

Computerized Psychological Assessment and how it can be used in Human Resource Management

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Contents

1. Psychological tests in human resources management
 - Using psychological tests
 - Advantages of psychological tests
 - Item-Response Theory and Rasch-Modell

2. Contents of the Vienna Test System HR
 - Test sets

3. Tips on using the system

Why?



What?



How?

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Why?



What?



How?

Using psychological tests

Recruitment

- Selecting suitable candidates / the best candidates
- Can be used very widely: any type of candidate from large number of trainees to managers
- Can also be used in specialized areas such as recruitment of professional drivers or pilots

Staff development

- Highlighting strengths and areas for development in order to identify high-fliers or provide customized training
- Identifying sources of pressure and stress for coaching purposes

Job or career counseling/ outplacement

- Advising candidates on the further course of their career



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Why?

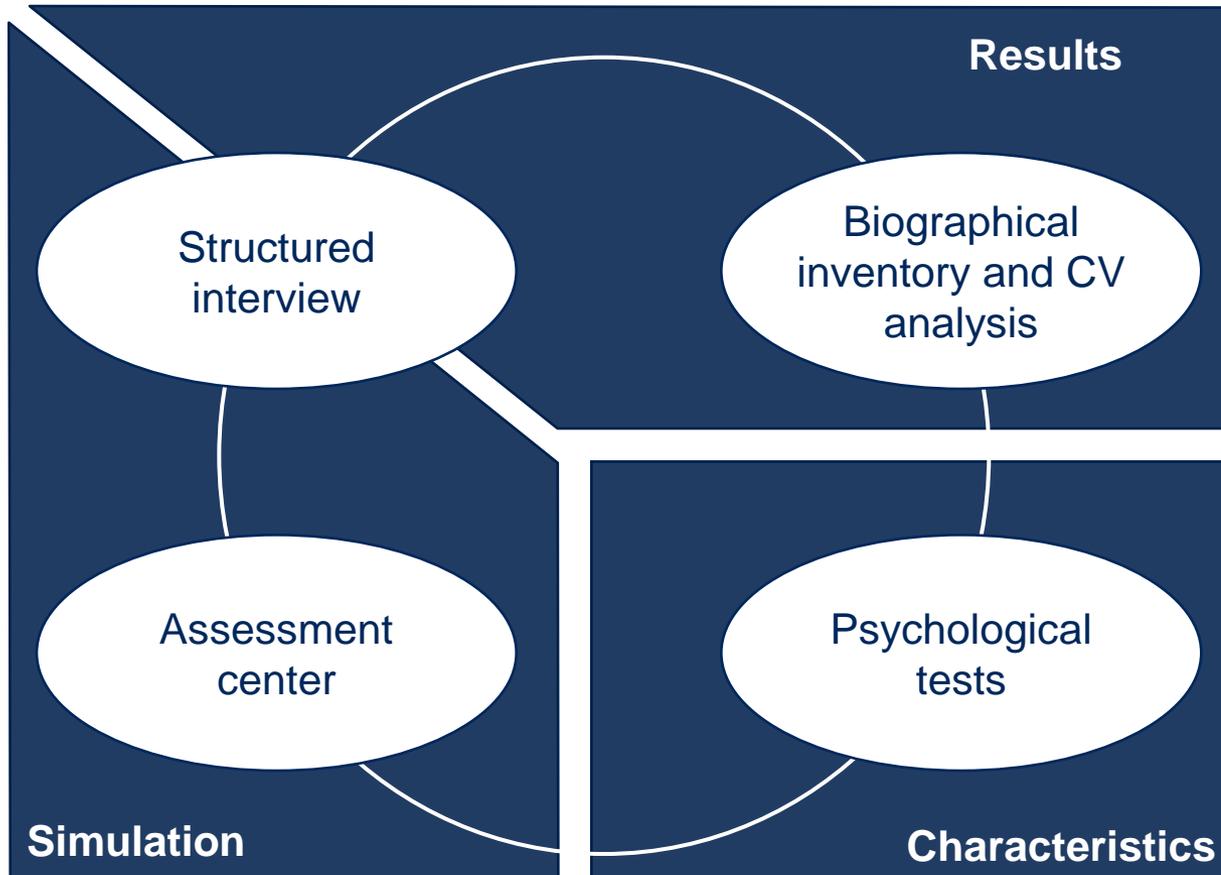


What?



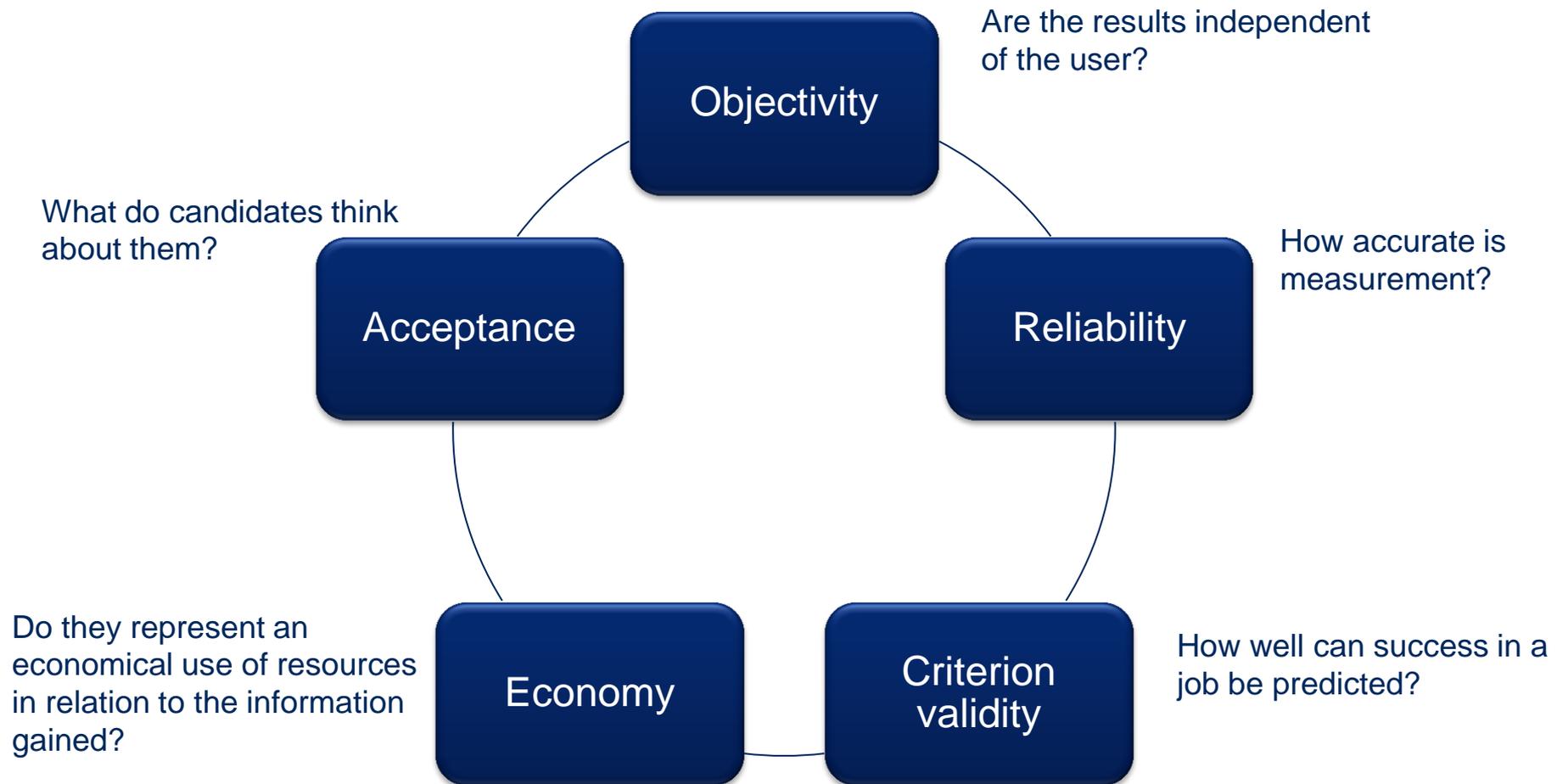
How?

Different HR tools

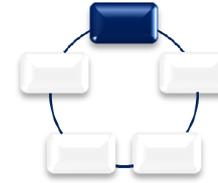


Psychological tests can provide information about as yet unrealized potential

Advantages of psychological tests



Objectivity



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Are the results independent of the user?

Computer tests

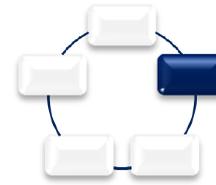
Maximum objectivity due to standardized administration, automated scoring and norming. The user cannot influence the results, either unconsciously or deliberately, at any stage.

Interview/AC

Objectivity is doubtful because different interviewers/assessors may influence the candidate in different ways and differ in their interpretation of the information. E.g. halo effect: some of an individual's characteristics (e.g. attractiveness, appearance, likeableness) influence the assessment of other characteristics (e.g. competence).

Why is objectivity important?

If a test is not objective (i.e. if different assessors obtain different results) it cannot be valid (i.e. it cannot predict a candidate's success).



Reliability

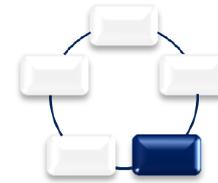
How accurate is measurement?

ÖNORM D 4000 / DIN 33430 recommend a **reliability of 0.7 – 0.85**. However, tests with a reliability of less than 0.7 can be used for screening purposes.

All the tests in the Vienna Test System are highly reliable. In some cases the reliability can be set by the test administrator, enabling the test to be lengthened or shortened.

Why is reliability important?

If a test is insufficiently objective it cannot be valid – that is, it cannot predict the candidate's success.



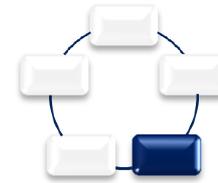
Criterion validity (1)

How well can success in a job be predicted?

ÖNORM D 4000 / DIN 33430 recommend a **criterion validity of 0.30 – 0.85**.

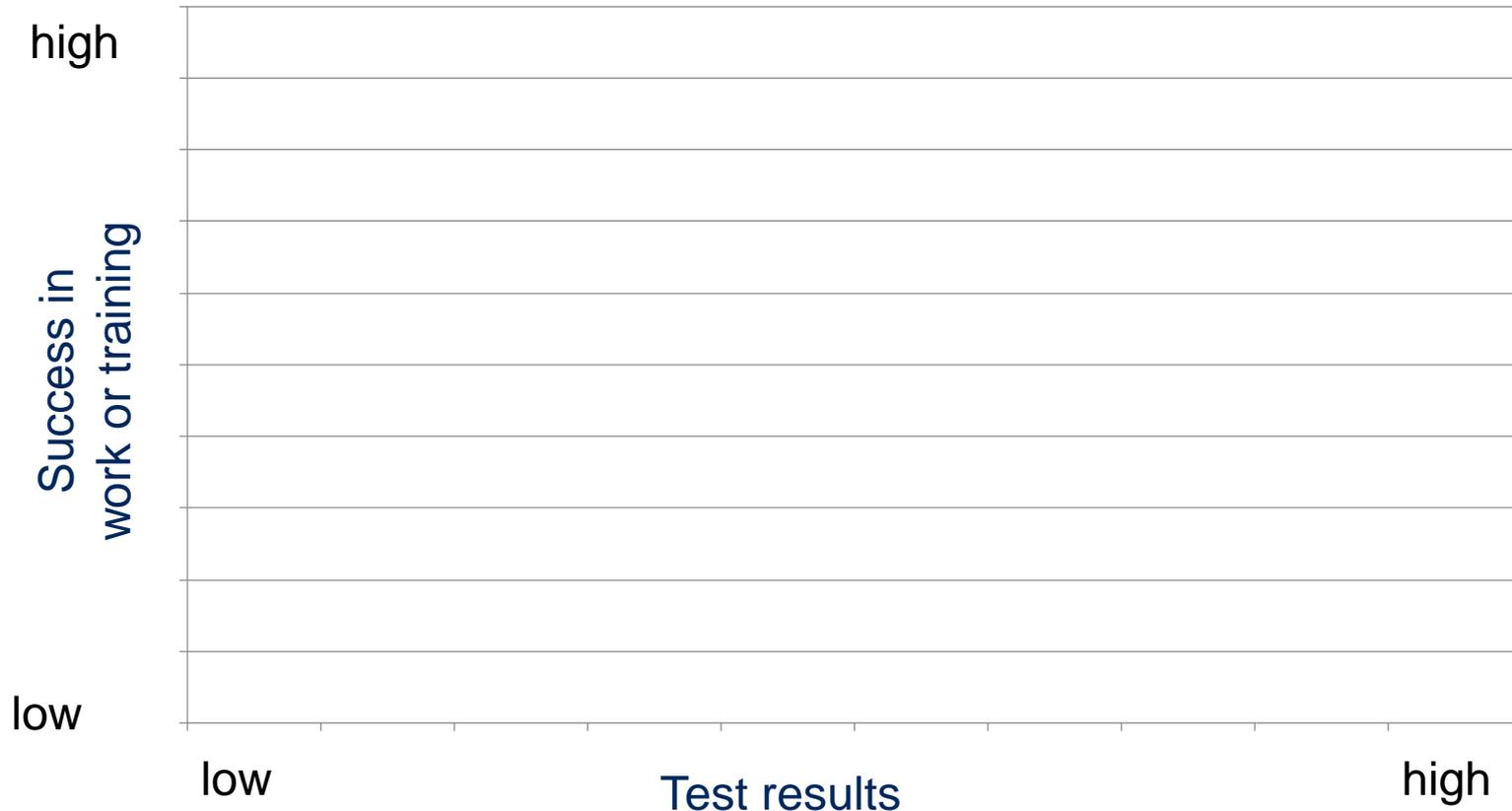
Why is criterion validity important?

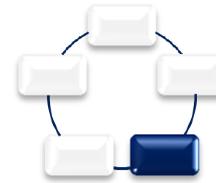
The higher the validity, the larger the number of suitable candidates that can be identified.



Criterion validity (2)

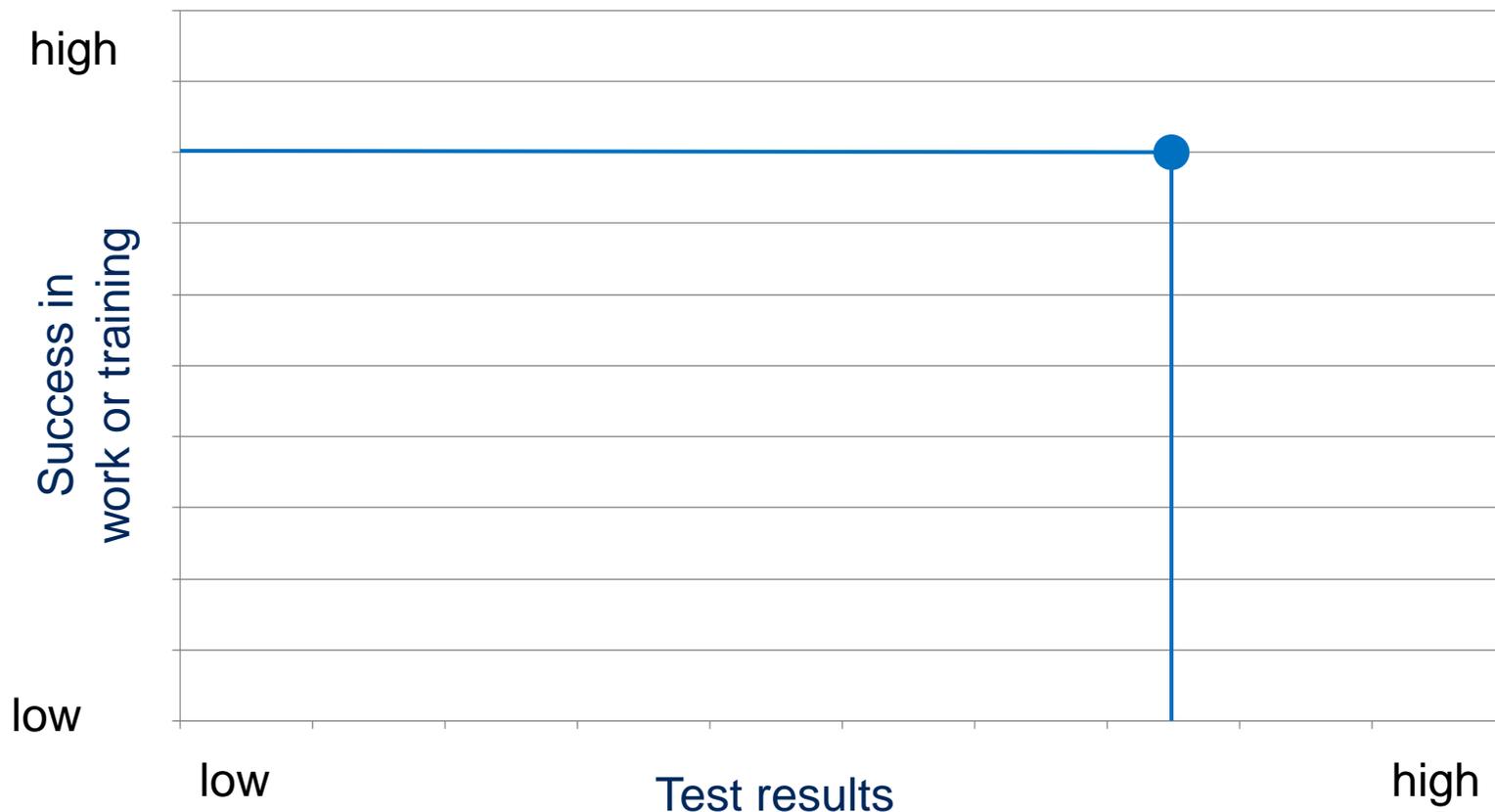
Criterion validity is the basis for calculating the usefulness of HR tools.

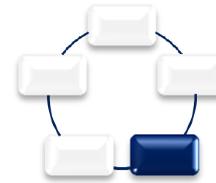




Criterion validity (3)

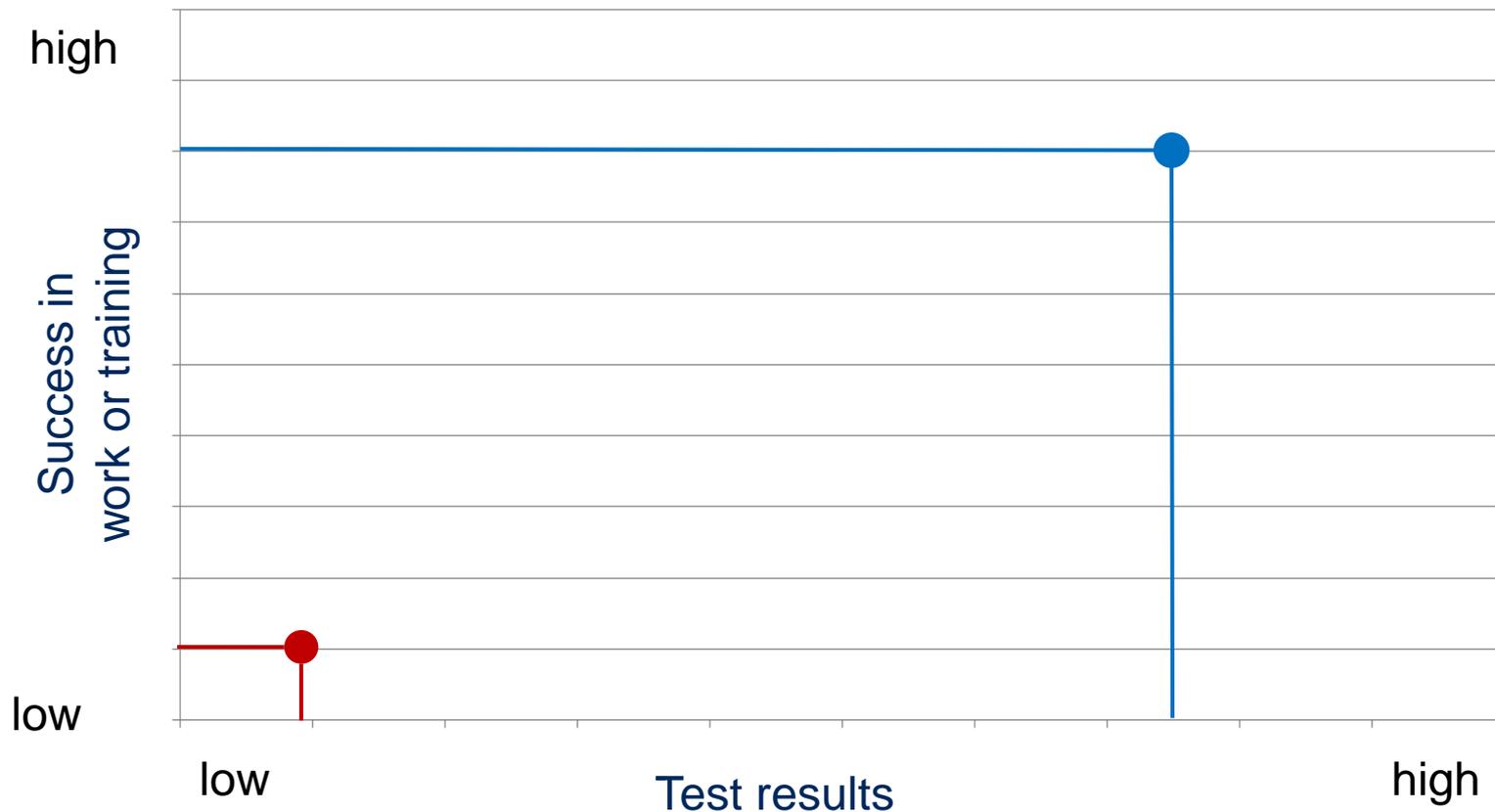
For predictive purposes it would be ideal if individuals with high scores were always highly successful in their job.

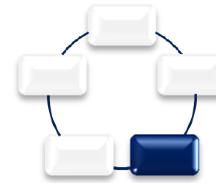




Criterion validity (4)

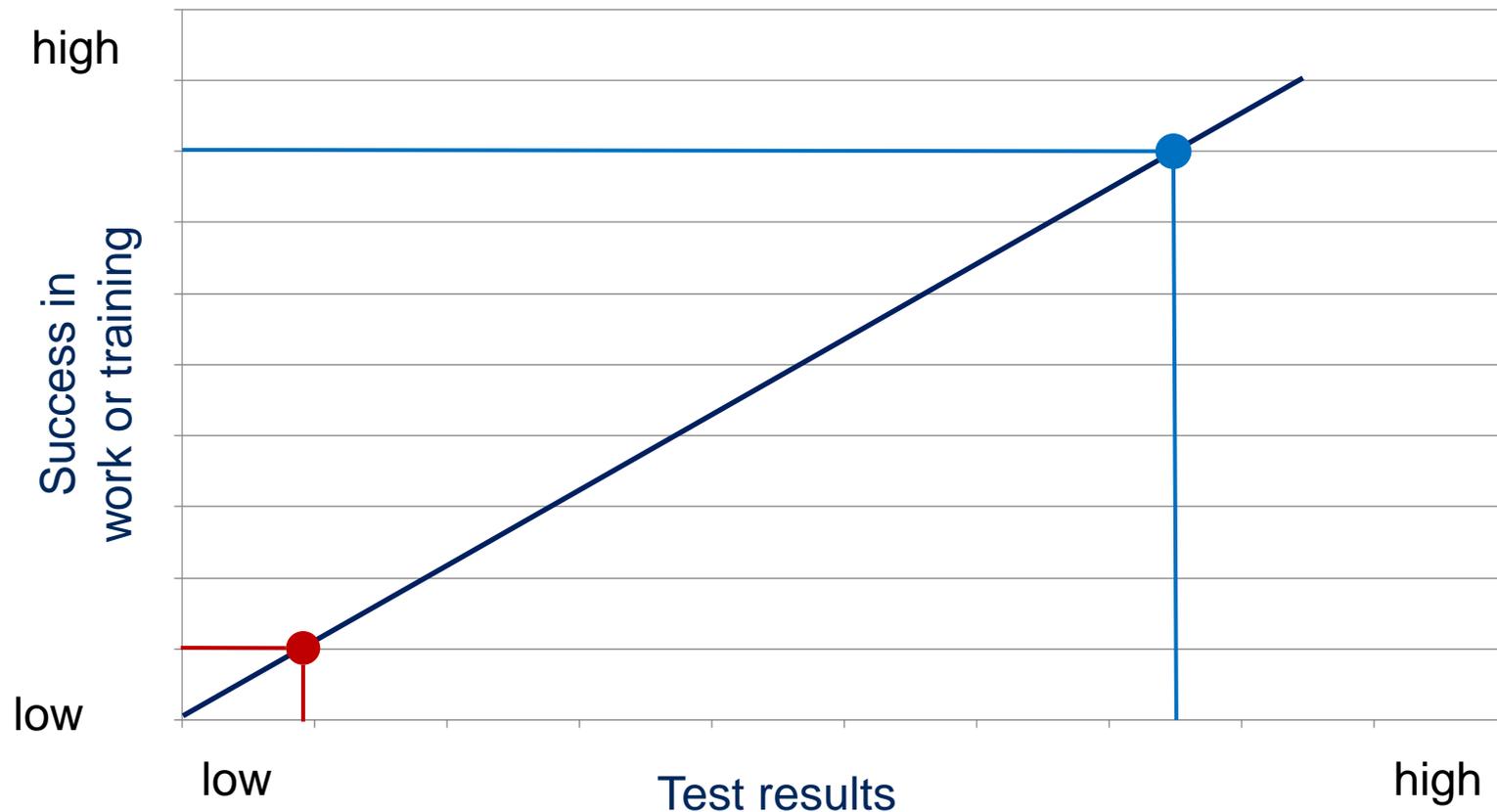
and individuals with low scores were less successful in their careers.

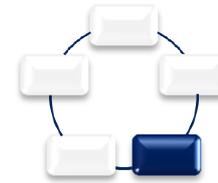




Criterion validity (5)

An individual's future success could then be predicted perfectly.

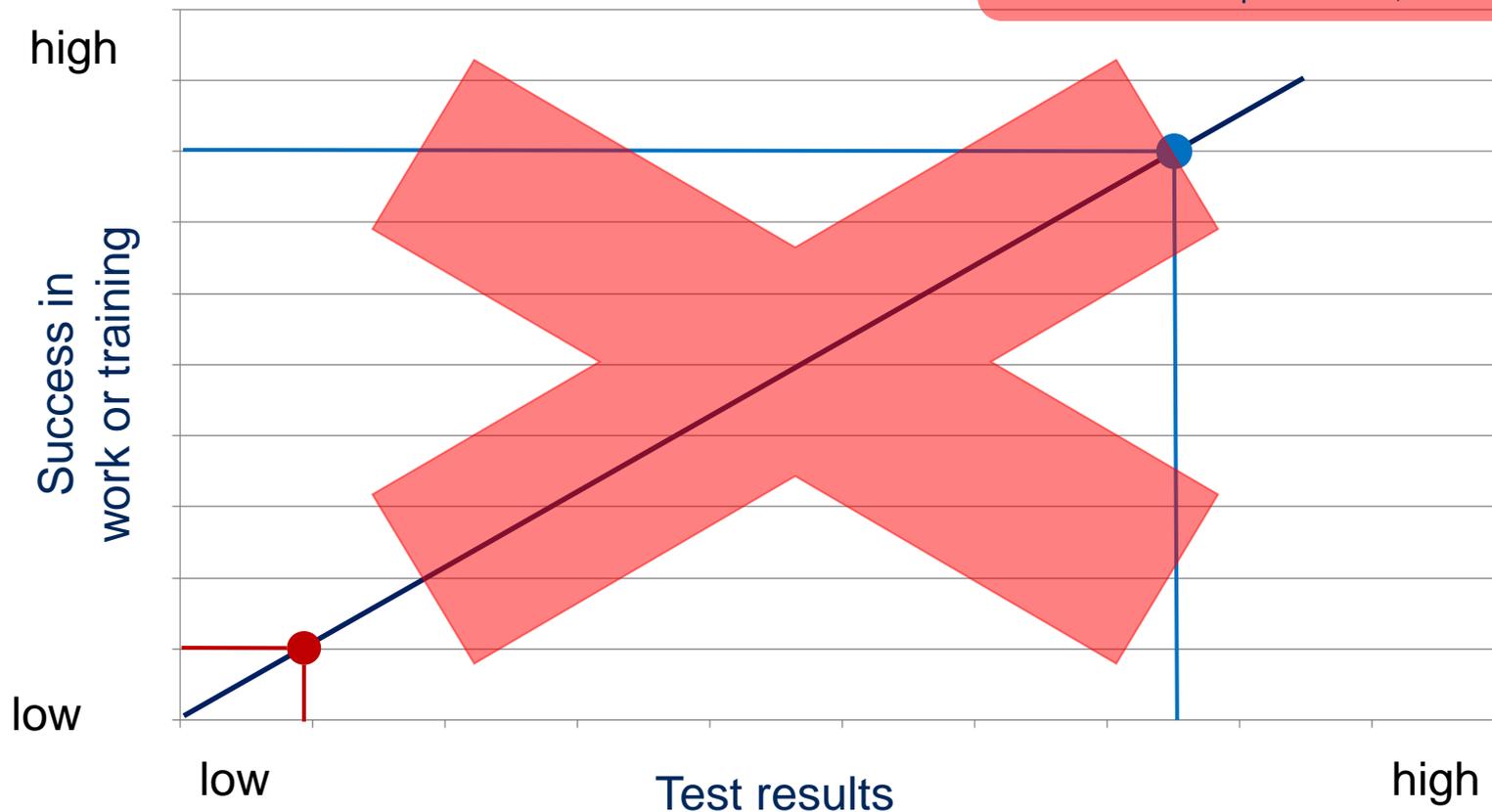


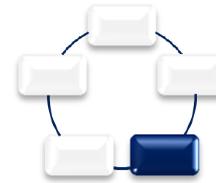


Criterion validity (6)

However, success in a job cannot be predicted perfectly by tests.

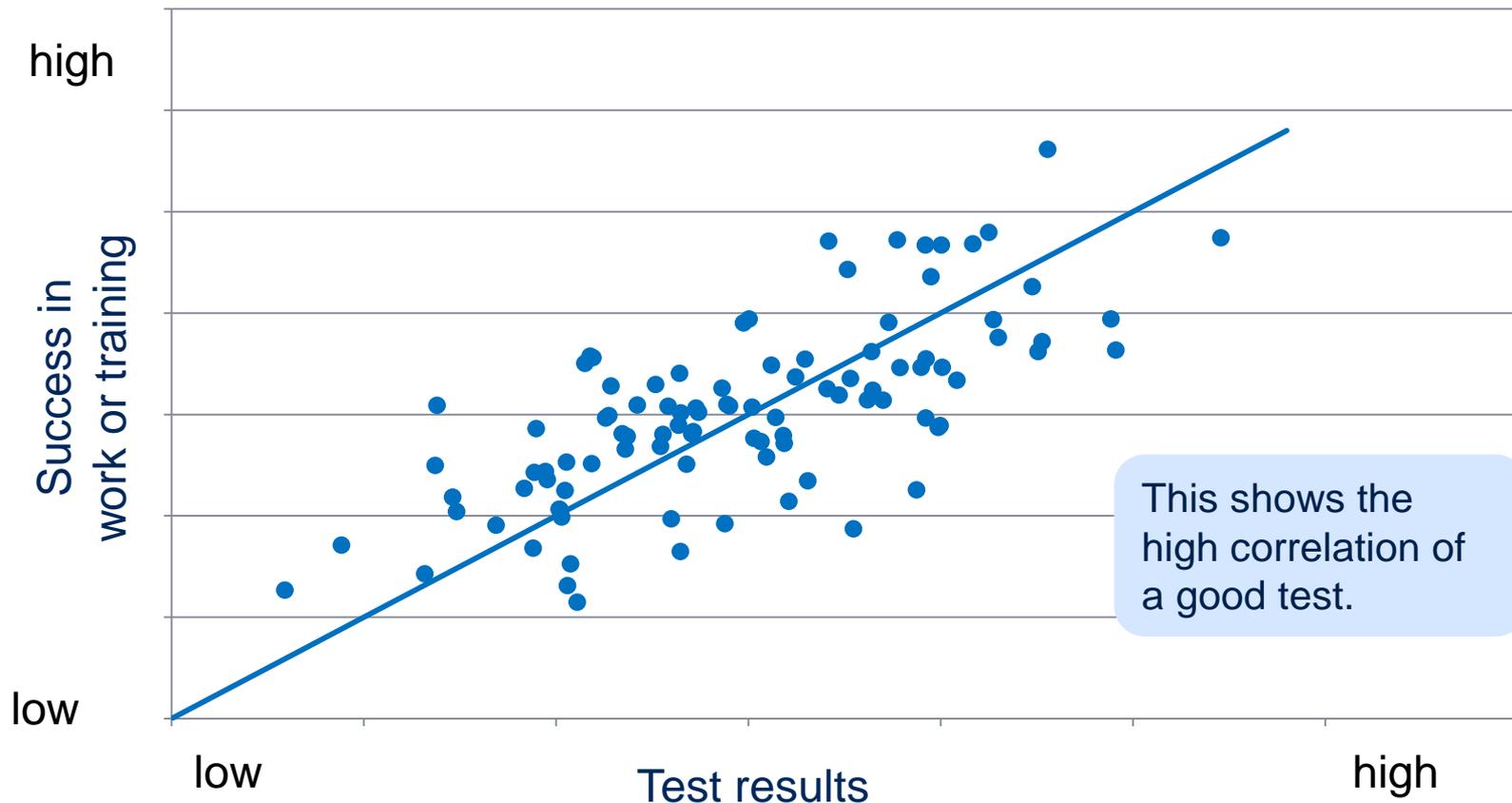
People change, tests are affected by measurement error, external circumstances are unpredictable, etc.

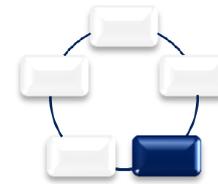




Criterion validity (7)

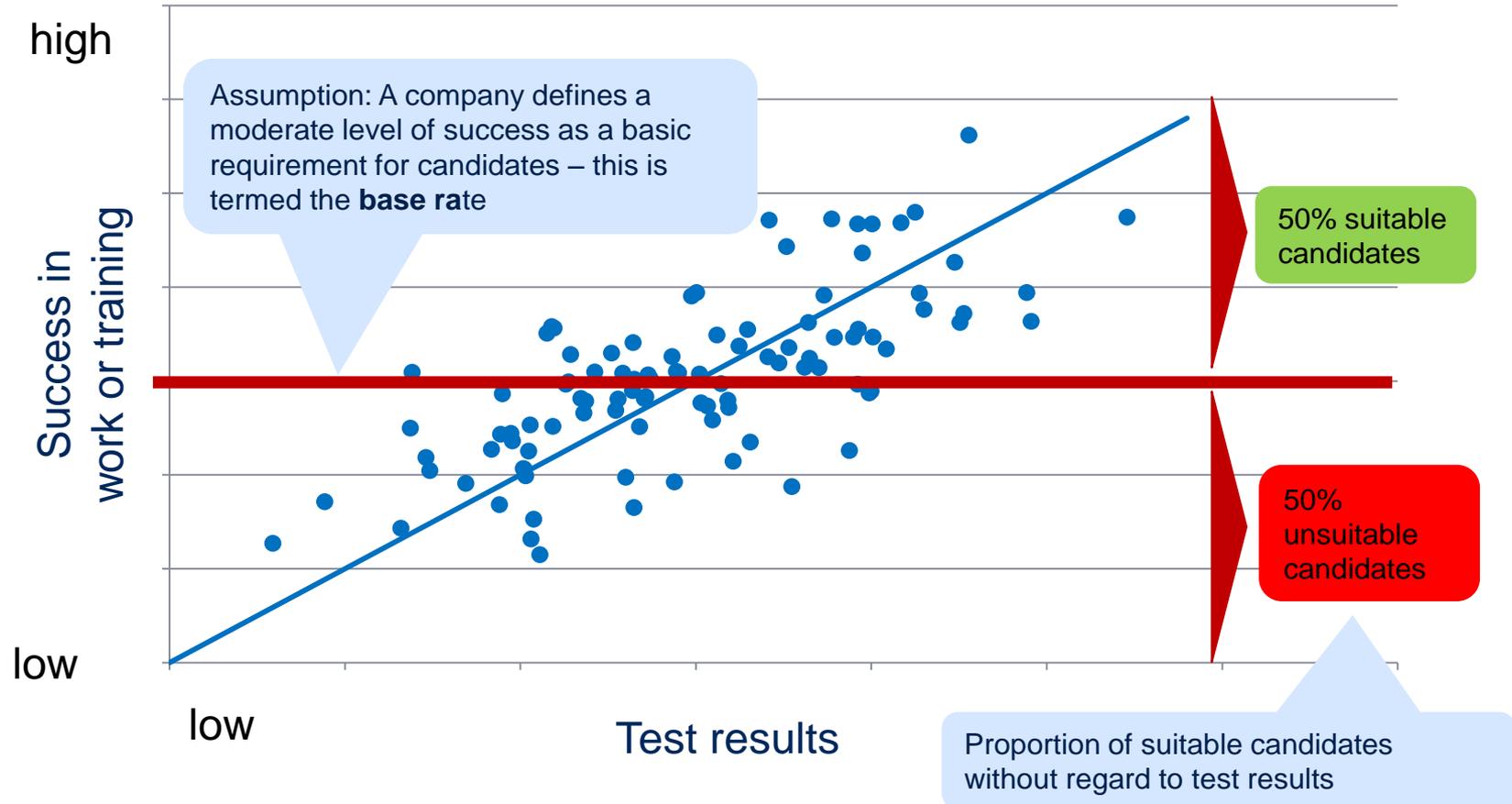
However, tests can predict success with a high level of probability

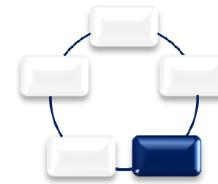




Criterion validity (8)

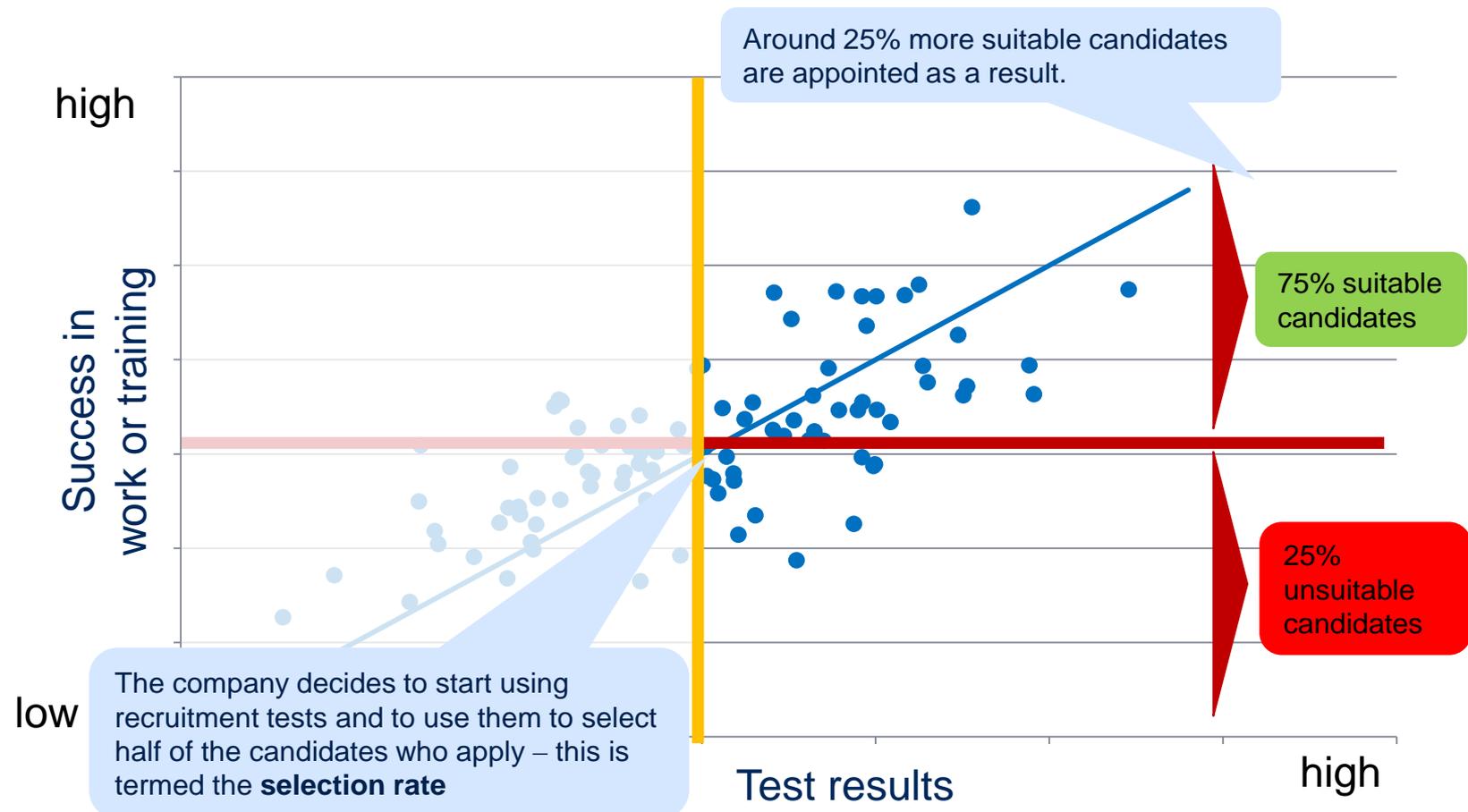
Although the correlation is not perfect, the test is of great practical usefulness

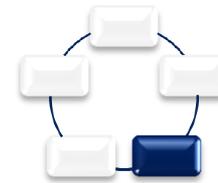




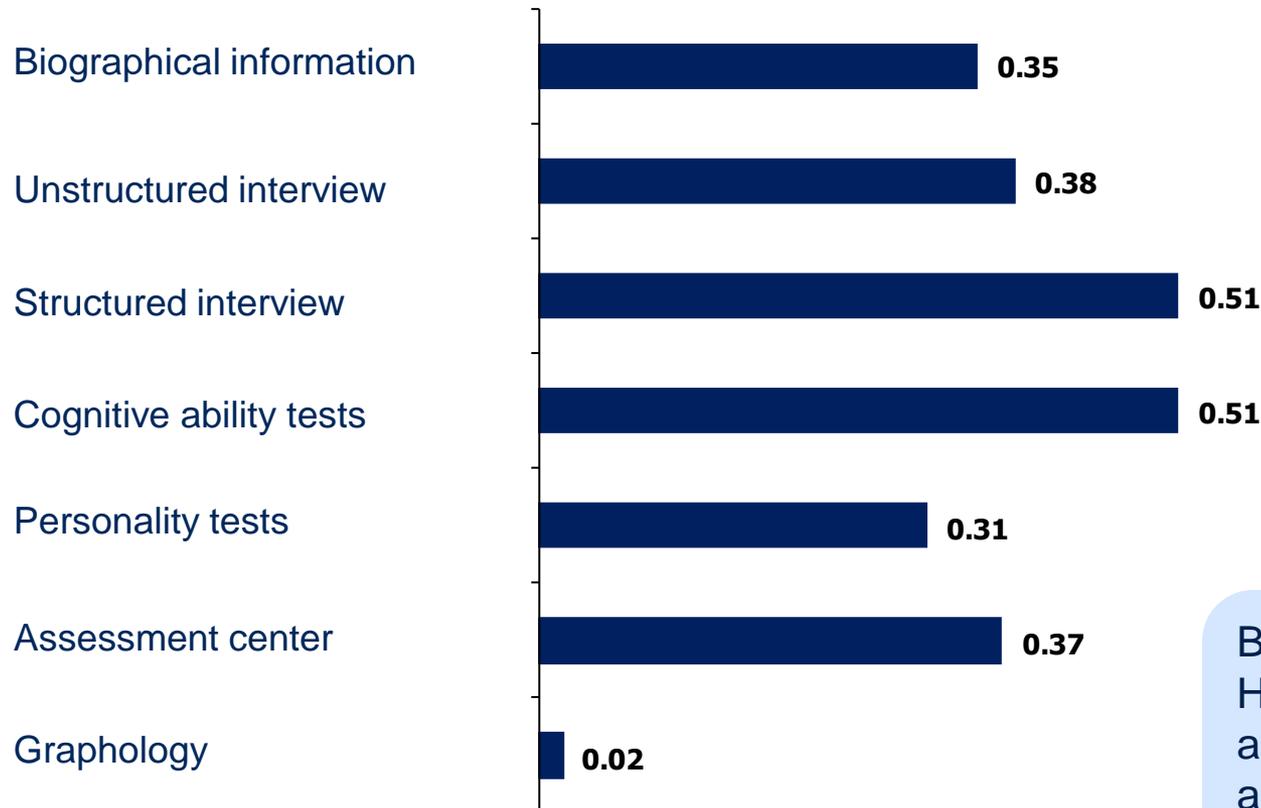
Criterion validity (9)

A good test greatly increases the strike rate and hence the proportion of suitable candidates

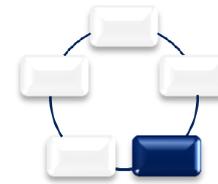




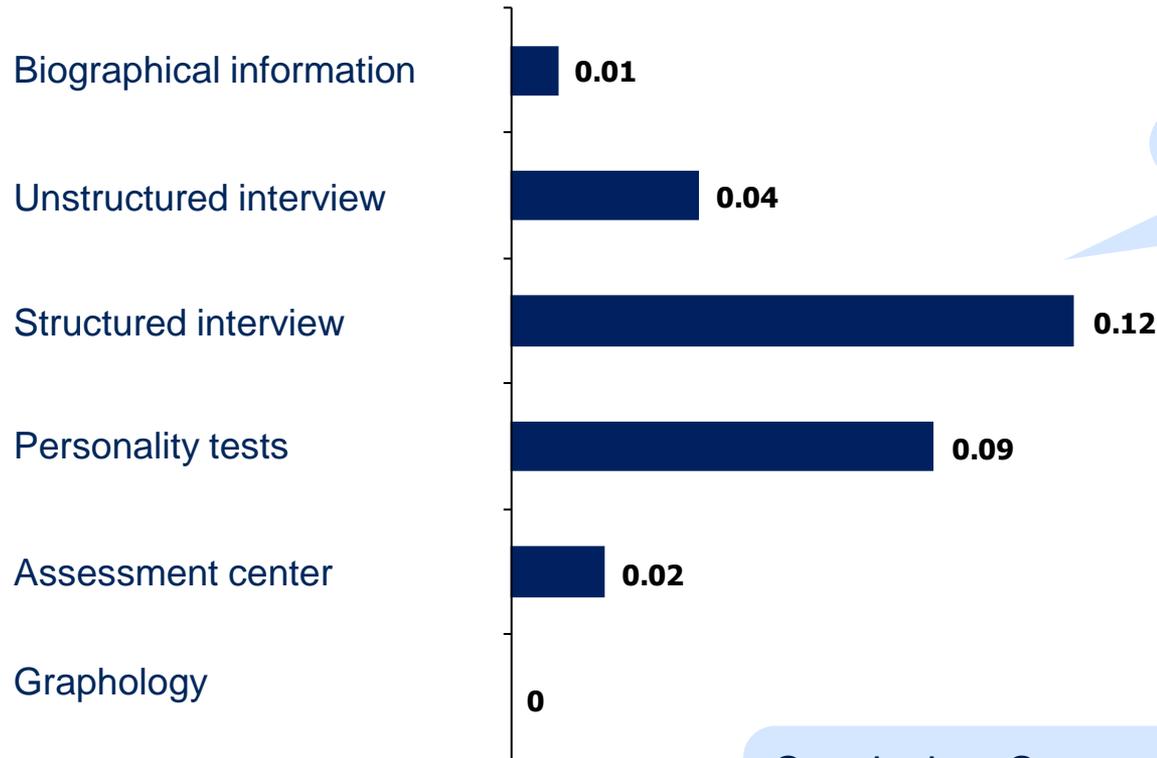
Criterion validity (10)



By comparison with other HR methods, ability tests and structured interviews are very good at predicting success



Criterion validity (11)



Additional validity if ability tests have already been used

Conclusion: Success in a job is predicted best by a combination of ability and personality tests and a structured interview.



Economy

Do they represent an economical use of resources in relation to the information gained?

Computer tests

Computerized tests are **very economical** because they are administered in computerized form, scoring and report creation are automated, data management is simple and group testing sessions are possible.

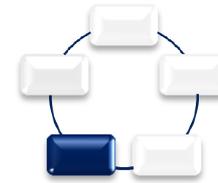
Interview/AC

Interviews and assessment centers are **less economical** because they are more labor-intensive. For example, only one person can be interviewed at a time, and an AC requires a number of assessors.

Cost/benefit calculations show that using tests can enormously increase the strike rate for suitable candidates. As a result of the costs saved, the money spent on purchasing the tests is recouped within a very short time.¹

1) Vetter, M. & Postai, B. (2006). Die Nutzung der DIN 33430 im Human Resources Management der Assekuranz – Eine gewinnbringende Investition. In K. Westhoff (Ed.), *Nutzen der DIN 33430* (33-52). Lengerich: Papst.

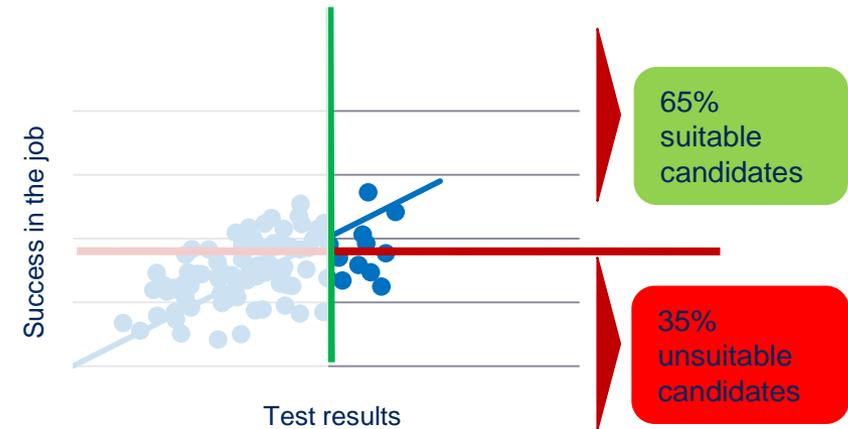
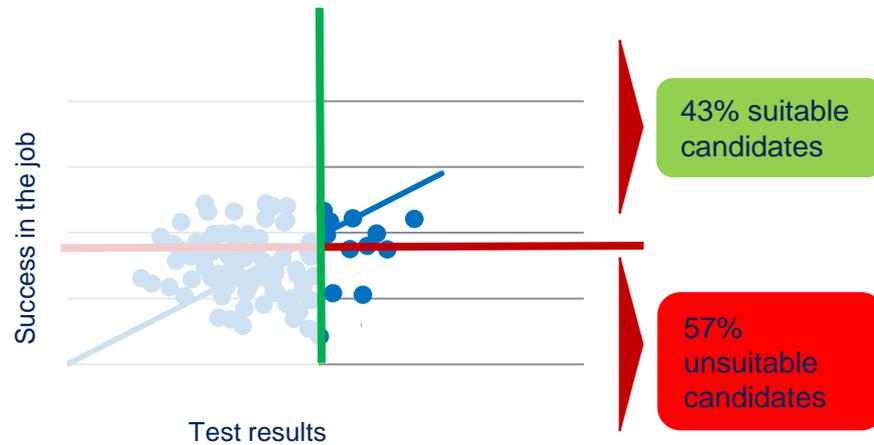
Economy – practical example



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Original recruitment process: validity 0.2

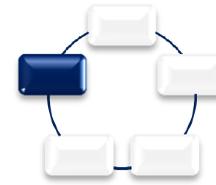
Recruitment using tests: validity 0.5



— Base rate: 25% of candidates are suitable

— Selection rate: 11.4% of candidates are appointed

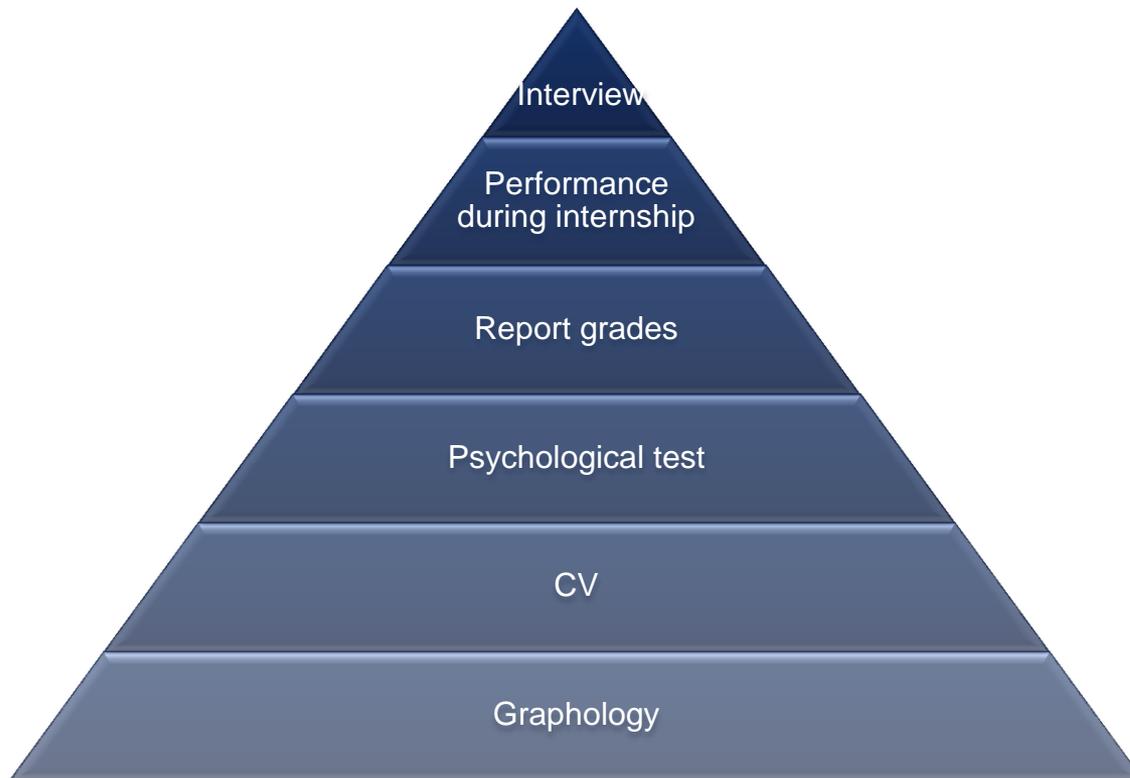
The strike rate of suitable candidates is increased from 43% to 65%!



Acceptance

What do candidates think about it?

Acceptance of different HR tools¹⁾



Increased acceptance²⁾

- **Information:** telling candidates at the start of the application or potential analysis process that psychological tests will be used
- **Explanation:** of the content, goals and benefits of testing
- **Feedback:** if possible, announce and provide individual feedback

1) Schuler, H. (Ed). (2006). *Lehrbuch der Personalpsychologie*. Göttingen: Hogrefe

2) Vetter, M. & Postai, B. (2006). Die Nutzung der DIN 33430 im Human Resources Management der Assekuranz – Eine gewinnbringende Investition. In K. Westhoff (Ed.), *Nutzen der DIN 33430* (33-52). Lengerich: Papst.

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How?

Item-Response Theory and Rasch-Model

IRT entails three assumptions:

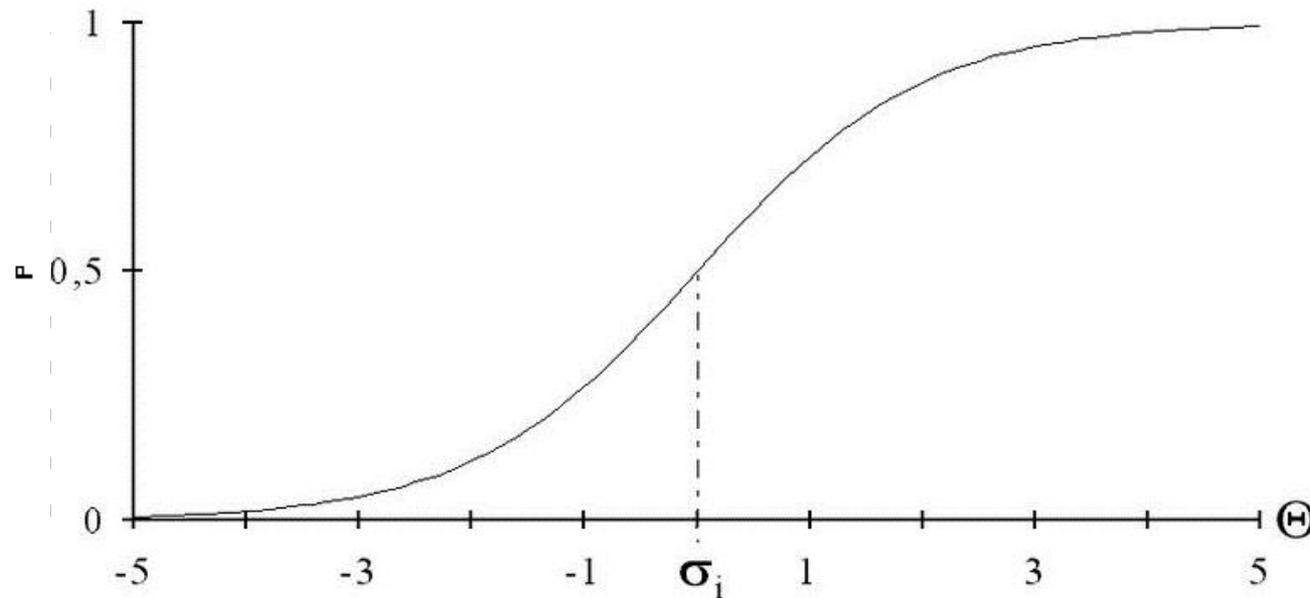
- A unidimensional trait denoted by θ
- Local independence of items
- The response of a person to an item can be modeled by a mathematical *item response function* (IRF).

According to the Rasch Model (RM; Rasch, 1980; Fischer & Molenaar, 1995) each person v is characterized based on a unidimensional person parameter θ_v (theta), and each item i is based on an item difficulty parameter σ_i (sigma). Therefore, the probability that person v solves a task can be estimate by the logistic equation:

$$p(+ | \theta_v, \sigma_i) = \frac{\exp(\theta_v - \sigma_i)}{1 + \exp(\theta_v - \sigma_i)}$$

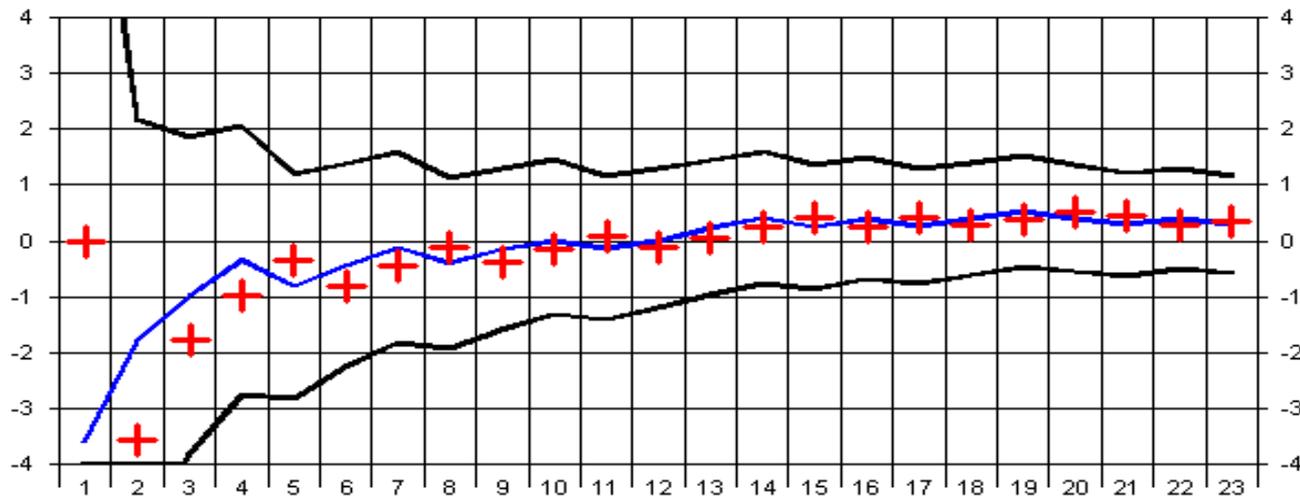
Computerized Adaptive Testing

- based on probabilistic test theory
- increases test reliability by administration of most informational items



Computerized Adaptive Testing (CAT)

In order to always administer the most informative items, CAT is an incremental procedure of estimating a respondents ability parameter and selecting the most appropriate item.



Therefore CAT claims to be:

- more motivating
- more economic

Example item of the numeric inductive reasoning (NID) instruction

Introduction...

Some of the problems will of course be more difficult. The pattern can consist of addition, subtraction, multiplication or division. Some sequences may involve several arithmetical operations.

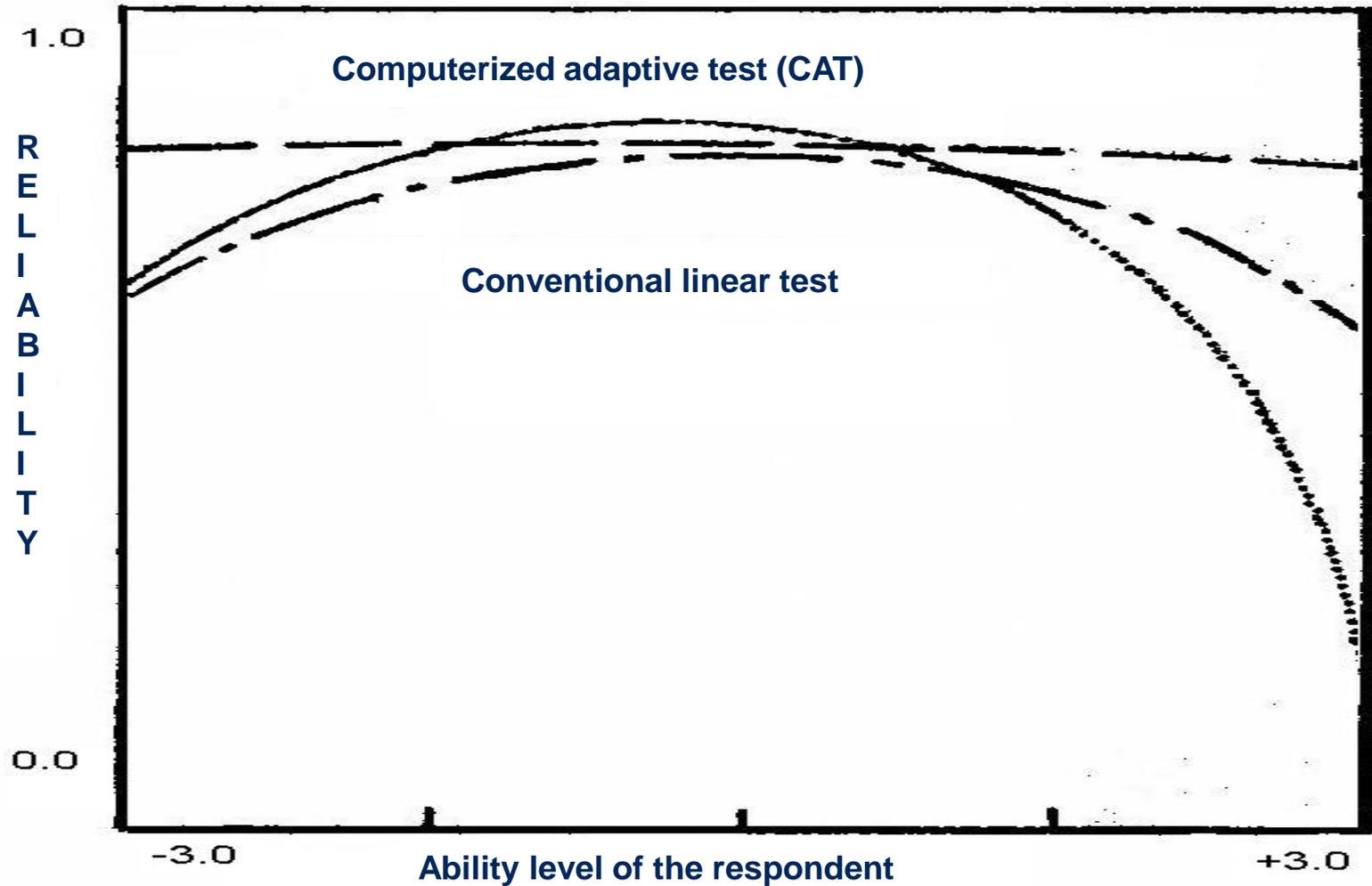
Now try to solve this problem yourself:

4 8 16 32 64 128 ?

Back Next

Let's have a look into the System

Psychometric measurement precision



Computerized adaptive testing (CAT)

Prerequisites of CAT:

- ✓ Sufficient large item pool calibrated by means of the 1PL-Rasch Model
- ✓ Advanced item selection and person parameter estimation algorithm

Advantages of CAT:

- ✓ Optimal adjustment of the item difficulties to the respondent's actual level of ability
- ✓ Maintenance of measurement precision across the entire ability scale
- ✓ Increased test economy by presentation only maximally informative items
- ✓ Increased test security by means of Item-Exposure-Control algorithms (e.g. Simpson & Hetter, 1985)
- ✓ Maintenance of test-taking motivation by means of motivation on demand (e.g. Häusler, 2006; Häusler & Sommer, 2008)

Objections against Computerized adaptive testing (CAT)

General Concerns:

- ✓ Rigid and inhuman procedures.
- ✓ Respondents not familiar with a computer are systematically disadvantaged.
- ✓ Computerization of paper-pencil tests leads to an alteration of their construct validity and the item parameters.

Empirical data regarding these concerns:

- ✓ Respondents who are unfamiliar with computers are not systematically disadvantaged in computerized assessments (Klinck, 2003).
- ✓ The positive correlation between computer familiarity and ability test scores hold for the computerised version as well as the paper-pencil version (Klinck, 2003).
- ✓ Measurement equivalence can be assumed in case the handling processes is similar in both version of the test (e.g. Norris, 1995; Klinck, 2003).

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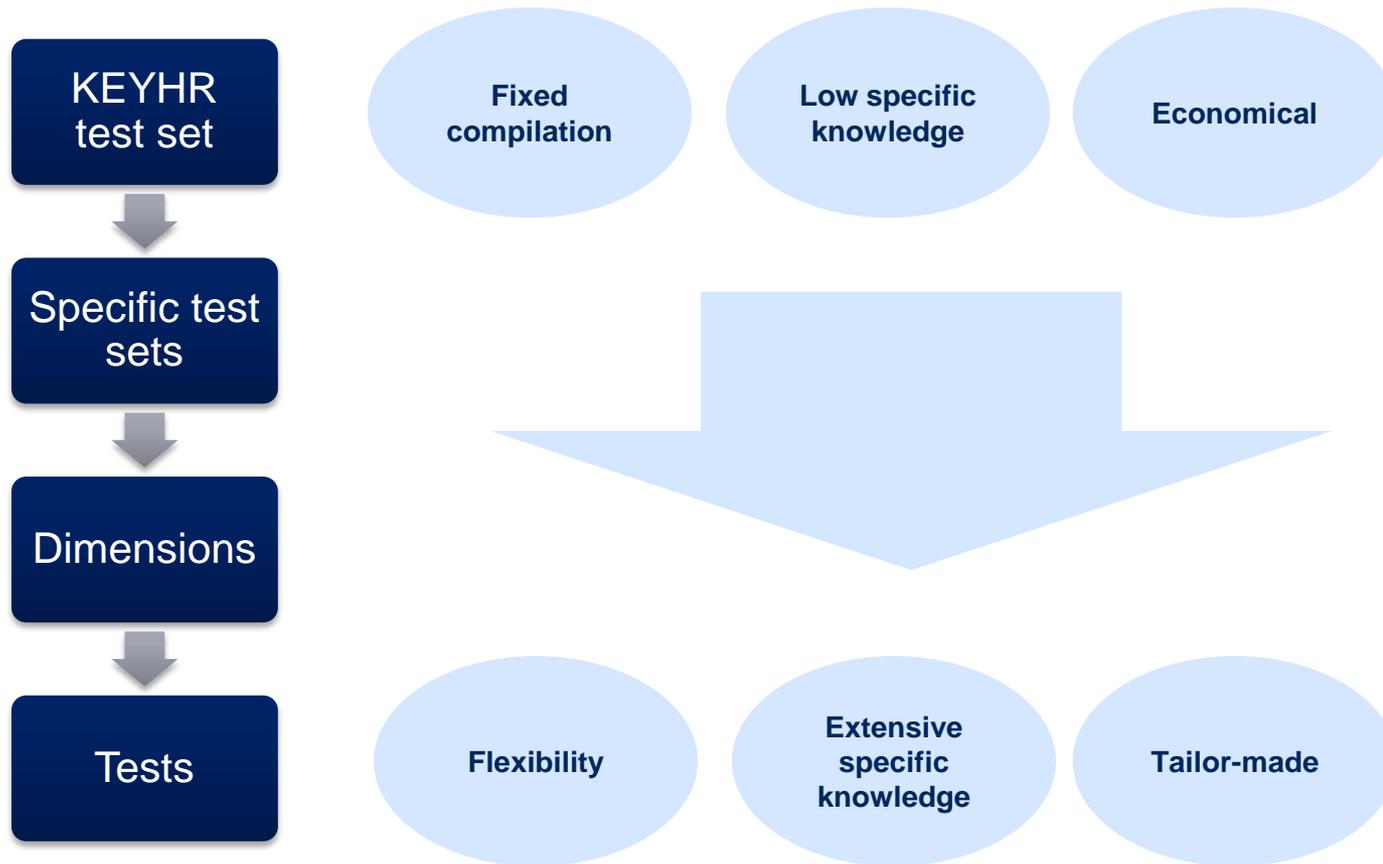


What?

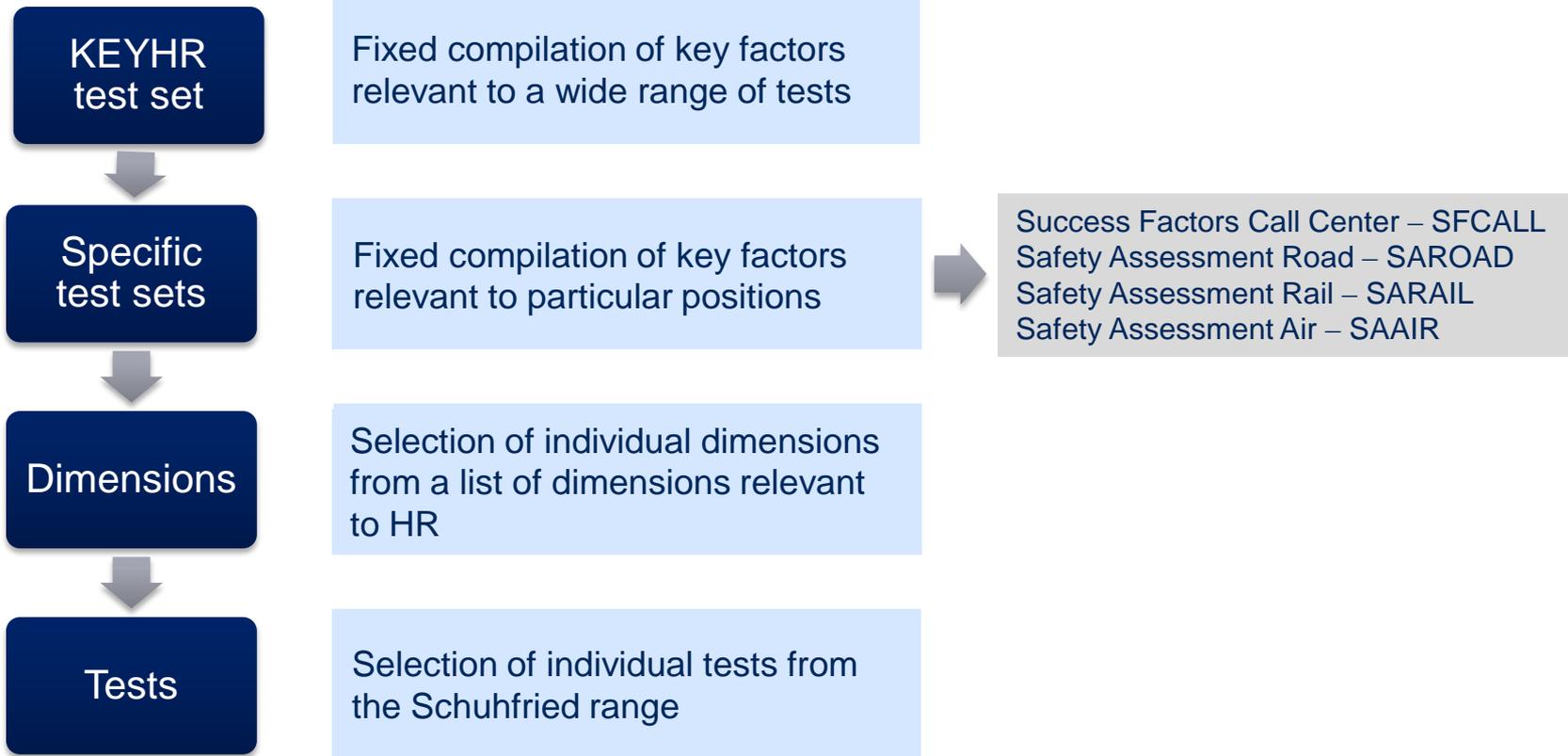


How?

Overview of the VTS HR



Overview of the VTS HR



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Why?



What?



How?

What are test sets?

- A test set is a combination of test dimensions that is used to address a complex assessment issue.
- The test sets have been compiled by experts; they are based on validation studies or relate to a statutory requirement.
- For each test there is:
 - a separate manual
 - a cross-test scoring
 - a report that summarizes the results of all dimensions graphically and verbally

A test set thus relieves you of the task of test selection and enables you to be certain that you are using the right dimensions for a particular situation. The test set also simplifies cross-test scoring and interpretation and hence makes it easier to obtain the information needed.



Key Factors HR (KEYHR): Introduction

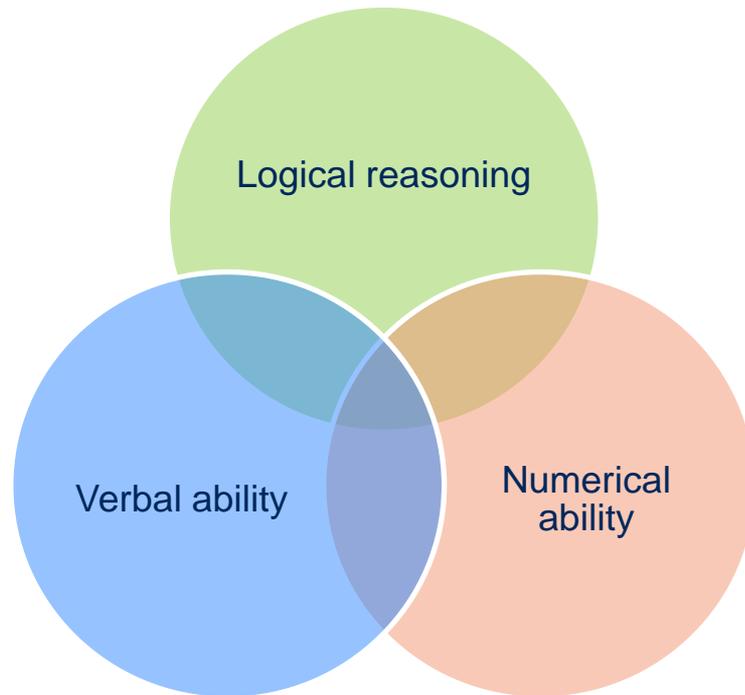
The KEYHR test set measures the ability and personality factors that are most important for a successful career.

- Because these key factors are not job-specific, the test set provides a good impression of a candidate's basic skills.
- Use in candidate pre-selection or in combination with a structured interview and/or other tests

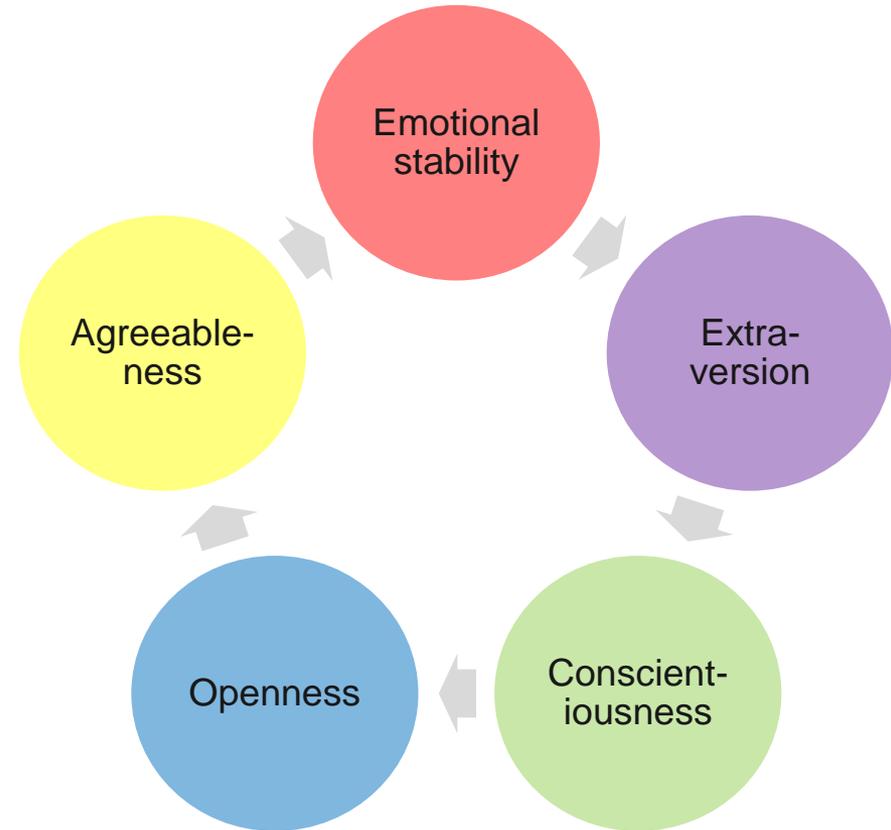


KEYHR: Overview of dimensions

Cognitive abilities
CHC model



Work-related aspects of personality
Big Five model



KEYHR: Scoring and interpretation



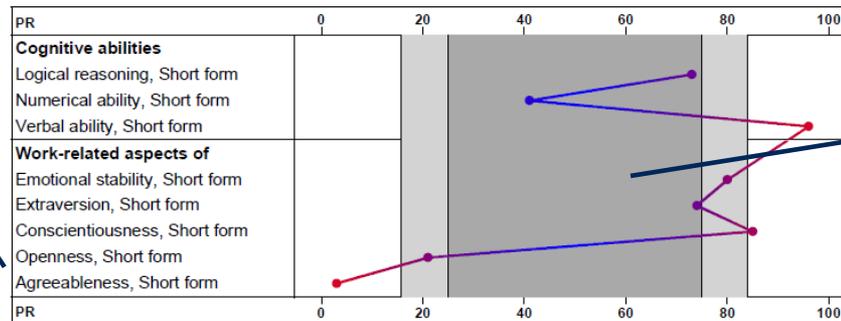
Test results - Representative Norm:

Test Variable		Raw score	Parameter	PR
Cognitive abilities				
Logical reasoning	Short form		0,808	73
Numerical ability	Short form		-1,960	41
Verbal ability	Short form		3,863	96
Work-related aspects of personality				
Emotional stability	Short form		0,575	80
Extraversion	Short form		0,458	74
Conscientiousness	Short form		0,937	85
Openness	Short form		-0,576	21
Agreeableness	Short form		-1,391	3

Percentile rank: the percentage of a representative comparison group that has the same score or a lower one on this dimension.

Dimensions

Profile - Representative Norm:



Average range:
PR = 25 - 75

KEYHR: Written report

2 individual written reports for each testee contain:

- Profile diagram
- Written description of the test results

Report for internal use

+ suggestions for additional interview questions



VIENNA TEST SYSTEM
HR

TEST RESULTS

KEYHR
Key Factors HR

Candidate
[varFirstName] [varName]

Test date
[varTestDate]

SCHUHFRIED
passion for psychology

Report for the candidate

+ suggestions for training and/or compensation



VIENNA TEST SYSTEM
HR

TEST RESULTS

Information for candidates

Candidate
[varFirstName] [varName]

Test date
[varTestDate]

SCHUHFRIED
passion for psychology

Success Factors Call Center (SFCALL): SCHUHFRIED

Introduction

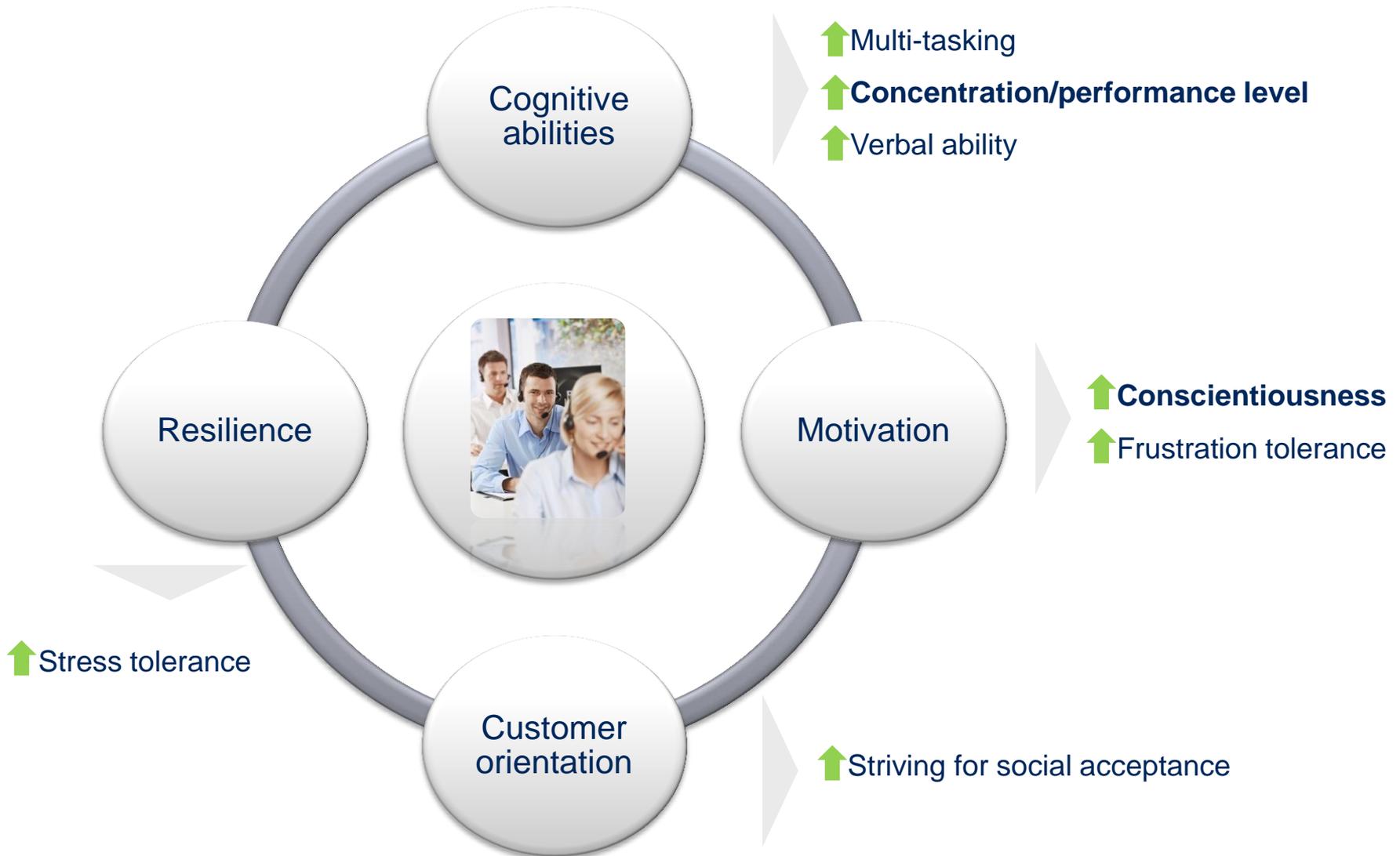
The aim of the SFCALL test set is to improve both the economy and quality of call-center agent recruitment.

- The tests have been selected on the basis of a **requirements analysis** and their suitability for selecting call center agents has been verified in a **validation study**.
- A distinction is made between **Inbound** and **Outbound** call centers:
 - Inbound agents receive calls passively (e.g. customer service, complaints management)
 - Outbound agents make calls actively (e.g. market research, opinion surveys, telemarketing)

→ There are some differences between the ideal characteristics of agents in the two areas. This test set can be used to assess candidates' suitability for both areas.



SFCALL: Dimensions - inbound

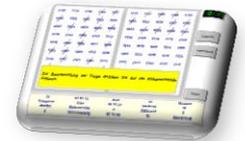


SFCALL: Dimensions - outbound



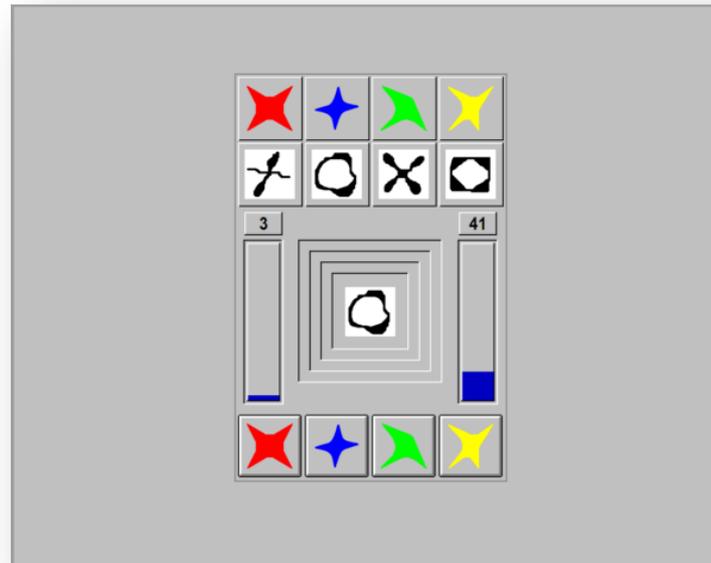
SFCALL: Dimension details

Range	Dimension	Test	Length
Cognitive abilities	Performance level	AHA	10
	Multi-tasking	SIMKAP	17
	Verbal ability	INSSV	7
Motivation	Aspiration level	AHA	-
	Frustration tolerance	AHA	-
	Conscientiousness	BFSI	6
Customer orientation	Empathy	SKASUK	2
	Good-naturedness	BFSI	2
	Striving for social acceptance	SKASUK	2
Resilience	Stress tolerance	SIMKAP	-
	Quality of work under unfavorable working conditions	BACO	17
	Total length	approx. 60 min.	



SFCALL: Attitudes to work (AHA)

- **Performance level (concentration)** is assessed by performance (number of correct responses) in simple coding tasks.
- **Aspiration level** reveals whether the respondent tends to set realistic or unrealistic goals.
- **Frustration tolerance** describes a person's capacity to endure frustration over a lengthy period without becoming demotivated.



SFCALL: Simultaneous Capacity (SIMKAP)

- **Multi-tasking** describes a person's ability to master work situations in which different requirements must be coordinated and a number of tasks must be handled at the same time.
- **Stress tolerance** describes the extent to which a person's performance changes in situations that make greater demands on their abilities (= stress situations).

The screenshot displays the SFCALL (SIMKAP) interface. At the top right, a digital timer shows 0:34. Below the timer are buttons for 'Calendar' and 'Teleph. book'. The main area contains a grid of numbers with some cells crossed out with diagonal slashes. A yellow text box in the center provides instructions: 'While you are carrying out the routine tasks you will be asked to answer some questions. The questions are not difficult. You can enter your responses by clicking on the corresponding answer at the bottom of the screen. Click "Next" to see an example.' At the bottom, a list of items is shown with corresponding numbers.

1725	1729	1744	1749	1737	1725	1737	1749	1749	1729
1535	1559	1537	1555	1543	1555	1543	1559	1537	1535
0521	0531	0555	0559	0558	0555	0559	0558	0559	0531
2116	2113	2120	2132	2117	2120	2120	2116	2113	2132
1810	1850	1846	1811	1830	1810	1830	1846	1811	1850

While you are carrying out the routine tasks you will be asked to answer some questions. The questions are not difficult. You can enter your responses by clicking on the corresponding answer at the bottom of the screen.

Click "Next" to see an example.

12	692-8173	doctor	23	Norbert
Wall Street	Moscow	582-9137	Sony	18
Mother	car inspection	4	dentist	6
8	insurance company	692-1990	16	Dublin

SFCALL: Intelligence Structure Battery – short form (INSSV)

SCHUHFRIED

Verbal ability describes the extent of a person's vocabulary.

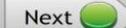
Sample exercise

The word **knowledge** is most similar to the word _____.

- suitability
- awareness
- opinion
- capacity

 Back

I do not know the answer

Next 

SFCALL: Big Five Structure Inventory (BFSI)

- **Conscientiousness** is an aspect of individuals' behavior at work. People with a high level of conscientiousness describe themselves as competent, organized, orderly, dutiful, focused, disciplined and ambitious.
- **Good-naturedness** describes the extent to which someone sees him- or herself as empathetic, understanding, benevolent and amiable. Good-naturedness is the only dimension in which a low level has been found to be successful (for outbound agents).

Nr. 1 von 300

feeling safe

untypical for me

rather untypical for me

rather typical for me

typical for me

SFCALL: Resilience Assessment (BACO)

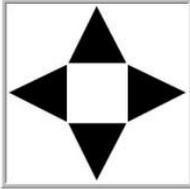
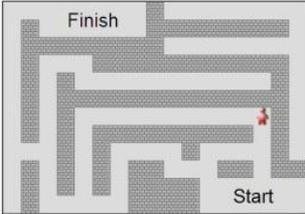
SCHUHFRIED

The dimension of **quality of work under unfavorable working conditions** indicates the extent to which an applicant's quality of work is affected by unfavorable working conditions.

Introduction...

On the right are the navigation buttons. You can move through the maze by clicking with the mouse on the direction that you want to move in.

Try this out and try to get from the start to the finish as quickly as you can!



SFCALL: Customer Service and Orientation Scaels (SKASUK)



- **Empathy** measures the extent to which someone describes him- or herself as sensitive, empathetic and emotionally aware. Empathy is thus a person's ability to put him- or herself in another person's shoes, to understand other people's various feelings and to distinguish between them.
- **Striving for social acceptance** describes a person's striving for social status and recognition.

No. 1 of 94

As soon as I notice that other people do not approve of my behavior, I try to change it appropriately.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
applies to a great extent	applies somewhat	applies a little	does not apply at all

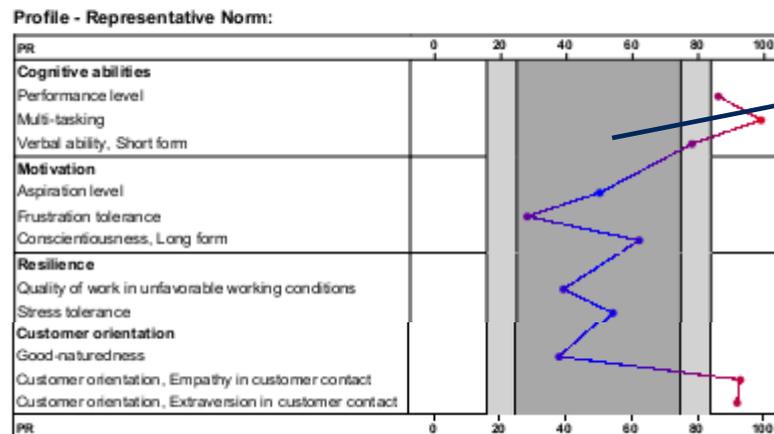
SFCALL: Scoring and interpretation

Fit scores: To what extent does the candidate fit the ideal profile for inbound and outbound agents? The closer the fit score is to 1,000, the greater the candidate's suitability for the area in question.

Test results - Representative Norm:

Test Variable	Raw score	Parameter	PR
Cognitive abilities			
Performance level	59		86
Multi-tasking	340		99
Verbal ability	Short form	2,089	78
Motivation			
Aspiration level	-0,15		50
Frustration tolerance	0,00		28
Conscientiousness	Long form	0,156	62
Resilience			
Quality of work in unfavorable working conditions	0,80		39
Stress tolerance	100		54
Customer orientation			
Good-naturedness	20	1,223	38
Customer orientation	Empathy in customer contact	12	93
	Striving for social acceptance	10	92
Fit scores			
Fit score inbound	793		
Fit score outbound	856		

Percentile rank: the percentage of a representative comparison group that obtains the same score or a lower one on this dimension.



Average range:
PR = 25 - 75

SFCALL: Written report

Contains:

- Profile diagram
- Fit scores for inbound and outbound
- Classification on the basis of fit scores as “very suitable”, “suitable” and “less suitable”.
- Written description of the test results

VIENNA TEST SYSTEM HR 

TEST RESULTS

SFCALL
Success Factors Call Center

Candidate
[varFirstName] [varName]

Test date
[varTestDate]

SCHUHFRIED
passion for psychology

Safety Assessment Rail (SARAIL): Introduction

SCHUHFRIED

The SARAIL test set provides information about train drivers' fitness to drive for use in personnel selection and development.

- The EU's *Directive 2007/59/EC of the European parliament and of the council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community* stipulates that would-be train drivers must undergo psychological assessment and that active train drivers must also be tested periodically.
- As well as being used to test train drivers, SARAIL can also be used to select drivers of other rail vehicles (e.g. rapid-transit train, metro, tram) and applicants for safety-related jobs in the rail sector.

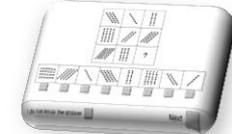
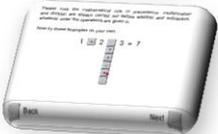
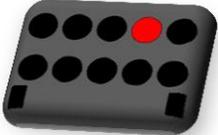
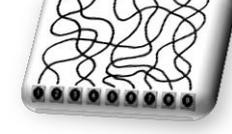
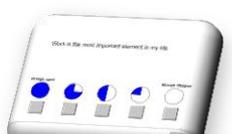
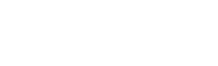


SARAIL: Overview of dimensions

- The selection of dimensions for the SARAIL test set is based on EU Directive 2007/59/EC and the criteria of the CER (Community of European Railways) and the ETF (European Transport Workers' Federation).
- The dimensions listed there have been found in meta-analyses and a large number of rail-specific studies to have predictive validity:



SARAIL: Dimension details

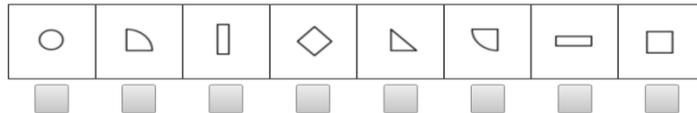
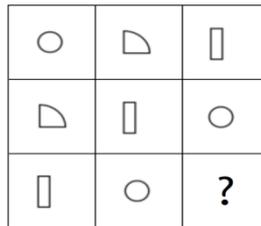
	Range	Dimension	Test	Length	
	Cognitive abilities	Memory	VISGED	13	
		Logical reasoning	INSSV	15	
		Verbal ability	INSSV	7	
	Stress tolerance & ability to react	Stress tolerance, reactive	DT	6	
		Ability to react	RT	6	
	Attention & concentration	Concentration	COG	10	
		Vigilance	WAFV	32	
	Sensomotor functions & perception	Eye-hand coordination	2HAND	4	
		Visual perception	LVT	13	
	Personality	Emotional stability	BFSI	2	
		Extraversion	BFSI	2	
		Conscientiousness	BFSI	2	
		Openness	BFSI	2	
		Agreeableness	BFSI	2	
	Total length		approx. 2 h		

SARAIL: Intelligence Structure Battery – short form (INSSV)

- **Logical reasoning** involves the ability to recognize regularities, understand the implications of statements and draw logical conclusions.
- **Verbal ability** describes the extent of a person's vocabulary.

Sample exercise

Look for the correct figure.



I do not know the answer

Next 

Sample exercise

The word **knowledge** is most similar to the word _____.

- suitability
- awareness
- opinion
- capacity

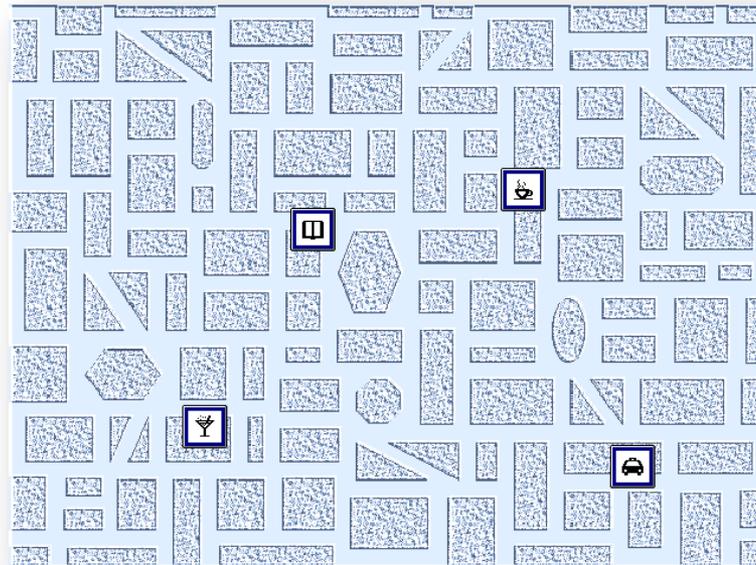
 Back

I do not know the answer

Next 

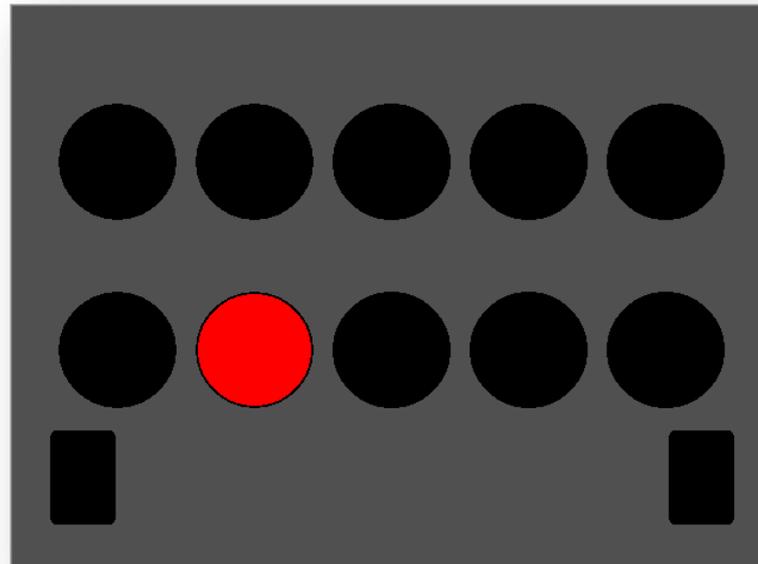
SARAIL: Visual Memory Test (VISGED)

Memory is the ability to retain, organize and later retrieve perceived information. SARAIL tests only visual short-term memory – i.e. the ability to retain visual information in the short term and reproduce it correctly.



SARAIL: Determination Test

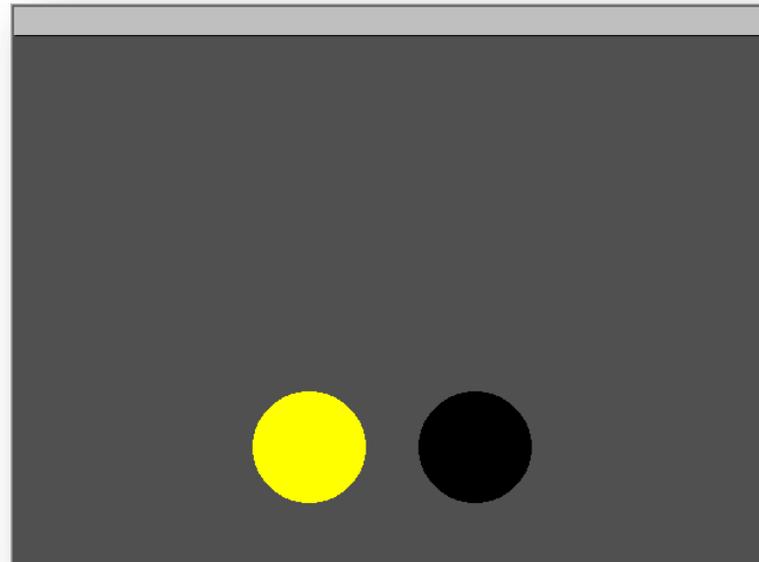
Reactive stress tolerance is used here to describe the individual's ability to react quickly and accurately even when under stress. High stress tolerance is particularly necessary in stressful situations.



SARAIL: Reaction Test (RT)

Ability to react involves the ability to respond to one or more stimuli as quickly and accurately as possible. Adequate reaction speed is essential for train drivers, since when an incident occurs suddenly even milliseconds may count – for example, if a pedestrian unexpectedly crosses the tracks and rapid braking is needed.

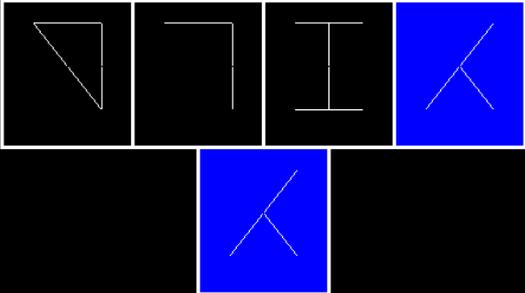
- **Reaction speed:** The time that elapses between a stimulus and the start of the mechanical response movement (i.e. the lifting of the finger from the rest button)
- **Motor speed:** The time that elapses between the lifting of the finger from the rest button and making contact with the key that is to be pressed. This score provides information about the respondent's speed of movement.



SARAIL: Cognitrone (COG)

Concentration is regarded here as a special function of attention, namely selective attention. When driving, this is called on every time that a stimulus needs to be shielded from other stimuli and concentration needs to be shifted from one stimulus to another

Compare these figures:

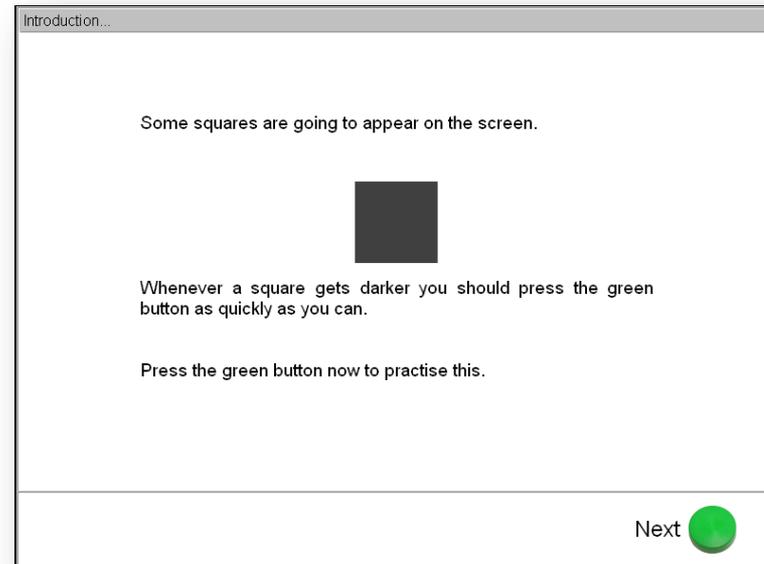


The figure below matches one of the figures above. So press the **green button**.

SARAIL: Perception and Attention functions Vigilance (WAFV)

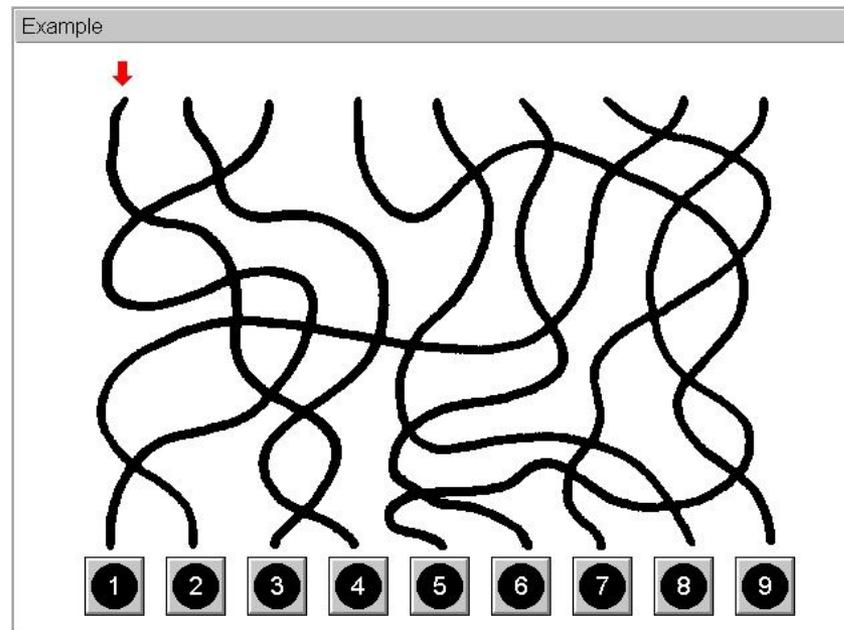
SCHUHFRIED

Vigilance is the ability to focus attention persistently over lengthy periods of time on one or more sources of information, in order to detect and respond to small changes in the information received. The relevant stimuli typically occur only at very irregular intervals and at very low frequency among a large number of irrelevant stimuli.



SARAIL: Visual Pursuit Test (LVT)

Visual perception involves the reception and processing of visual stimuli.



SARAIL: Big Five Structure Inventory (BFSI)

- **Emotional stability:** Dealing with one's own emotions and potential stresses
Subscales: Social confidence, Emotional robustness
- **Extraversion:** Interpersonal behavior
Subscales: Sociability, Assertiveness
- **Conscientiousness:** Performance and attitude to work
Subscales: Sense of duty, Ambition
- **Openness:** The desire to work with new experiences, impressions, ideas and values
Subscales: Openness to ideas, Openness to actions
- **Agreeableness:** Interaction with others
Subscales: Genuineness, Willingness to help

Nr. 1 von 10

brave

untypical for me

rather untypical for me

rather typical for me

typical for me

SARAIL: Scoring and interpretation

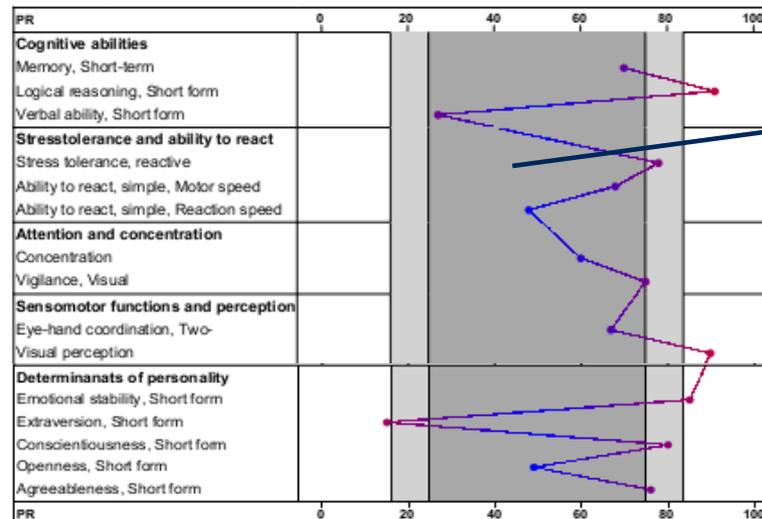
Test results - Representative Norm:

Test Variable	Raw score	Parameter	PR
Cognitive abilities			
Memory Short-term		0,388	70
Logical reasoning Short form		1,728	91
Verbal ability Short form		1,066	27
Stresstolerance and ability to react			
Stress tolerance, reactive	269		78
Ability to react, simple Motor speed	143		68
Ability to react, simple Reaction speed	436		48
Attention and concentration			
Concentration	2,942		60
Vigilance Visual	433		75
Sensomotor functions and perception			
Eye-hand coordination Two-dimensional	30,31		67
Visual perception	39		90
Determinanats of personality			
Emotional stability Short form		0,737	85
Extraversion Short form		-0,769	15
Conscientiousness Short form		0,683	80
Openness Short form		-0,110	49
Agreeableness Short form		0,474	76

Percentile rank: the percentage of a representative comparison group that has the same score or a lower one on this dimension.

Dimensions

Profile - Representative Norm:



Average range:
PR = 25 - 75

SARAIL: Written report

Contains:

- Profile diagram
- Written description of the test results

VIENNA TEST SYSTEM
HR 

TEST RESULTS

SARAIL
Safety Assessment Rail

Candidate
[varFirstName]
[varName]

Test date

SCHUHFRIED
passion for psychology

Contents

1. Psychological tests in human resources management
 - Using psychological tests
 - Advantages of psychological tests
 - Item-Response Theory and Rasch-Modell
2. Contents of the Vienna Test System HR
 - Test sets
3. Tips on using the system

Why?



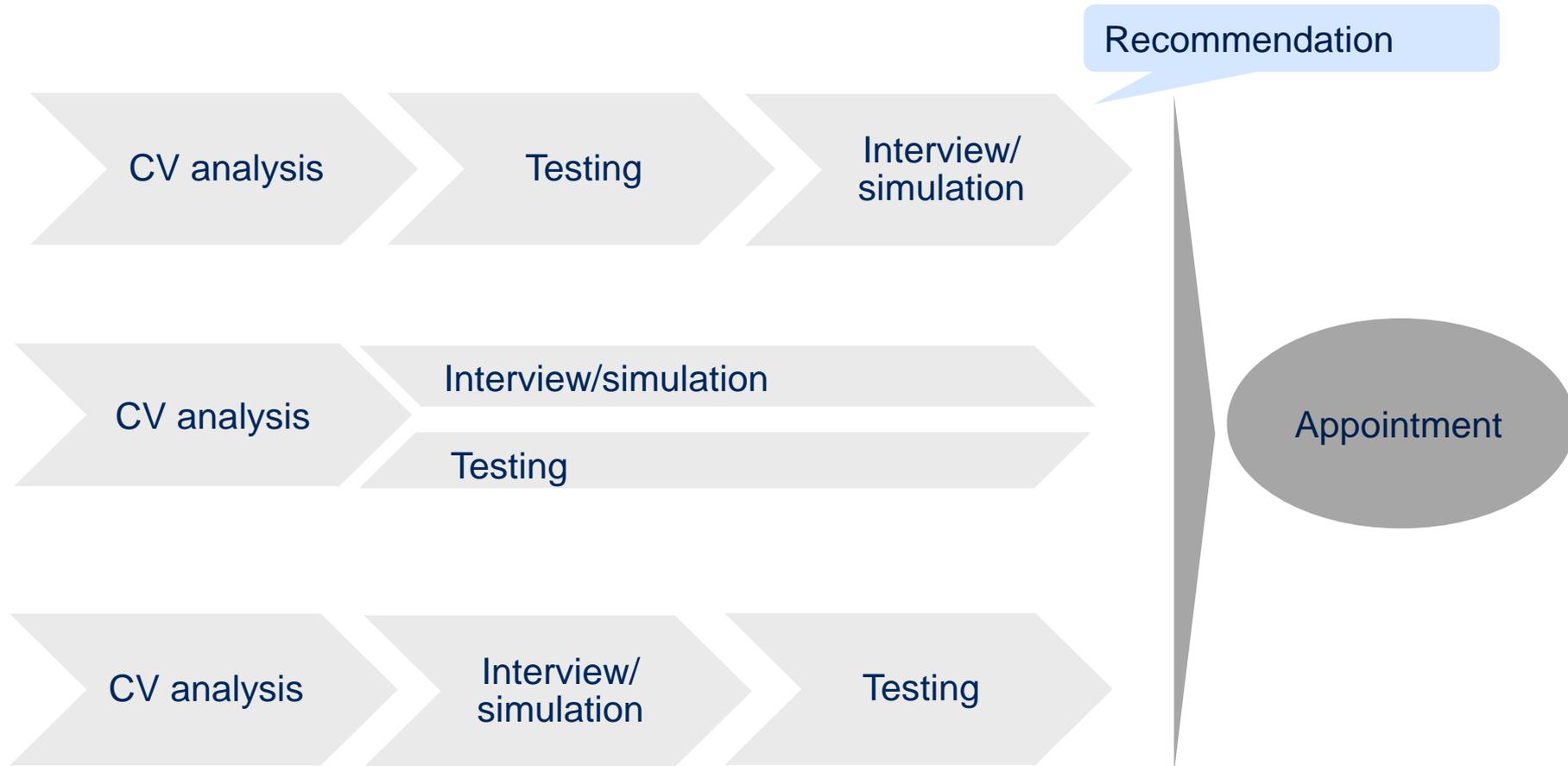
What?



How?

Incorporation into the recruitment process

SCHUHFRIED



Note: Simulation involves activities such as role plays and presentations that mimic typical situations encountered at work

Tips – before the test session

- **Notify candidates** at the invitation stage that standardized tests form part of the recruitment process:
 - Brief explanation of the **aims** of testing: e.g. testing enables skills that are objectively important for the job in question to be assessed
 - Brief explanation of the type of **content** that candidates can expect
 - Statement about how the **data** will be handled (discretion, confidentiality, etc.)
- **Test battery compilation**
 - Variation between tests with regard to the type of material they contain reduces fatigue and boosts motivation
 - Incorporation of breaks (for ability tests a break of at least 10 min. after approx. 2 hours.

Tips - administration

- The tests are designed to be completed by the candidate working alone and independently.
- If the candidate fails to understand the task after reading the instructions several times, the test administrator may go through the instructions with him. However, this is not an ideal procedure and it should be taken into account when interpreting the results.
- For reasons of fairness it is recommended that no assistance is given during the test phase. However, the test administrator or an assistant should be on hand to ensure that concentration is maintained and that there are no opportunities for cheating.

Tips – after the test session

- **Interpreting the results**
 - **Percentile rank:** the percentage of a comparison group that obtained the same or a lower score on the ability or personality characteristic in question.
 - Comparison group: representative sample of the population or specific groups
 - Average: PR = 25-75
 - Consideration of the individual **profile:** Identification of strengths and areas for development
- **Feedback to candidates**

Concrete feedback on test results increases the acceptance of psychological tests.

Ranking the candidates

- Results on the individual test variables can be combined into a **fit score**.
- This involves defining ideal ranges and weighting the individual test variables.
- The maximum fit score is 1,000. A score of 1,000 means that there is a 100% match between the candidate and the ideal profile.
- Candidates can be ranked on the basis of their fit scores



Ranking of 'Personnel selection DEMO'

Rank	Points	Client	V1	V2	V3	V4	V5	V6	V7	V8
1.	800	Webber, Kathy; 16.03.1971	66+	46-	84-	82+	19-	11-	47+	47-
2.	793	Smith, Patti; 19.01.1955	88+	33-	17-	50+	66-	64+	48+	11-
3.	782	Hoffer, Jimmy; 31.10.1973	45-	66+	58-	57+	3-	27-	90+	42-
4.	659	Doe, John; 05.10.1976	35-	0-	92-	1-	90+	65+	27+	26-
5.	598	Snyder, Rick; 14.10.1957	21-	32-	26-	3-	63-	10-	9-	33-

Take Home Message

- ✓ Computerized Testing provides a lot of advantages
- ✓ A large number of computerized tests is available
- ✓ Test sets for general or specific position definition are economic instruments in the selection process

Take Home Message

Computerized Testing provides a lot of advantages

A large number of computerized tests is available

Test sets in general for or specific position are economic instruments in the selection process





**Thank you for your
attention!**

Contact Information

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SCHUHFRIED



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Homepage: www.schuhfried.at



Back Up

SCHUHFRIED



Written report

- Reports can be customized to meet your particular requirements.
- They usually contain a profile diagram and a written description of the test results.
- For example, reports can be used in an interview to explore strengths and weaknesses.

The image shows a screenshot of a test results report. At the top, it says 'VIENNA TEST SYSTEM HR' with a small icon of a person carrying a briefcase. Below this, the title 'TEST RESULTS' is displayed in large, bold, white letters on a dark blue background. Underneath, the test name 'KEYHR' is shown, followed by 'Key Factors HR'. The report includes two sections for candidate information: 'Candidate' with fields for '[varFirstName]' and '[varName]', and 'Test date' with a field for '[varTestDate]'. At the bottom right, the 'SCHUHFRIED' logo is present, with the tagline 'passion for psychology' written in a cursive font below it.

Introduction

The SAAIR test set assesses aspects of cognitive ability that are relevant to aviation safety for the purpose of selecting civil and military pilots and trainee pilots

- In practice, psychological ability tests are used mainly in the early stages of a multi-stage selection process that frequently culminates in a test of aviation-related skills in a flight simulator.
- Aims: (1) To increase aviation safety
(2) To reduce training costs
(3) To improve the reasonableness of the assessment process



SAAIR: Validation

3 independent studies of the tests' criterion validity:

1) 99 prospective pilots; prediction of performance in the flight simulator (Arendasy et al., 2007)

Tests: INSBAT, VISGED, DT, SMK

Result: The test battery correctly predicted success in the flight simulator (suitable v. unsuitable) for 89.8% of candidates → **validity: 0.62**

2) 82 prospective pilots; prediction of performance in the flight simulator (Sommer et al., 2004)

Tests: SIGNAL, ATAVT, COG, VIGIL

Result: The test battery correctly predicted success in the flight simulator (suitable v. unsuitable) for 94.4% of candidates → **validity: 0.80**

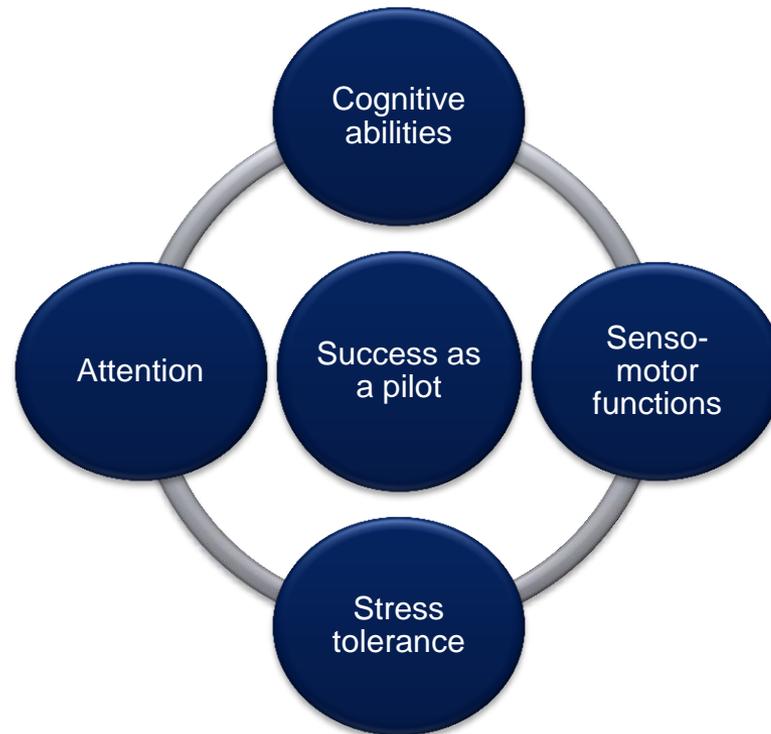
3) 99 prospective pilots; prediction of performance in the flight simulator (Sommer et al., 2006)

Tests: INSBAT, A3DW, COG, ATAVT

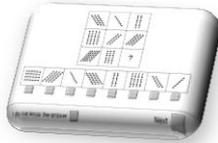
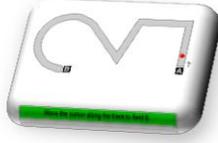
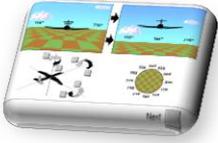
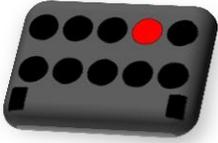
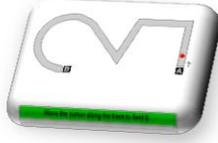
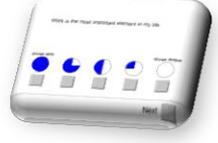
Result: The test battery correctly predicted success in the flight simulator (suitable v. unsuitable) for 92.9% of candidates → **validity: 0.71**

SAAIR: Overview of dimensions

- The selection of dimensions is based on international requirements analyses and validation studies involving prediction of training outcome or of performance in flight simulators.
- Aspects of the latest thinking on validity theory and test security were also taken into account in order to ensure that the psychometric quality of the tests used is as high as possible.



SAAIR: Dimension details

	Range	Dimension	Test	Length	
   	Cognitive abilities	Logical reasoning	INSBAT	31	
		Numerical ability	INSBAT	40	
		Spatial ability	PST	13	
		Memory	VISGED	7	
	Stress tolerance	Stress tolerance, reactive	DT	10	
	Attention	Focused attention	SIGNAL	15	
		Attention	Vigilance	VIGIL	30
	Sensomotor functions		Eye-hand coordination	2HAND	4
		Total length	2 h 30 min		

SAAIR: INSBAT

- **Logical reasoning** involves the ability to recognize regularities, understand the implications of statements and draw logical conclusions.
- **Numerical ability** describes a person's capacity for understanding basic mathematical principles and using them to solve practical problems. It involves both the ability to use the basic arithmetical operations and the person's "feel" for numbers.

Introduction...

Now try to solve this problem on your own:

$$19 - 9 =$$

Delete

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

Introduction...

Some of the problems will of course be more difficult. The pattern can consist of addition, subtraction, multiplication or division. Some sequences may involve several arithmetical operations.

Now try to solve this problem yourself:

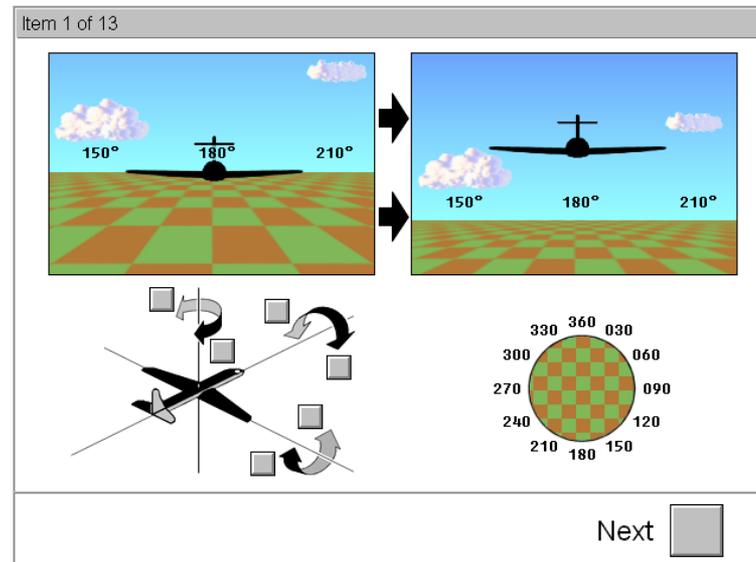
4 8 16 32 64 128 ?

Delete

1	2	3	4	5	6	7	8	9	0
---	---	---	---	---	---	---	---	---	---

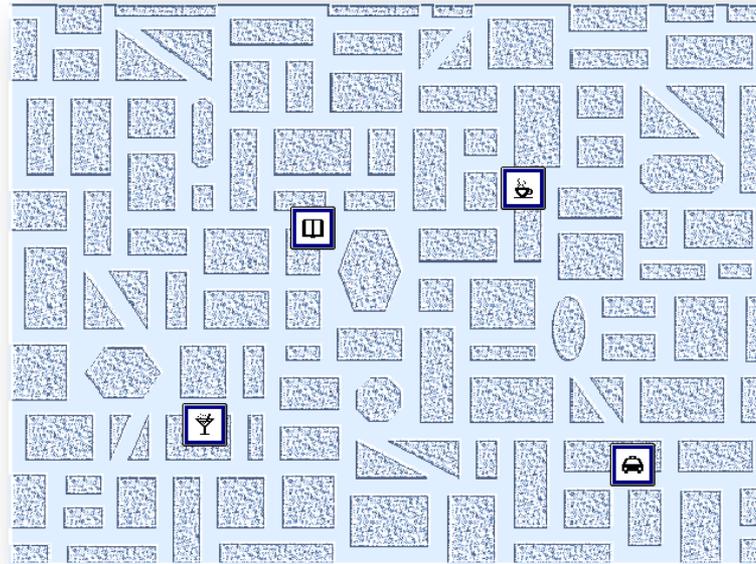
SAAIR: PST

Spatial ability describes the ability to picture objects in one's mind and manipulate them mentally (e.g. by rotation). This means that objects that are depicted in two dimensions can be imagined three-dimensionally; in one's mind one can also switch between different views of them.



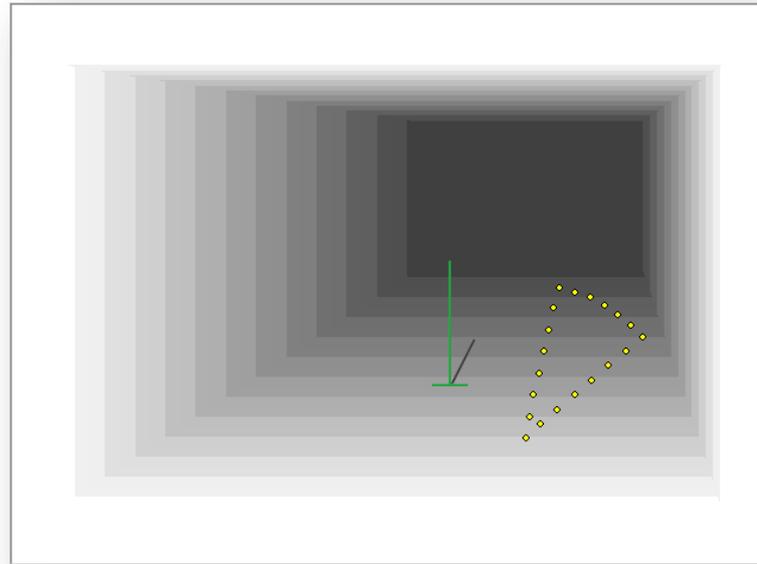
SAAIR: VISGED

Memory is the ability to retain, organize and later retrieve perceived information. SAAIR tests only visual short-term memory – i.e. the ability to retain visual information in the short term and reproduce it correctly.



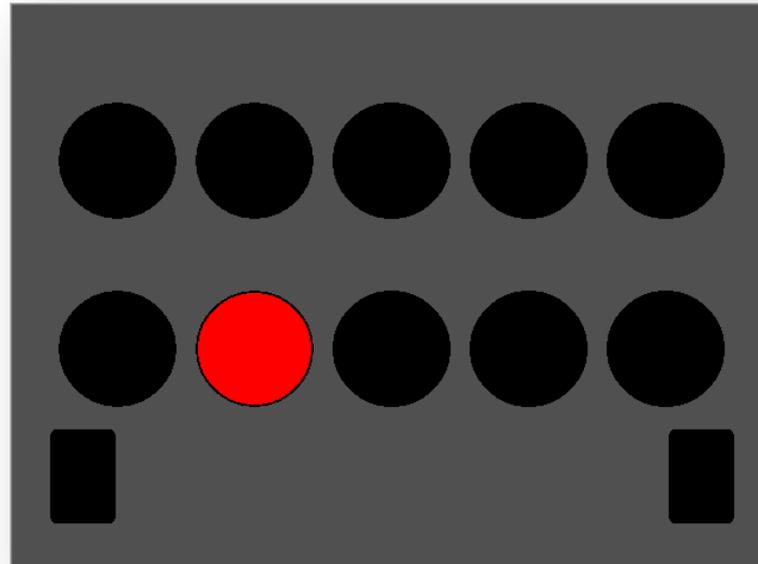
SAAIR: SMK

Eye-hand coordination tests how well someone can convert visual information into hand movements – in other words, how well they can coordinate eye and hand in making fine, small-scale movements.



SAAIR: DT

Reactive stress tolerance is used here to describe the individual's ability to react quickly and accurately even when under stress. High stress tolerance is particularly necessary in stressful situations.



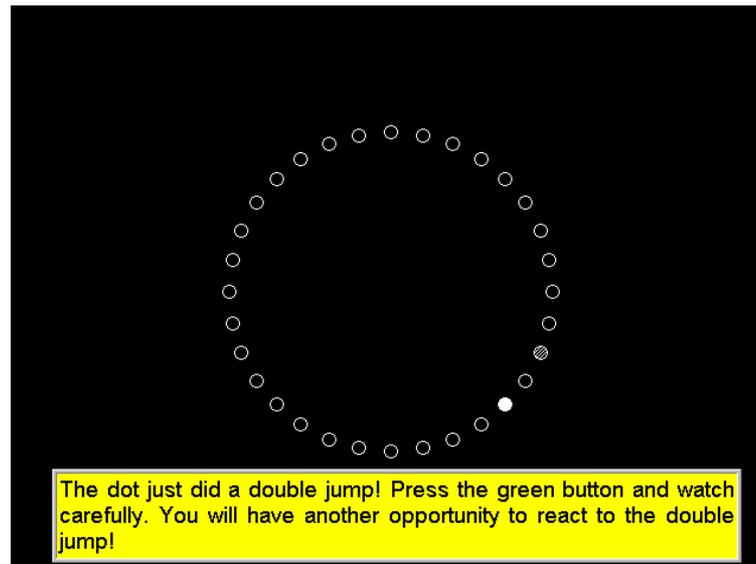
SAAIR: SIGNAL

Focused attention describes the ability to isolate a segment of reality in order to be able to focus on it more closely. Key to this is the ability to maintain this focus even in the face of distractions.



SAAIR: VIGIL

Vigilance is the ability to focus attention persistently over lengthy periods of time on one or more sources of information, in order to detect and respond to small changes in the information received. The relevant stimuli typically occur only at very irregular intervals and at very low frequency among a large number of irrelevant stimuli.



SAAIR: Scoring and interpretation

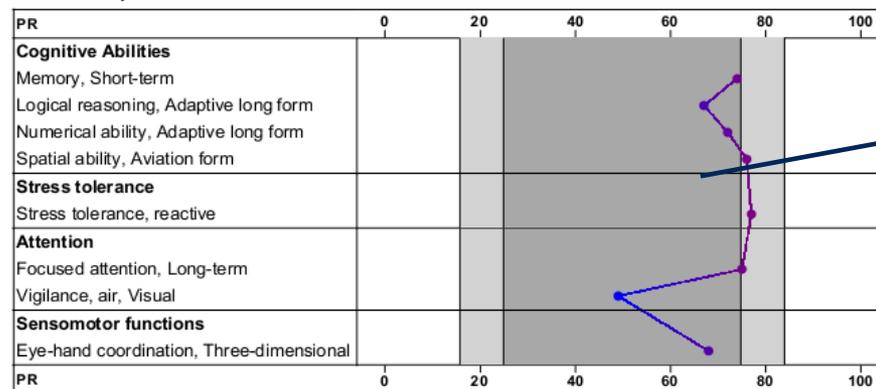
Percentile rank: the percentage of a representative comparison group that has the same score or a lower one on this dimension.

Test results - Representative Norm:

Test Variable	Raw score	Parameter	PR
Cognitive abilities			
Memory Short-term	1	0,660	74
Logical reasoning Adaptive long form	-0,339	-0,339	67
Numerical ability Adaptive long form	-1,009	-1,009	72
Spatial ability Aviation form	6	0,580	76
Stress tolerance			
Stress tolerance, reactive	266		77
Attention			
Focused attention Long-term	95		75
Vigilance, air Visual	0,470		49
Sensomotor functions			
Eye-hand coordination Three-dimensional	11		68

Dimensions

Profile - Representative Norm:



Average range:
PR = 25 - 75

SAAIR: Written report

Contains:

- Profile diagram
- Written description of the test results

VIENNA TEST SYSTEM HR 

TEST RESULTS

SAAIR
SAFETY ASSESSMENT AIR

Candidate
[varFirstName] [varName]

Test date
[Var.TestDate]

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