

Scholastic aptitude test and other admission criteria at the University of Tartu

*The 13th SweSAT Conference 15-17 June 2010
Umeå*

Olev Must
Estonia



Primus

ELLU VIIB SIHTASUTUS
ARCHIMEDES



Euroopa Liit
Euroopa Sotsiaalfond



Eesti tuleviku heaks

**The University of Tartu was founded in
1632 by the Swedish king Gustavus II
Adolphus**



**In 2010:
9 faculties
About 17,400 students**



Estonia

- About 1,4 million inhabitants
- 34 institutions of higher education
 - 6 public universities
- 69,000 students
- 19,000 new entrants per year
- 9000 dropouts per year
- **One birth cohort:**
 - 1987- 1988: 25,000
 - 1995- 2003: 12,000-13,000



Admission policies

There are no official data about admission criteria.

Very different in different institutions.

Partly influenced by aim to earn money via tuition fee (only about 1/3 study seats are tuition free)

Dominating admission criteria: combinations of state examination grades in gymnasia ; **role of admission test is marginal (Tartu University and Estonian National Defence College)**

Admission tests in Estonia

- First attempts to select teacher training students date back to the early 1920ths
- 1930ths: Discussion in Tartu University about the use of IQ tests for admission
- 1990ths: tests for selection of students to the faculty of social sciences of Tartu University
- 1998: SweSat influence
- 2009: about 1,300 test-takers in Tartu University

Estonian admission test

- 8 subtests
 - 150 multiple-choice items
 - 3 hours
- Composite score = sum of standardized scores of subtests
- Scale: mean = 50, Sd = 16 (range: 0-100)
- In Estonian and Russian (10% test-takers are Russian- speaking)

Subtests

1. Tables, diagrams, maps (DTM)
2. Vocabulary (VOC)
3. Data sufficiency (DS)
4. Information (INFO)
5. Text comprehension (TEXT)
6. Mathematics (MATH)
7. Spatial reasoning (SR)
8. Foreign language comprehension (FLANG)

Vocabulary (meaning of words and relations between words)

pliiats : paber (pencil:paper)

A kukk : tera (rooster:corn)

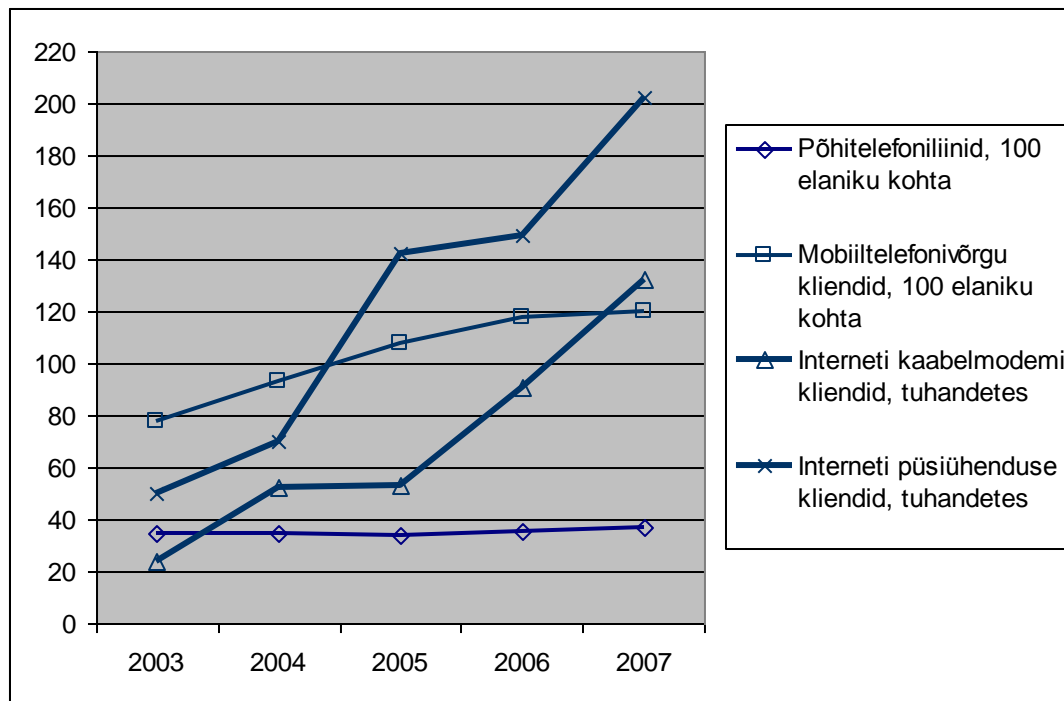
B käbi : känd (cone:stump)

C pilt : sein (painting:wall)

D püstol : padrun (gun: bullet)

E sõrm: liiv (finger: sand)

Tables, diagrams, maps



Data sufficiency

Karbis on siniseid, punaseid ja rohelisi pliiatseid kokku 20. Siniseid on 6 korda rohkem kui rohelisi.

Mitu punast pliiatsit on karbis?

- (1) punaseid on vähem kui siniseid
- (2) punaseid on paarisarv

- A Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- B Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- C BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- D EACH statement ALONE is sufficient.
- E Statement (1) and (2) TOGETHER are NOT sufficient to answer the question asked, and additional data are needed.

Information

Who composed the melody of the European Anthem?

- A G. F. Händel
- B W. A. Mozart
- C J. Strauss (sen)
- D A. L. Webber
- E L. W. Beethoven

Mathematics (problem solving)

- *Question about triangle, sides and perimeter*
:
- Ühe kolmnurga küljed on 20 cm, 16 cm ja 28 cm. Selle kolmnurgaga sarnase kolmnurga pikim külg on 21 cm. **Arvuta teise kolmnurga ümbermõõt.**
- A 36
- B 43
- C 48
- D 56
- E 64

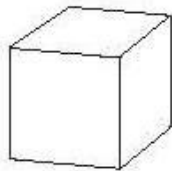
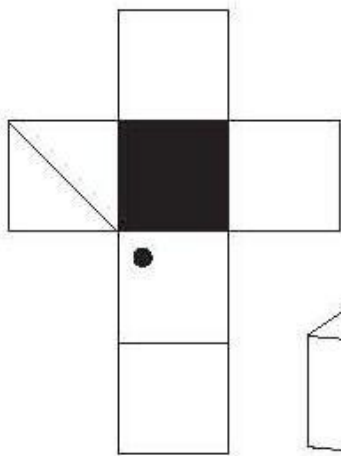
Text comprehension (2 texts)

(Lévi-Strauss, The Wild Thought)

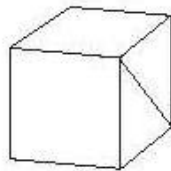
.../Signs resemble images in being concrete entities but they resemble concepts in their powers of reference. Neither concepts nor signs relate exclusively to themselves; either may be substituted for something else. Concepts, however, have an unlimited capacity in this respect, while signs have not. The example of the 'bricoleur' helps to bring out the differences and similarities. Consider him at work and excited by his project. His first practical step is retrospective. He has to turn back to an already existent set made up of tools and materials, to consider or reconsider what it contains and, finally and above all, to engage in a sort of dialogue with it and, before choosing between them, to index the possible answers which the whole set can offer to his problem. He interrogates all the heterogeneous objects of which his treasury* is composed to discover what each of them could 'signify' and so contribute to the definition of a set which has yet to materialize but which will ultimately differ from the instrumental set only in the internal disposition of its parts. A particular cube of oak could be a wedge to make up for the inadequate length of a plank of pine or it could be a pedestal - which would allow the grain and polish of the old wood to show to advantage. In one case it will serve as extension, in the other as material. But the possibilities always remain limited by the particular history of each piece and by those of its features which are already determined by the use for which it was originally intended or the modifications it has undergone for other purposes/.....

Spatial Reasoning

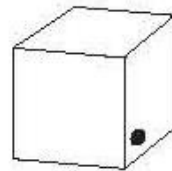
Question about cube and its development



A



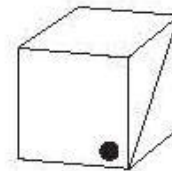
B



C



D



E

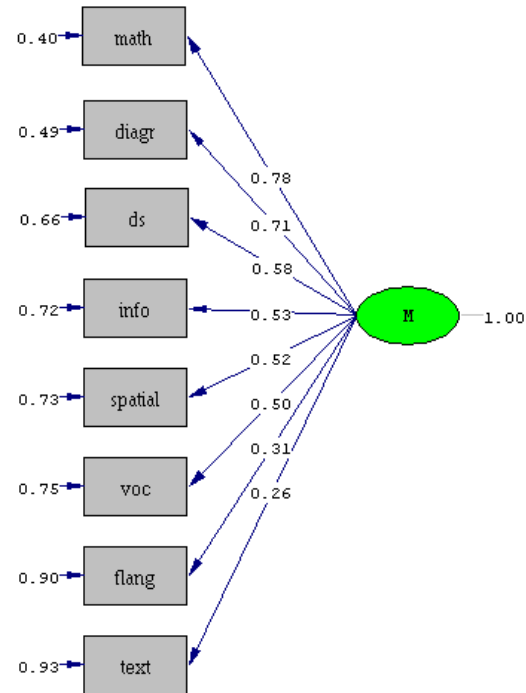
Subtest difficulty (2009)

Subtest	Items	Raw mean	% of max score
VOCAB	26	12,4	48%
DTM	20	10,6	53%
DS	17	5,6	33%
INFO	25	11,4	46%
MATH	20	8,4	42%
TEXT	10	3,3	33%
SPAT	17	9,4	55%
FLANG	15	4,5	30%

Composite score of the test

- Confirmative factor analysis supports idea about one latent variable.
- But...
 - Some loadings are small (.26; .31) and residuals are big: .93; .90
- The model fit with 2 latent variables is better (fluid & crystallized).

Does the one-factoral model hold?



Chi-Square=136.93, df=20, P-value=0.00000, RMSEA=0.069

Two factor solution is better

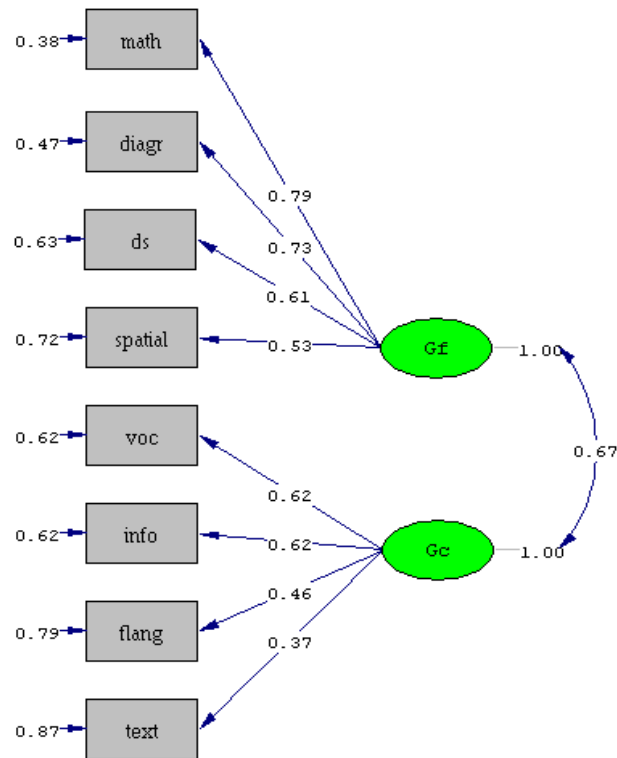
Two correlated latent factors.

Interpretation:

Fluid – crystallized?

Quantitative – verbal?

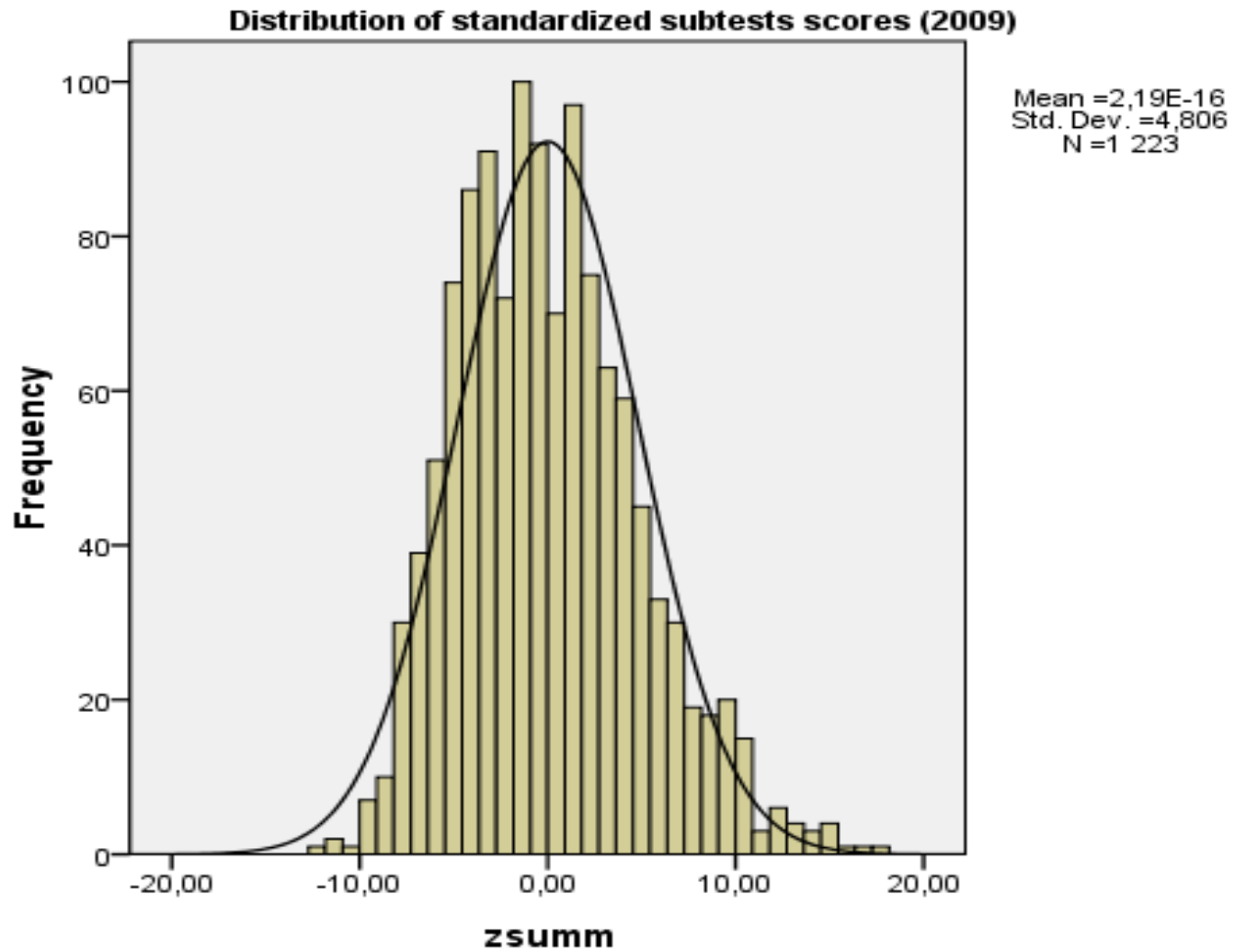
Test structure: CFA2



Chi-Square=54.15, df=19, P-value=0.00003, RMSEA=0.039

Final score/Scale

- A. Standardization of subtests scores.
- B. Summating standardized scores.
- C. Transforming to the form:
 - Mean = 50
 - SD = 16
 - Spread 0 - 100



Admission test score is ONE of
the components of the admission
COMPOSITE SCORE

(in Tartu University)

Admission composite score for faculty of social sciences (2009)

- **Admission test score-** up to 40%
- **Professional interview (non-cognitive assessment)** – up to 30%
- **Mother language/** state examination grade/ (Grade1) – up to 15%
- **Highest grade** /mathematics or social sciences or foreign language/ (Grade2) – up to 15%

Thresholds for the composite score

- Two thresholds for entering to the faculty of social sciences
 - Tuition free study seats : threshold 75 points
 - Tuition fee: threshold 60 points

Exception

If the admission test score > 80
($>+2$ SD of the mean)

free access to any speciality in Tartu
University and no any other admission criteria

Prediction of study success via admission criteria

- Two analysis:
 - 2009/2010: after first semester (n= 118)
 - 2005: all students of the faculty (n= 887)

Study success after 1. semester in university (2009/2010)

Credits (mean/Sd): 28,6/7,6 (expected = 30)

Grade (Mean/Sd) : 2,8/1,1 (5-point system)

A= 5

B= 4

C= 3

D= 2

E= 1

F= 0

Prediction of grade in university (2009)

(first semester; multiple linear regression)

	Males			Females		
	R=.426; F(4,66)=3.67, p=.009			R=.479; F(4,118), p=.000		
	β	t	p	β	t	p
Test	.079	.841	.402	-.012	-.093	.926
Interview	.205	2.375	.019	.061	.533	.596
Grade1: mother language	.110	1.272	.213	.284	2.365	.021
Grade2 (Best Grade)	.271	2.719	.008	.225	1.755	.084

Prediction of grade in university (2005)

(semester 1-5; multiple linear regression)

	Males			Females		
	R=.48; F(3,336)=3.34, p=.001			R=.56; F(3,549), p=.001		
	β	t	p	β	t	p
Test	.187	3.62	.000	.201	5.10	.000
Interview	.123	2.44	.015	.163	4.25	.000
Grade1+ Grade2	.309	6.03	.000	.355	8.83	.000

Conclusion about the prediction validity of admission criteria in university

- 1. Best predictor is the grade in gymnasia. (Evidently it is not the mean grade.)
- 2. Non-cognitive assessment (interview) is important
- 3. Admission test improves the prediction.