

Ohlsson 1993, Martin 1994, Chan 1994

**EPIDEMIOLOGIE
&
PATHOGENESE**

voice disorders

How do voice disorders occur?

Why do voice disorders persist?

voice disorders

How do voice disorders occur?

epidemiology

Epidemiology of voice problems in Dutch teachers

Jong de FICRS, Kooijman PGC, Huinck W,
Graamans K, Schutte HK

Geaccepteerd voor publicatie door Folia Phoniatica et Logopaedica

Risk Factors for Voice Problems in Teachers

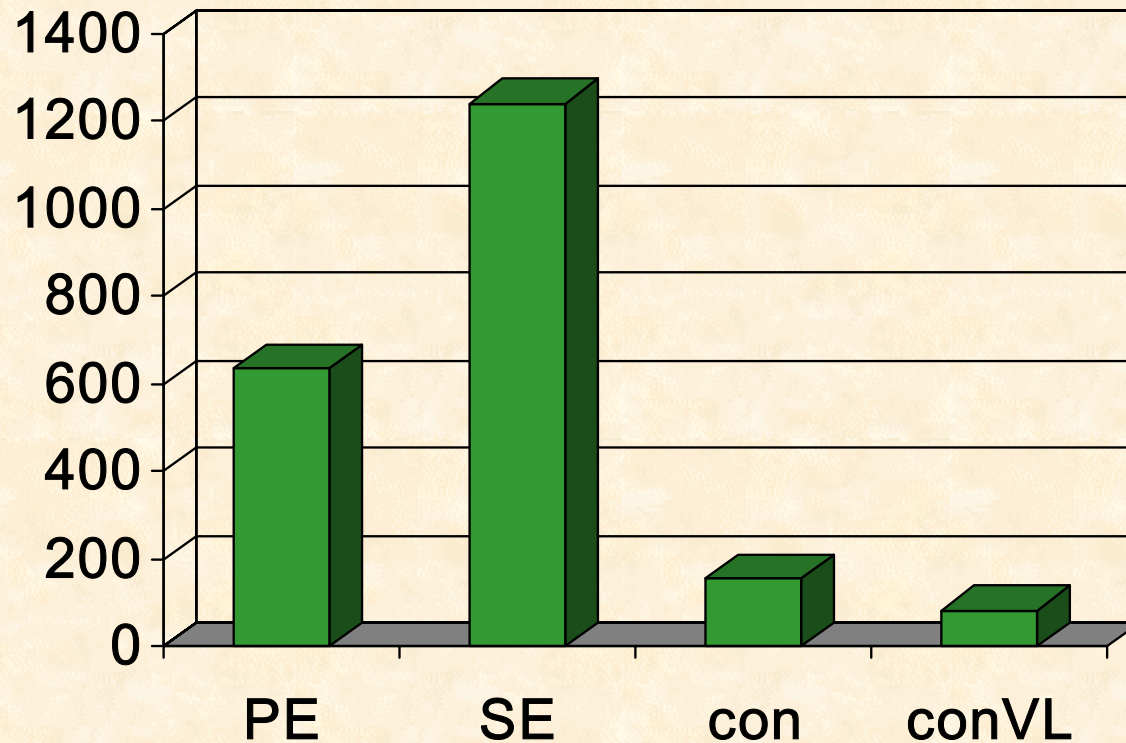
Kooijman PGC, Jong de FICRS, Huinck W,
Graamans K, Schutte HK

Geaccepteerd voor publicatie door Folia Phoniatica et Logopaedica

inquiry

prevalence and causes
of
voice problems in teachers

subjects (group breakdown)



n = 2228

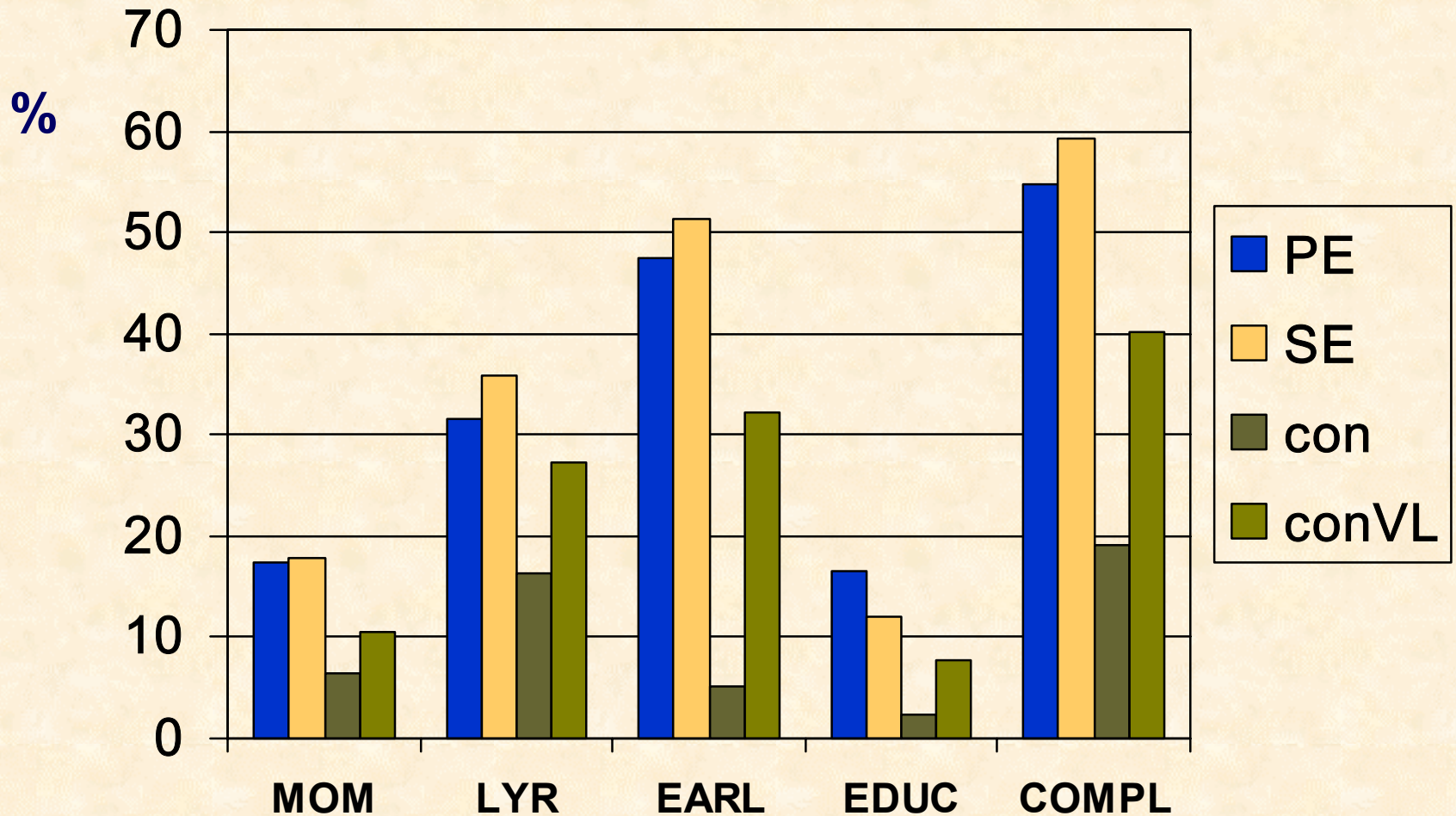
question

Prevalence of voice complaints and
absence of work due to voice problems?

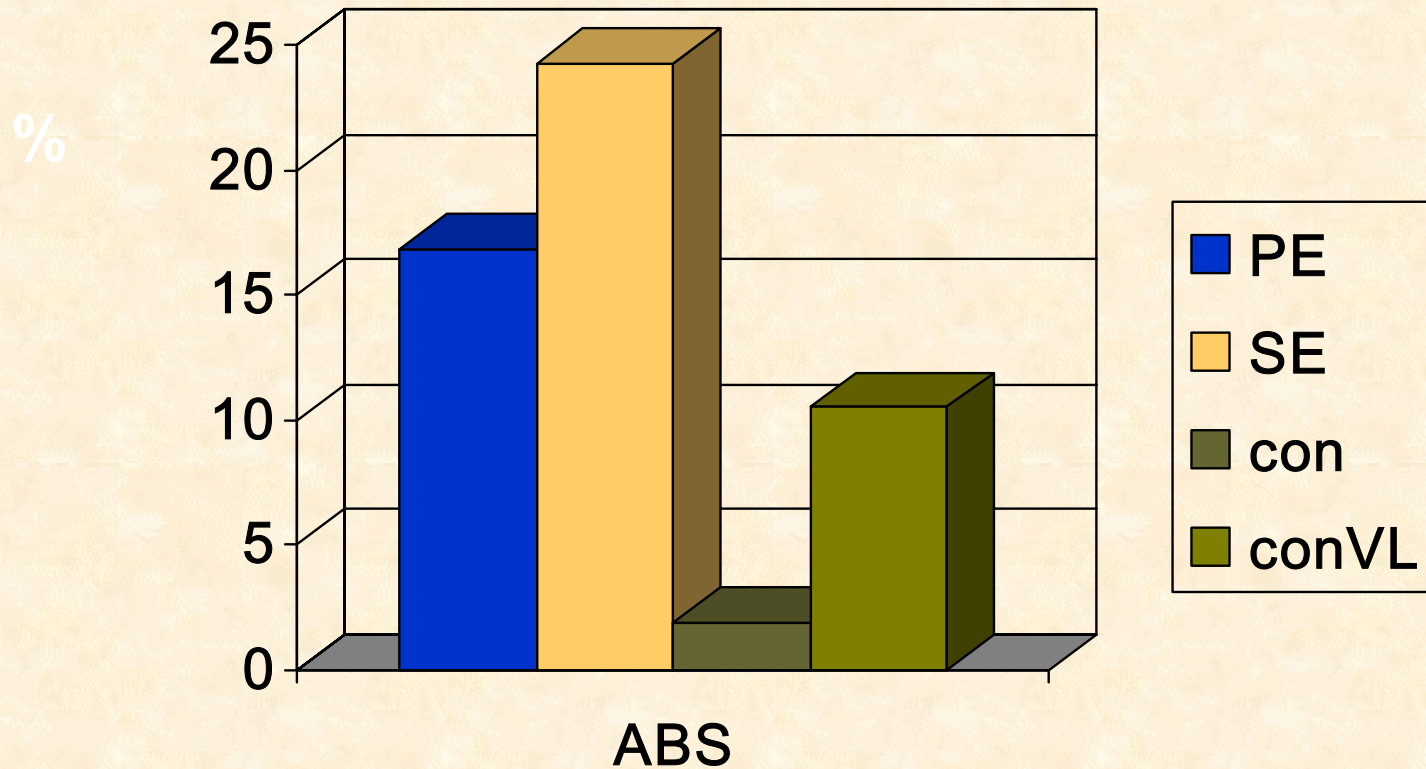
correction of number of cases

- sex: yes
- age: no

voice complaints



absence



question

Which are the most important risk-factors of getting voice complaints and absence of work due to voice problems?

correction of number of cases

only teachers

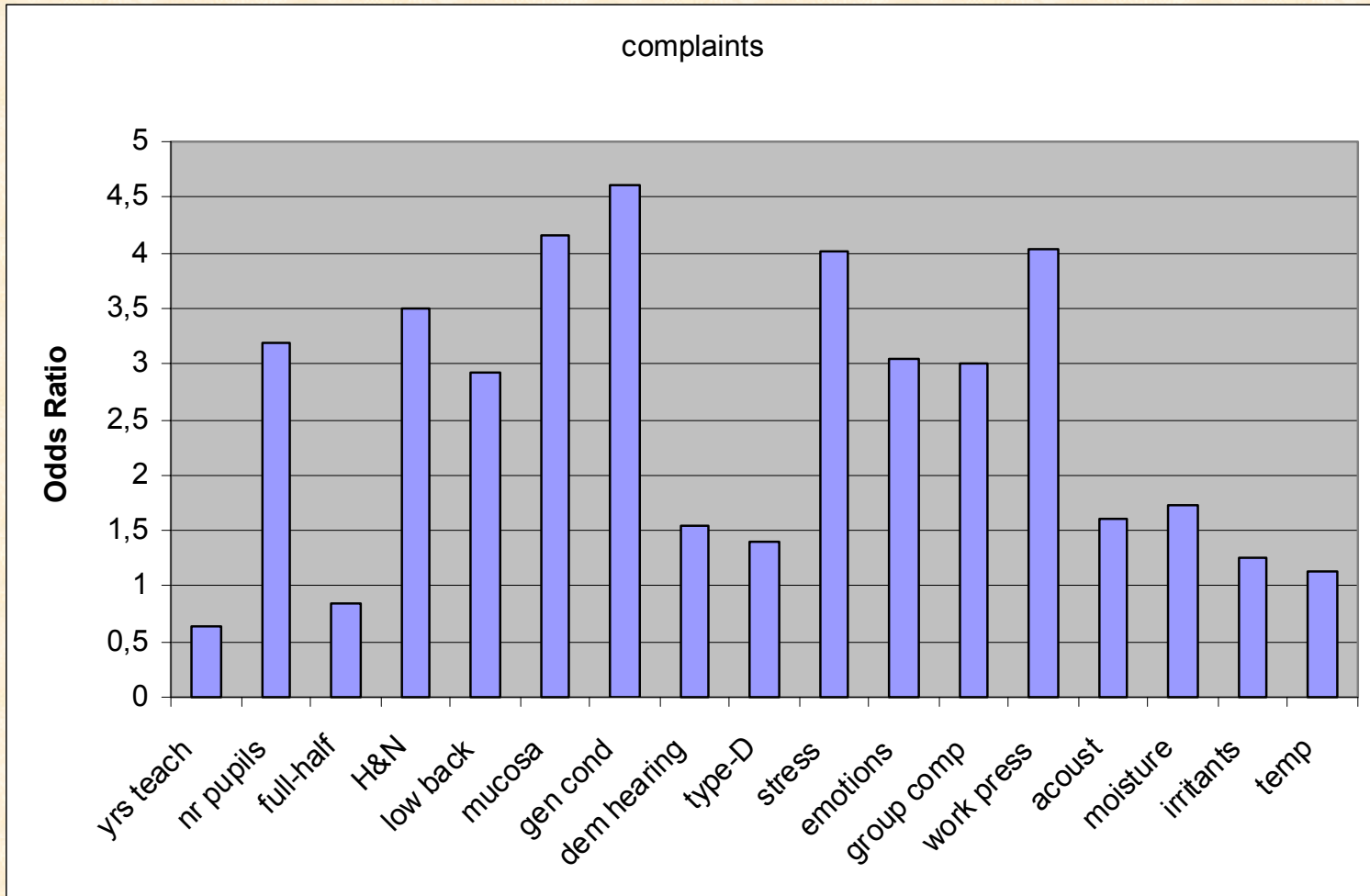
- sex: yes
- age: no
- school type: yes

causes and risks

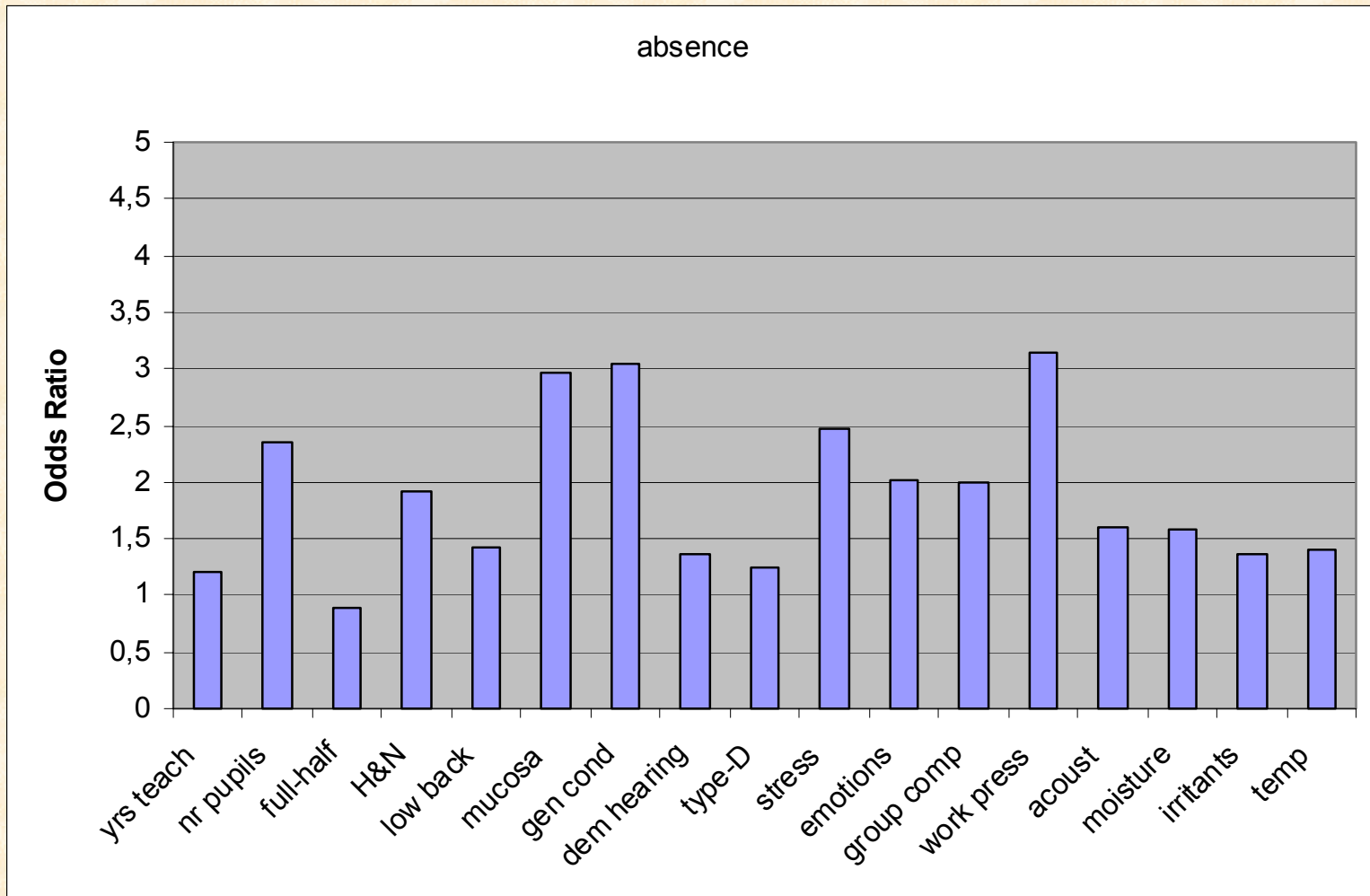
factors

- physical
- psychological
- voice load
- environment

factors for complaints (Odds Ratio)



factors for absence (Odds Ratio)



conclusions

voice problems in teachers

- frequently
- relatively severe
- multifactorial genesis
- voice load is not the most important factor
- psychological, environmental and physical aspects appear to be of equal or even greater importance

considerations

- How do the individual factors act?
- How do the individual factors inter-act?
- Specific risk combinations
- $1+1=3$
- Relation to entire dynamic process

voice disorders

Why do voice disorders persist?

psychological cascade

A PSYCHOLOGICAL CASCADE MODEL FOR PERSISTING VOICE PROBLEMS IN TEACHERS

Jong FICRS de, Cornelis BE, Wuyts FL, Kooijman PGC,
Schutte HK, Oudes MJ, Graamans K

Folia Phoniatr Logop, 55: 91-101, 2003

course of voice complaints

- maintaining factors?
- coping by the subject?

subjects I

- inclusion criteria:
 - voice problems
 - previous absence of work due to voice problems

subjects II

- subjects: $n = 76$
- gender: $m=21, f= 55$
- age: $\mu = 45 \text{ y } (23 - 59)$
- school type
 - PE: 43
 - SE: 24
 - other: 9

assessment

multidisciplinary

- inquiry
- phoniatrixian
- physiotherapist
- voice therapist
- haptonomic psychologist

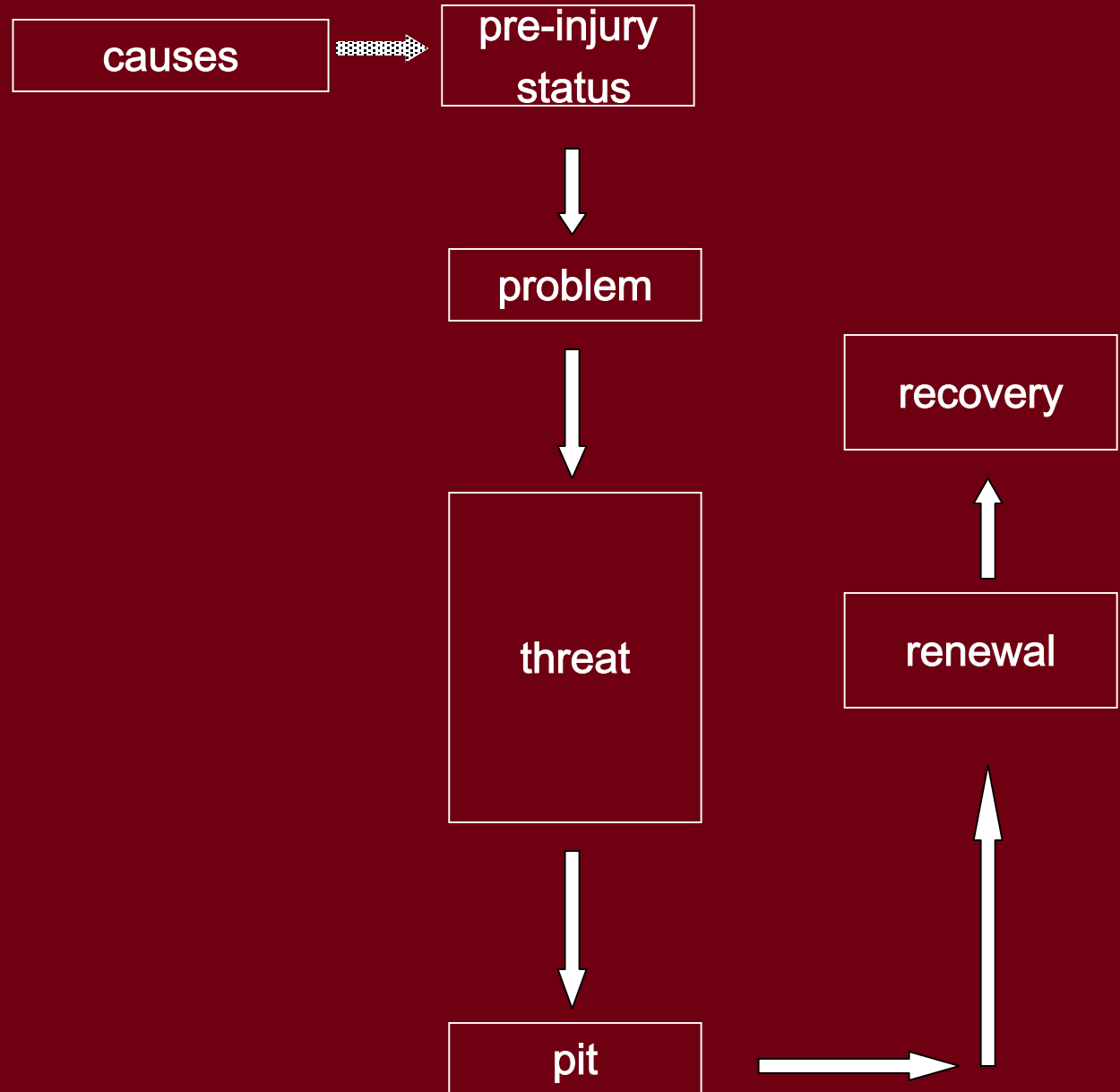
dynamics of pathophysiology

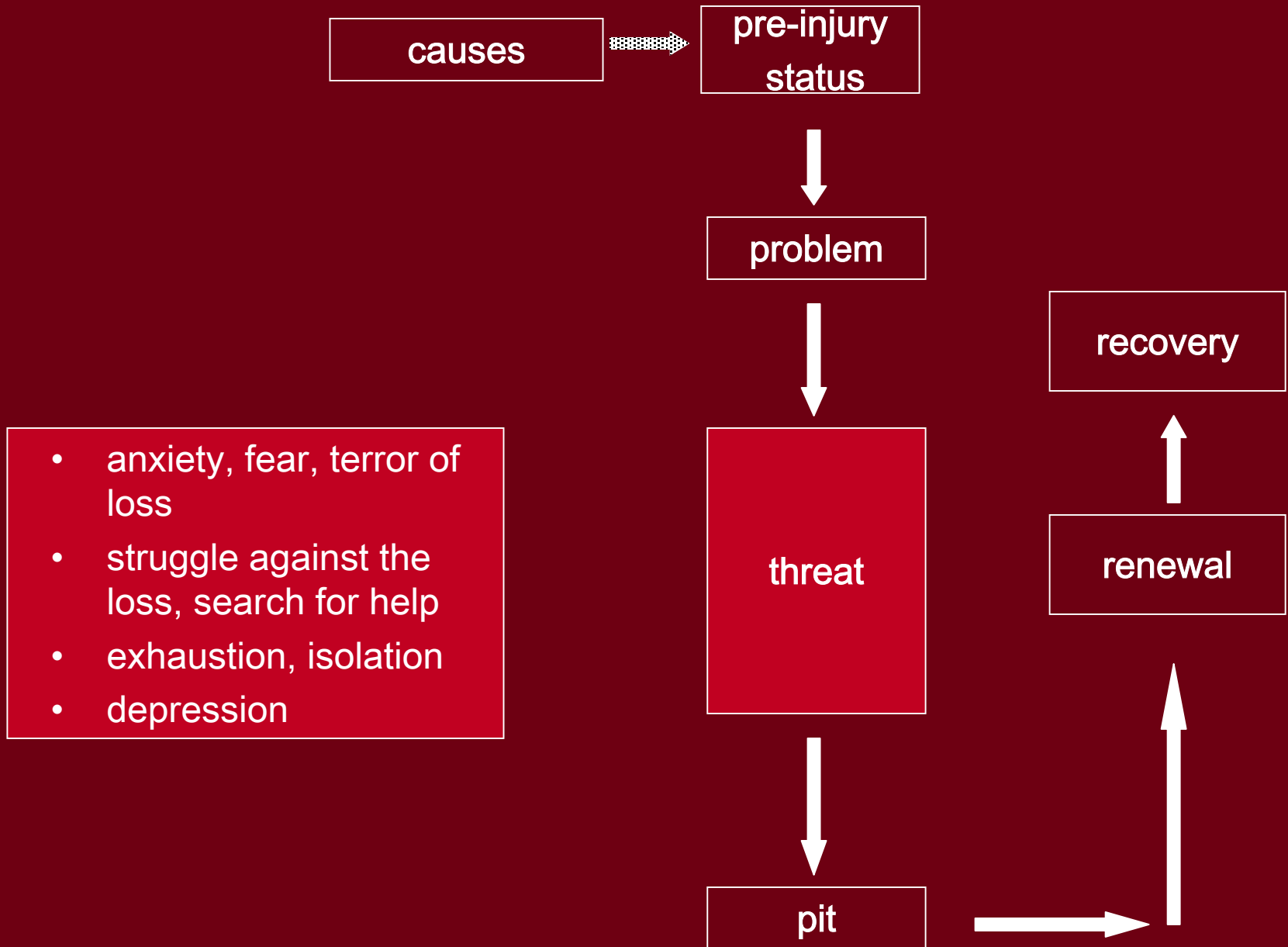
psychological cascade in low back pain
after Anderson: 3 stages

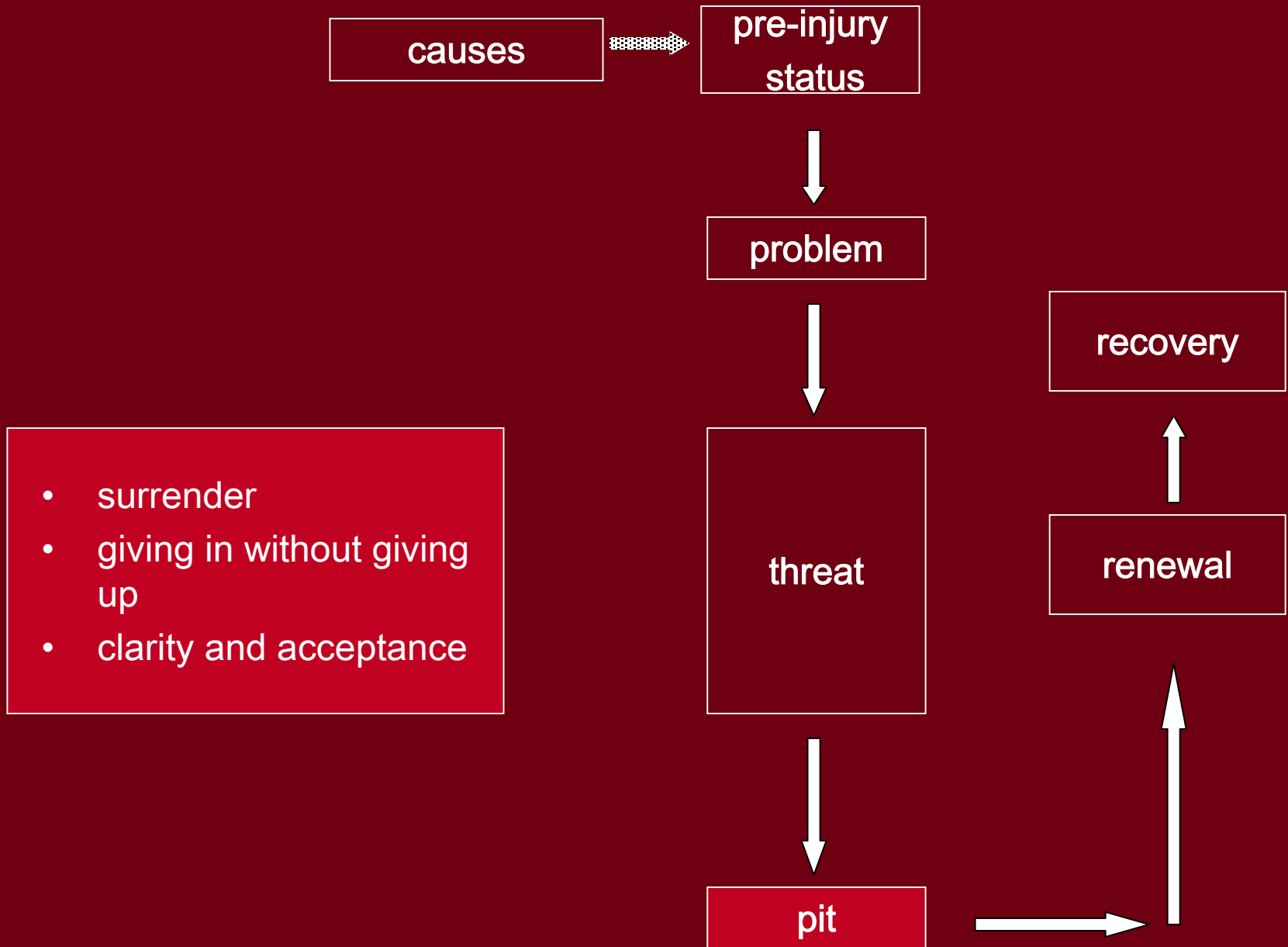
- I threat
- II pit
- III renewal

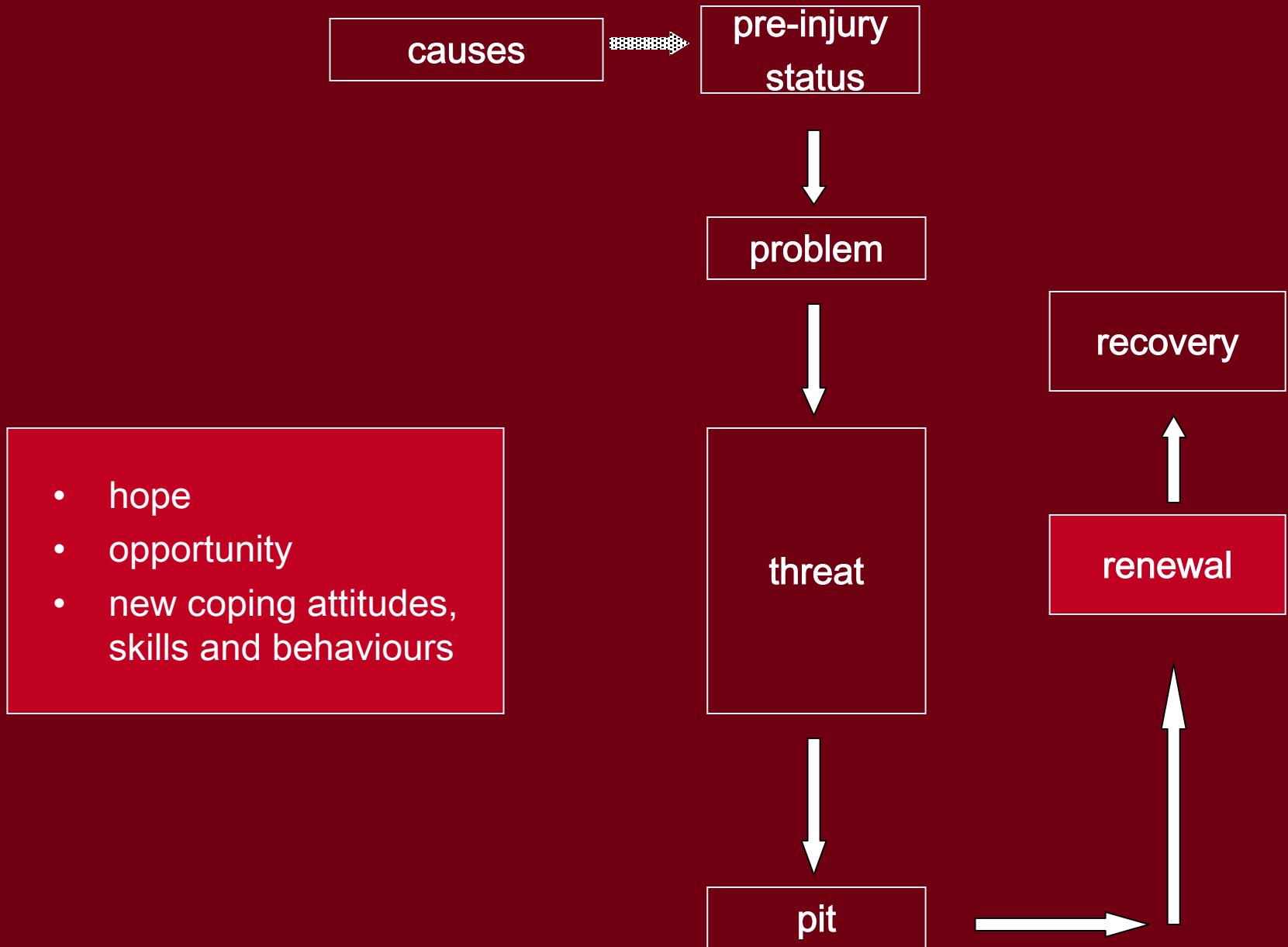
Anderson, 1995

*psychological
cascade
after Anderson*



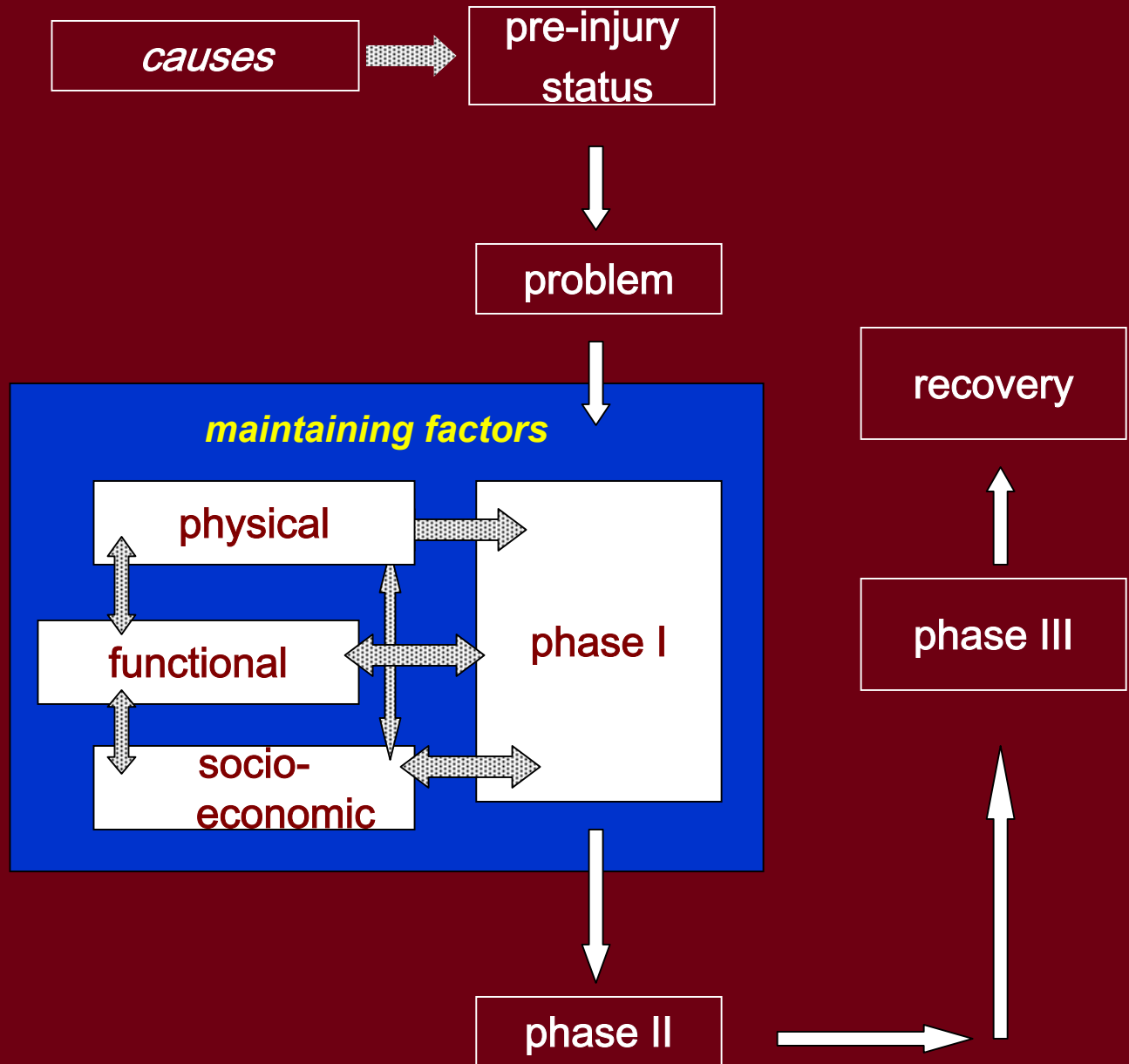






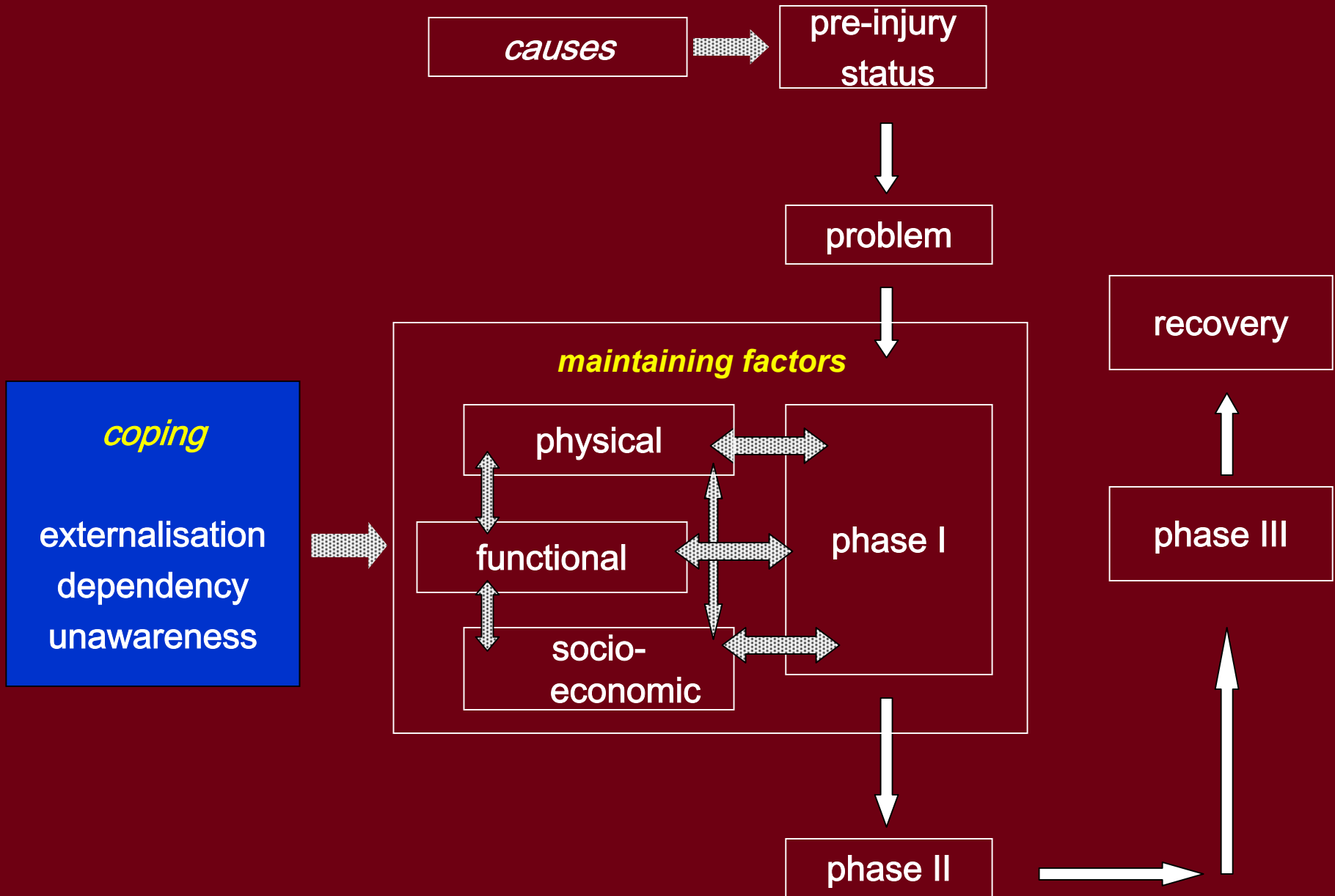
course of voice complaints

- maintaining factors?
- coping by the subject?



course of voice complaints

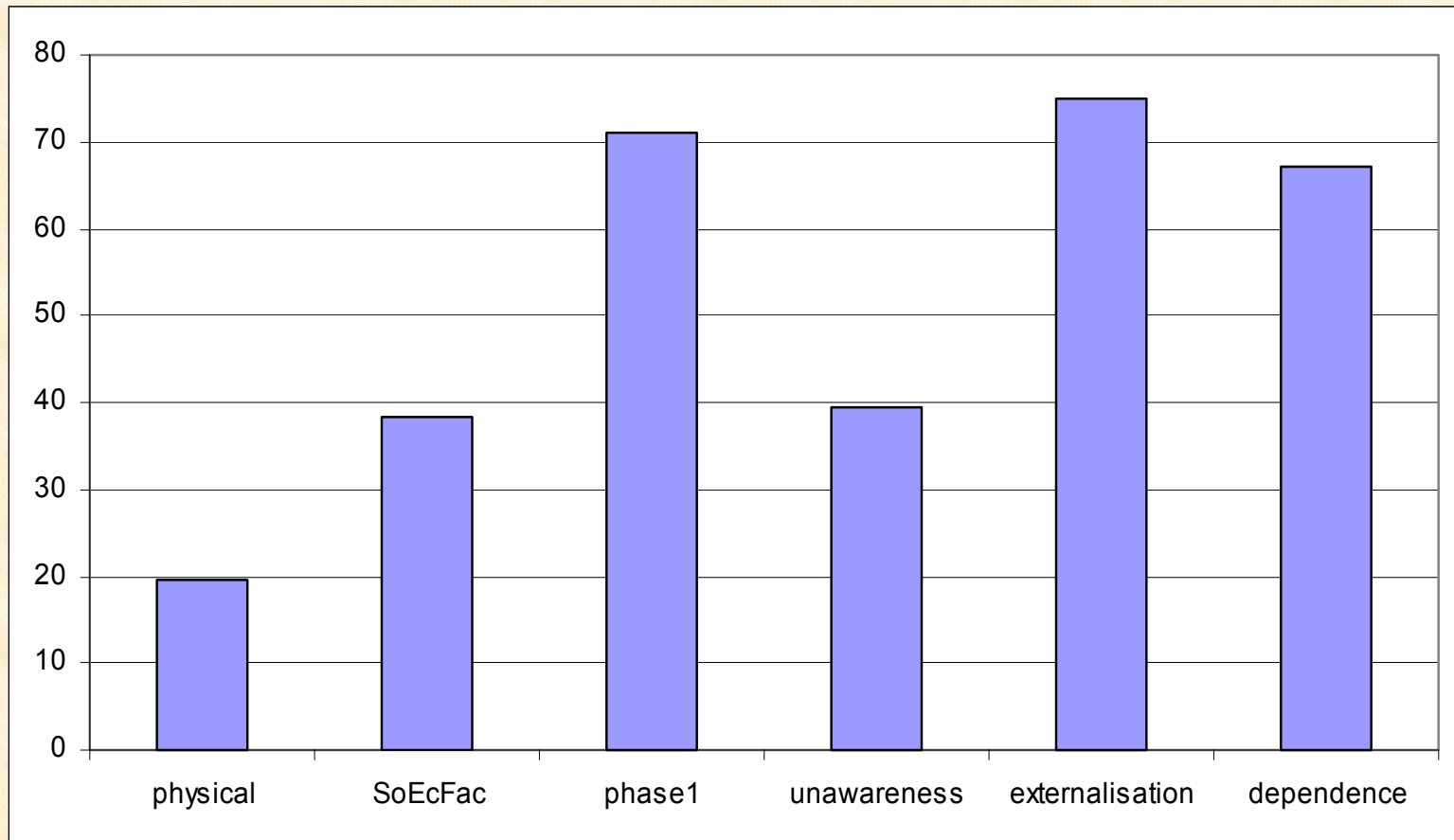
- maintaining factors?
- coping by the subject?



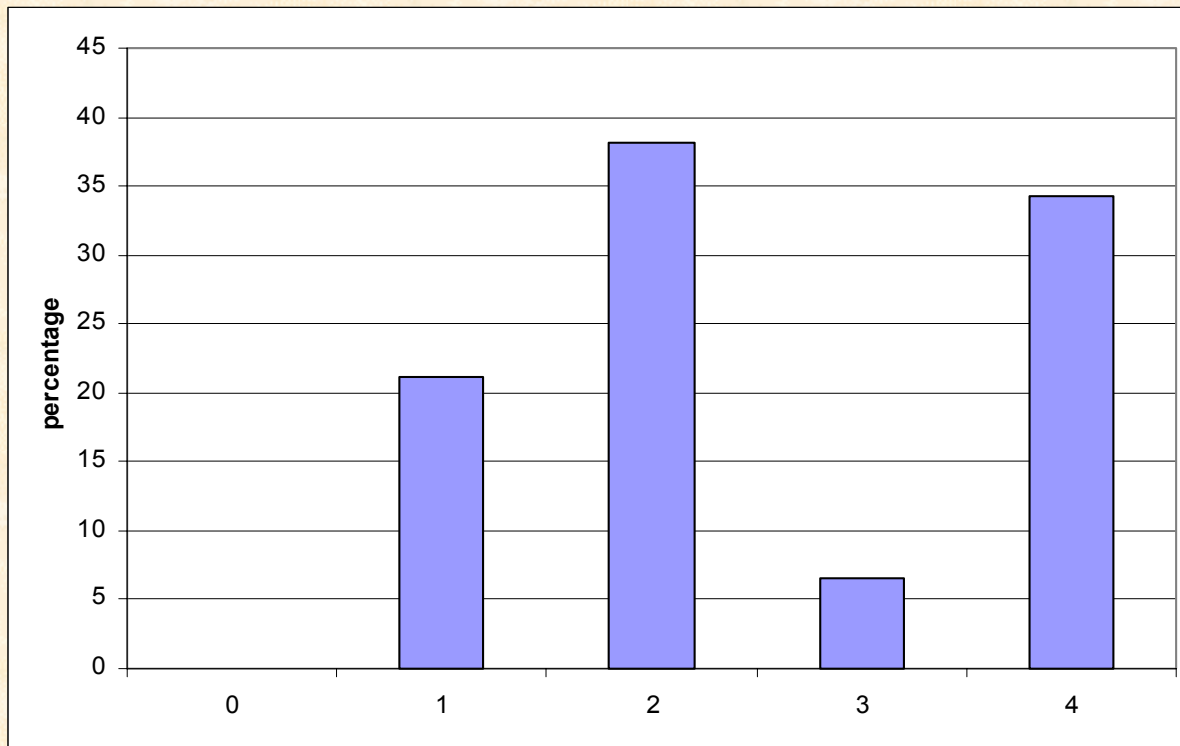
maintaining factors & coping

		score
maintaining factors	physical	0 or 4
	functional	0 - 4
	socio-economic	0 or 4
	phase 1	0 or 4
coping factors	externalisation	0 or 4
	dependence	0 or 4
	unawareness	0 or 4

maintaining & coping factors



functional factors



course of voice complaints

- phase I and other maintaining factors in many subjects
- inadequate coping

phase 1

- more other maintaining factors?
- more inadequate coping?
- more severe complaints (VHI and VAS)?

factors phase 1 vs. not phase 1

	p
physical	<i>.532</i>
functional	<i>.135</i>
SEF	<i>.008</i>
unawareness	<i>.001</i>
externalisation	<i>.000</i>
dependence	<i>.015</i>

Pearson Chi-Square

factors phase 1 vs. not phase 1

	phase 1 median	not phase 1 median	p
TOT maint-ph1	6.00 (1-12)	3.00 (1-8)	<i>.009</i>
TOT manag	8.00 (0-12)	2.00 (0-12)	<i>.000</i>
TOTAL	14.00 (1-24)	5.50 (1-16)	<i>.000</i>
VAS	70.00 (4-100)	54.00 (41-88)	<i>.039</i>
VHI	78.00 (35-102)	52.00 (22-94)	<i>.006</i>

Pearson Chi-Square

maintaining & coping factors

- which combination has the greatest risk regarding phase 1?
- which parameter within this combination is the most important?

>> logistic regression analysis

factors phase 1 vs. not phase 1

included factors	prediction correct phase 1	prediction correct not phase 1	p
physical	83.3	72.7	.215
functional			.520
SEF			.735
unawareness			.033
externalisation			.009

step 2, cut value: .650

maintaining & coping factors

- which combination has the greatest risk regarding complaints (VAS and VHI)?
- which parameter within this combination is the most important?

>> multiple regression analysis

multiple regression analysis

- VHI (n=40)
 - SEF (p=.025)
 - phase 1 (p=.045)
- VAS (n=76)
 - SEF (p=.023)

conclusions & considerations 1

frequently

- deadlocked situation (phase I)
- other maintaining factors
- inadequate coping

conclusions & considerations 2

phase I

- more other maintaining factors
- more inadequate coping

unawareness + externalisation

- more voice complaints (VAS, VHI)

phase 1+ SEF

conclusions & considerations 3

a psychological cascade may play a
role in persistence of dysphonia

conclusions & considerations 4

Chronicity in teachers with voice problems is a similar process as in chronic complaints of the musculoskeletal apparatus, apart from the nature of the restrictions.

conclusions & considerations 5

teachers with persistent dysphonia

- maintaining factors and coping parameters can be considered as indicators of chronicity

conclusions & considerations 6

chronicity

=

not the time-related
static condition, e.g. put on 3
month

but incapacity to escape from a
deadlocked situation

conclusions & considerations 7

teachers with persistent dysphonia

- special attention to
 - maintaining factors
 - coping of the course of events
- relation to entire dynamic process

conclusions & considerations 8

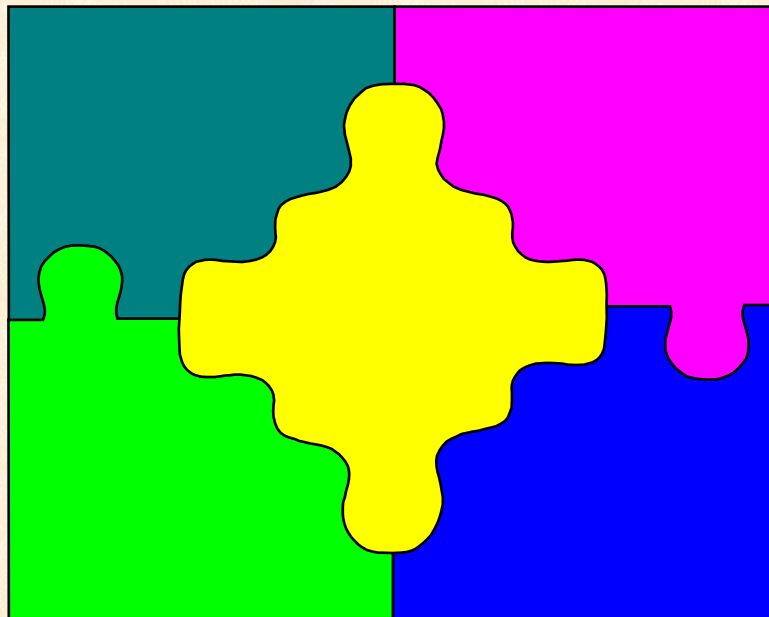
psychological cascade

- voice education
- prediction

SYNTHESIS

pathogenesis of voice disorders

multicausal - multisymptomatic



pathogenesis of voice disorders

the weight of the different factors

- What is the individual impact of the different factors?
- There is a cumulative effect of the different factors.
- What is the effect of the accumulation of the different factors?

pathogenesis of voice disorders

single parameter



- combination of parameters, indices
- determination of a profile, holistic approach

occupational dysphonia

- The final judgement of voice performance should be performed by the creation of a profile.
- **Profile:** The way of which the different aspects of voice performance are related to the total functioning of the individual should be outlined in a clear mode.

occupational dysphonia

Think

- multifactorial
- multidimensional
- in a dynamic way

RISICO ANALYSE VAN STEMPROBLEMEN BIJ LEERKRACHTEN

risk assessment

OSH

occupational safety health

OSH

- work related injuries
- ill health
- diseases
- incidents, deaths

international labour organization, 2001

OSH

safe and healthful working conditions
on the job

is

threatened by

HAZARDS and **RISKS**

hazard

the inherent potential to cause injury or
damage to people's health

International Labour Organization, 2001

hazardous event

causes and/or maintains a problem

De Jong, 2003

likelihood

qualitative description of
probability or frequency

International Labour Organization, 2001

consequences (severity of harm)

the outcome of an event expressed
qualitatively or quantitatively

International Labour Organization, 2001

risk

the combination of

the likelihood of an occurrence of
a hazardous event

+

the severity of injury or damage to the health of
people caused by this event

International Labour Organization, 2001

“ at high risk”

good chance of hazard

+

severe consequences

risk levels

definition weather or not a defined action
should be taken

International Labour Organization, 2001

action to be taken

proceed or stop

International Labour Organization, 2001

risk assessment

British Standard:

Guide to Occupational Health and Safety
Management Systems (BS 8800), 1996

risk assessment

- identify hazards
- estimate the risk of each hazard
 - the likelihood of hazard
 - severity of harm
- decide if the risk is tolerable

OSH Standard (BS 8800), 1996

risk assessment



OSH standard (BS 8800), 1996

risk assessment



SPEAKING TASK

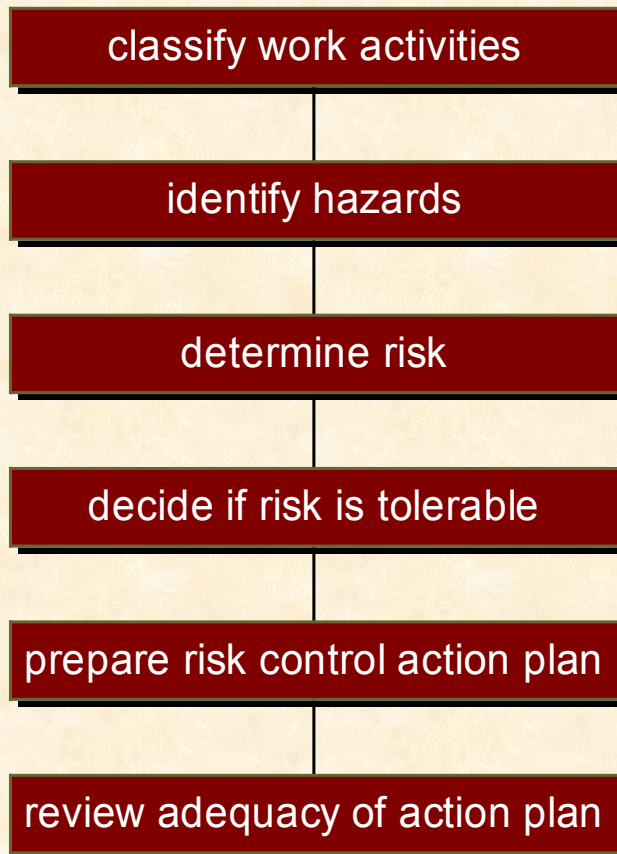
- intensity
- pitch
- variations, mimics
- duration
-

VOCAL LOAD

risk assessment



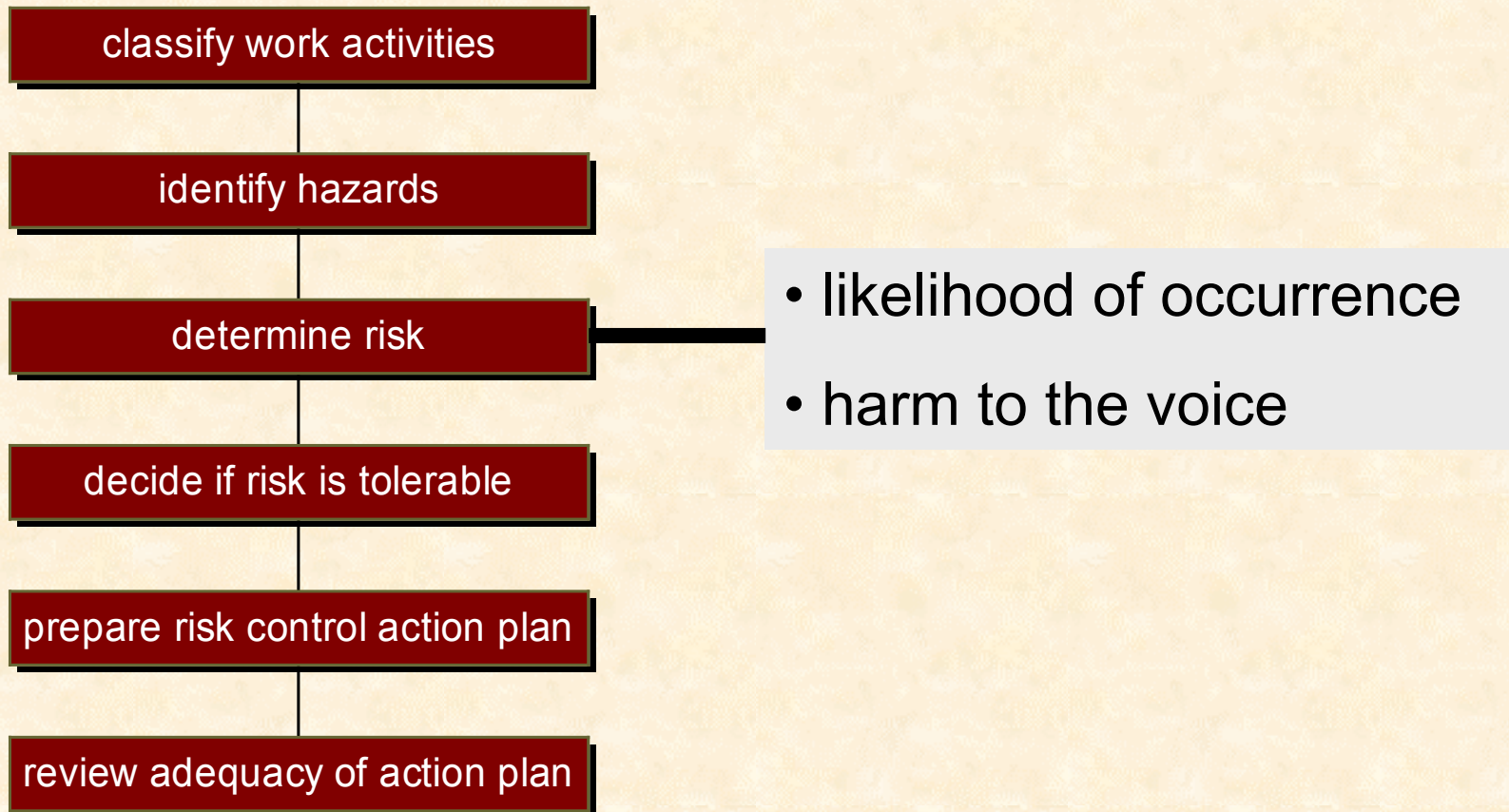
risk assessment



VOICE CAPACITY

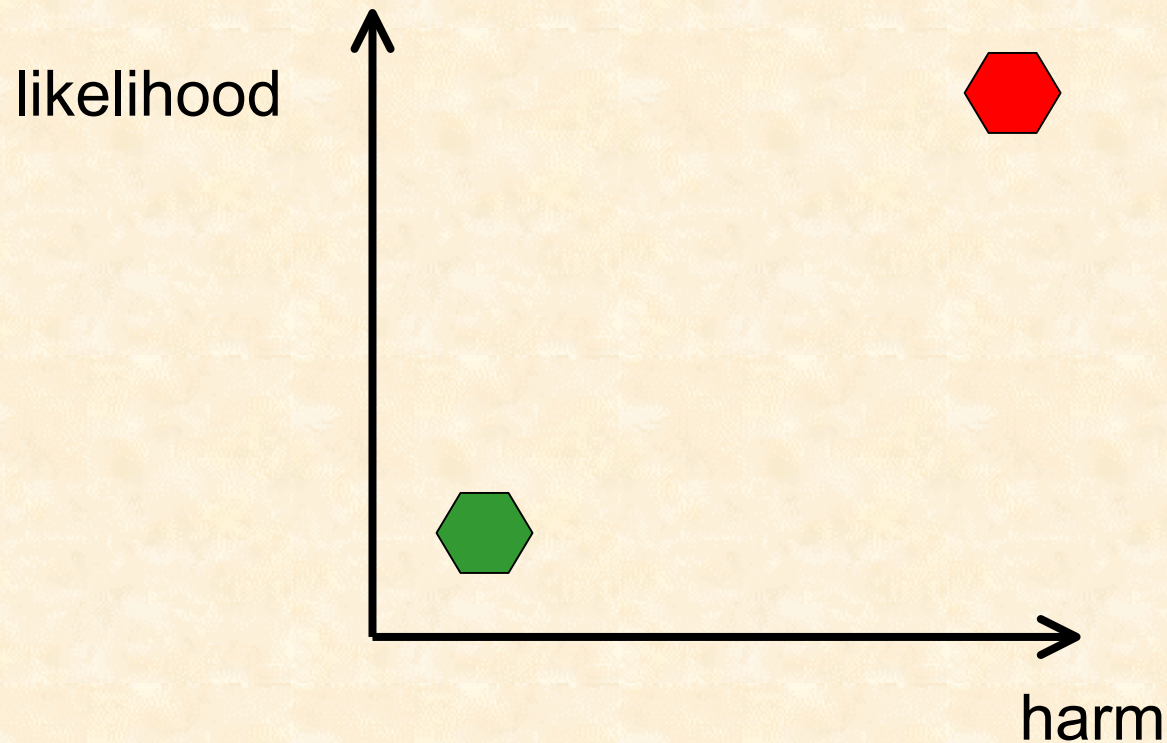
- yrs practising profession
- sex, age
- voice apparatus
- general condition
- psycho-emotional
- pupil group
- environment
-

risk assessment



risk assessment

quantification of risk: risk level



risk assessment

classify work activities

identify hazards

determine risk

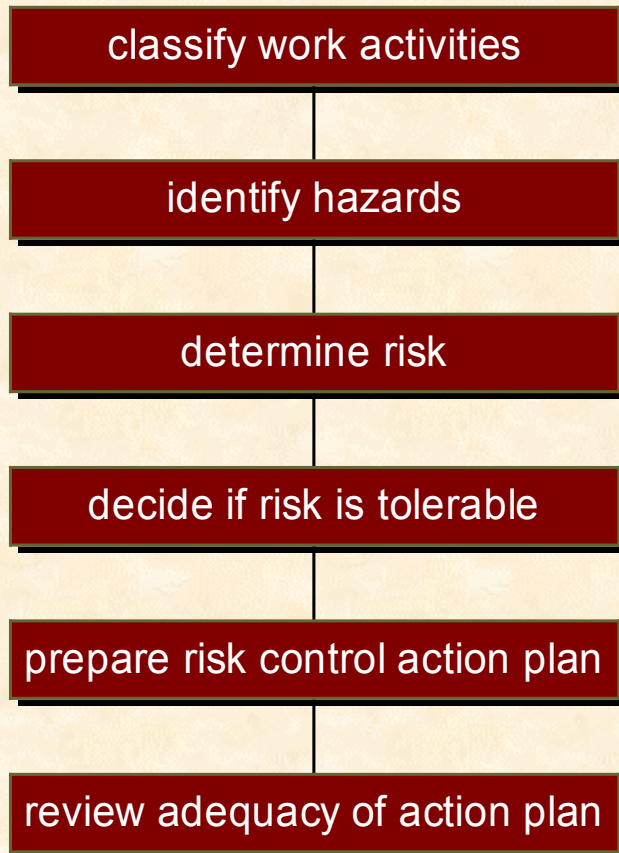
decide if risk is tolerable

prepare risk control action plan

review adequacy of action plan

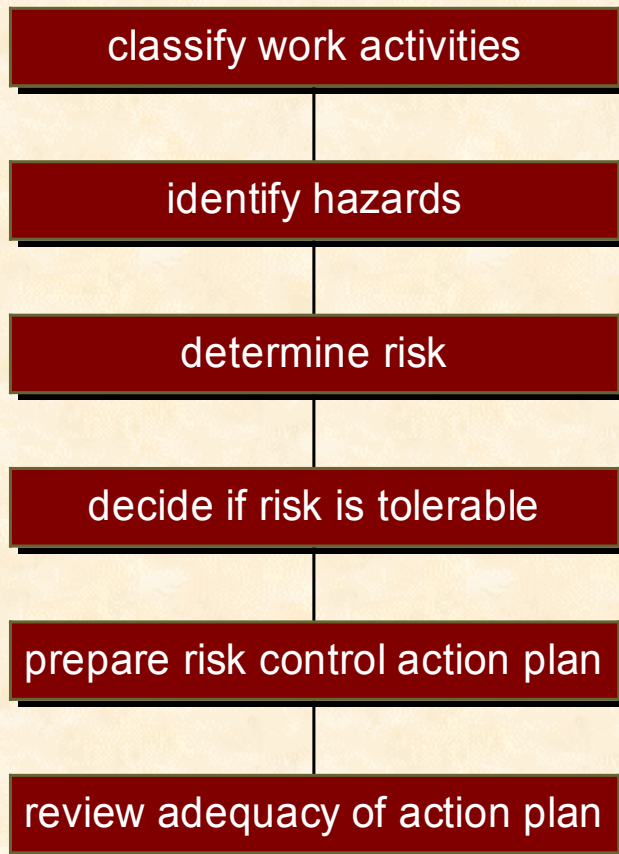
- are precautions sufficient?

risk assessment



- prepare plan
- new action plans?

risk assessment



- tolerable risk levels?
- new hazards created?
- cost-effectiveness
- What do affected people think about the need for and practicality of the revised preventive measures?
- applicability of revised controls?

risk assessment

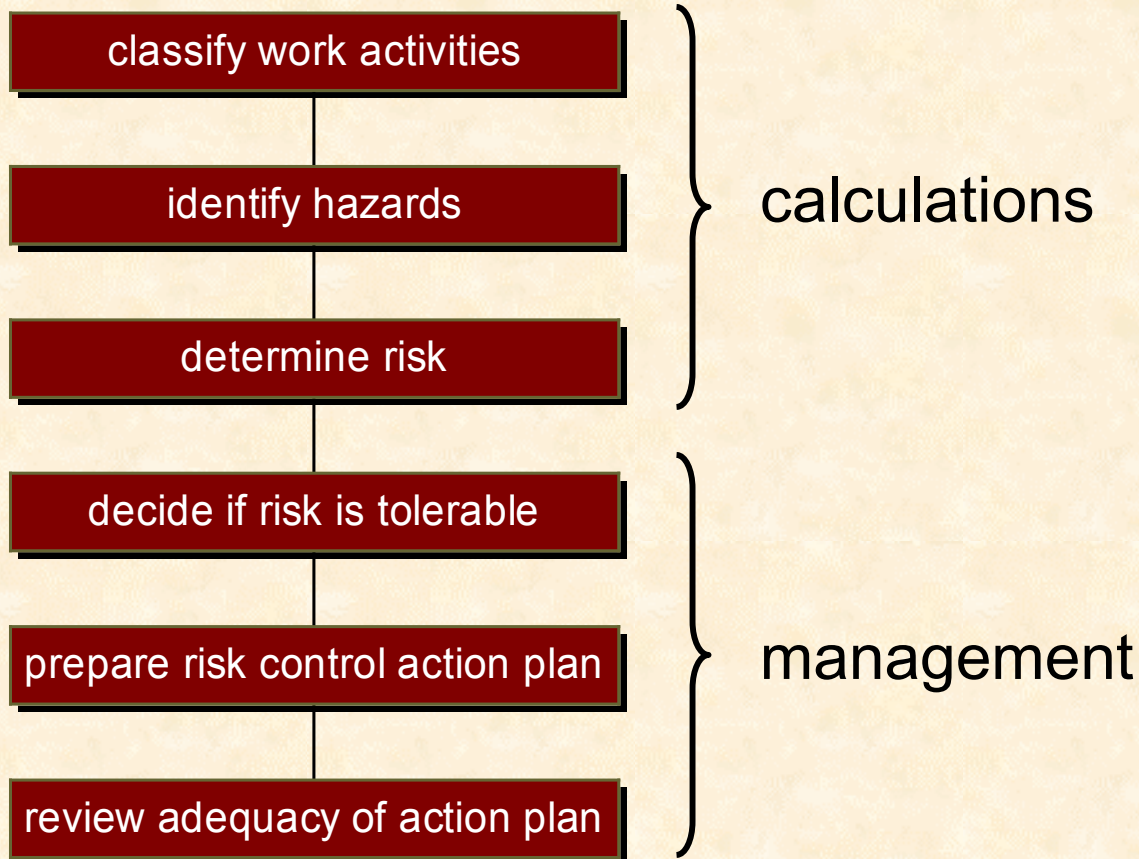
continuing process

occupational voice problems

risk analysis: teachers

CONSIDERATIONS

risk assessment



occupational voice problems

risk analysis

considerations: calculations

risk assessment

quantification of

- vocal demands
- hazards
- risk

quantification of vocal demands

- intensity (low and high)
- pitch (low and high)
- imitation
- variation
- duration
- pauses
- message: emotional, didactic contents

quantification of hazards

- physical voice load
- general physical condition
- psychological
- environment
- education

vocal demands and hazards

need for objective criteria

- standardization
- validity
- reliability

quantification of risk

- likelihood of vocal hazards

quantification of risk

- harm to the voice of vocal hazards

occupational disease

uni-factorial >>> multi-factorial

occupational disease

Work-related diseases are multifactorial diseases in which the work environment plays a partial role in causation.

El Batawi, 1984

weight of the different hazards

- the individual impact of the various vocal hazards
- the effect of accumulation of the different vocal hazards

occupational voice problems

risk analysis

considerations: management

occupational disease

definition: different perspectives

- health insurance
- (industrial) medicine
- politics, civil law
- social insurance
- judgement of the patient

occupational disease

- work >>> individual
 - *why is the work pathogenic?*
 - *absolute criteria?*

- individual >>> work
 - *why is the individual getting ill?*
 - *individual criteria?*

risk levels

risk level	actions
trivial	no action
tolerable	monitoring
moderate	risk reduction
substantial	do not start without considerable risk reduction
intolerable	do not start or continue without considerable risk reduction; if not possible work has to remain prohibited

risk level estimator

		consequences		
		slightly harmful	harmful	extremely harmful
likelihood	highly unlikely	trivial	tolerable	moderate
	unlikely	tolerable	moderate	substantial
	likely	moderate	substantial	intolerable

risk level estimator

		consequences		
		slightly harmful	harmful	extremely harmful
likelihood	highly unlikely	trivial	tolerable	moderate
	unlikely	tolerable	moderate	substantial
	likely	moderate	substantial	intolerable

risk level estimator

		consequences		
		slightly harmful	harmful	extremely harmful
likelihood	highly unlikely	trivial	tolerable	moderate
	unlikely	tolerable	moderate	substantial
	likely	moderate	substantial	intolerable

The diagram illustrates a risk level estimator matrix. The matrix is a 3x3 grid where the rows represent likelihood (highly unlikely, unlikely, likely) and the columns represent consequences (slightly harmful, harmful, extremely harmful). The resulting risk levels are: trivial, tolerable, moderate, moderate, substantial, substantial, moderate, substantial, and intolerable. Two callouts are present: a green oval around the 'tolerable' cell (unlikely likelihood, slightly harmful consequence) with a green arrow pointing to it from another green oval around the 'substantial' cell (likely likelihood, harmful consequence).

occupational disease

"A personal health problem is not an occupational disorder or OSH issue."

Vilkman, 2003

OSH management

- insurance vs. science

OSH management

Where is the action?

OSH management

- what?
- how?
- who?
- when?
- financing?
- legislation?

OSH management

- prevention
 - students
 - teachers
- early recognition
- rapid and adequate treatment
- reintegration

OSH management

- prevention

 students

- teachers
- early recognition
- rapid and adequate treatment
- reintegration

questionnaire

- teachers: complaints during education
 - 90 % complaints during career
 - 31 % absence from work
- teachers: no complaints during education
 - 49 % complaints during career
 - 18 % absence from work

for complaints and absence: $p < 0.001$

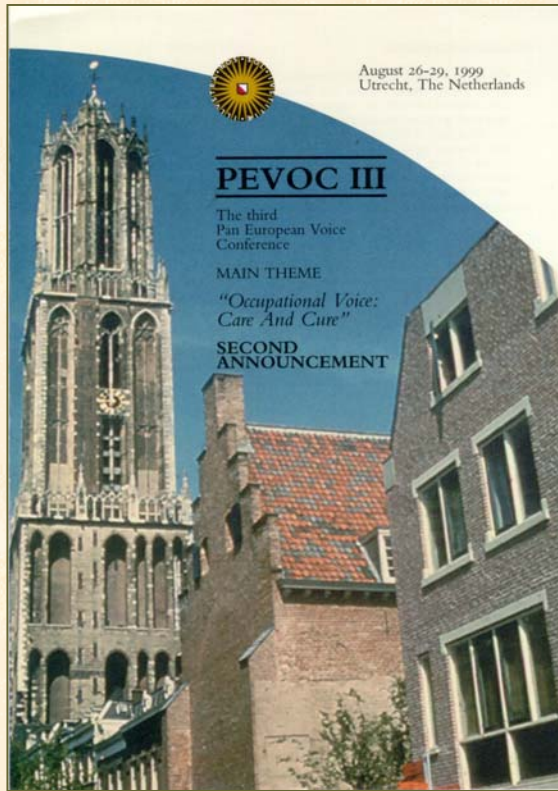
attention for voice during education

34 PABO's :

- No information about voice/voice therapy in general information
- No information about screening and possible consequences
- In 2 cases lessons for $\frac{1}{2}$ - 1 studypoints

Kooijman, 2003

predictive parameters in occupational dysphonia



Myth or reality?

*Jong F.I.C.R.S. de, Kooijman P.G.C., Orr R.
In: Occupational voice-care and cure 101-112, 2001.
Ed. P.H. Dejonckere. Kugler Publications, Den Haag.*

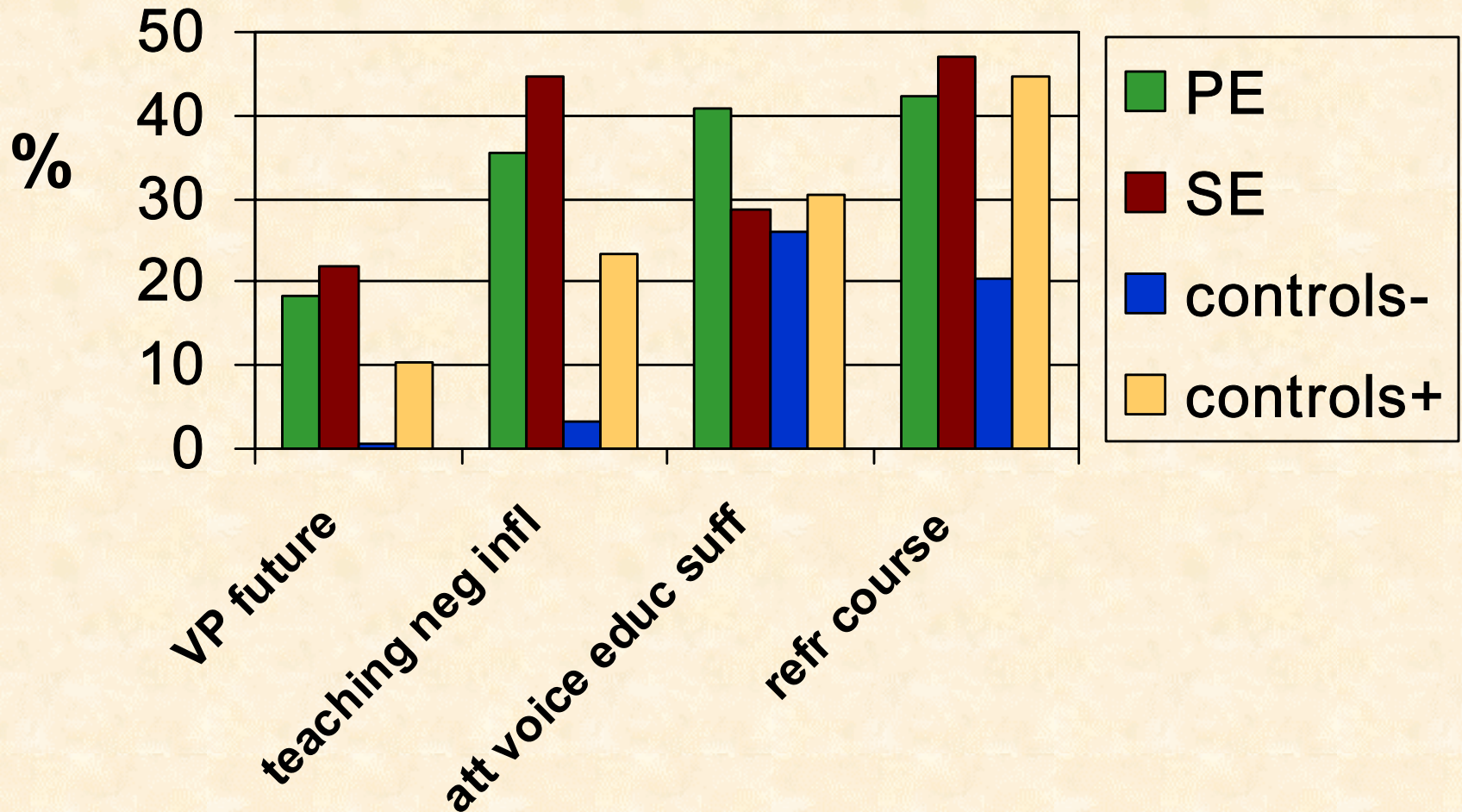
OSH management

- prevention
 - students

 teachers

- early recognition
- rapid and adequate treatment
- reintegration

voice and career



risk analysis of voice disorders

- The final judgement of risk should be performed by the creation of a **individual profile**.
- **Profile:** clear outline of the way of which the various vocal hazards are related to
 - the total functioning of the individual
 - the work conditions