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The relationship between
learning approaches, motivation, time
spent and **academic performance**.

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“You should study more!”



“I am already studying a lot of time!”

“How do you study?”

“Simply studying!”

“She is not motivated to study!”



- Aim
 - understanding the material
 - long term retention
- Link new knowledge to previous acquired knowledge
- Personal commitment to learning (want to understand the material)
- Study in-dept



- Aim
 - reproduction of the material
 - focus on isolated, unlinked facts
- Focus on memorization (learning by heart)
- Only sufficient knowledge to pass the exam

Deep learning approach

Surface learning approach

Research questions

Can we influence the **learning approach**?

- Is high motivation leading to *deep* learning?

Does the learning approach matter?

- Is deep learning leading to **higher performance**?
- Is deep learning leading to more **time spent** (on studying)?
- Is the impact of deep learning, **simply because of** the more time spent?



Biggs 3 P model

Presage

Learning process

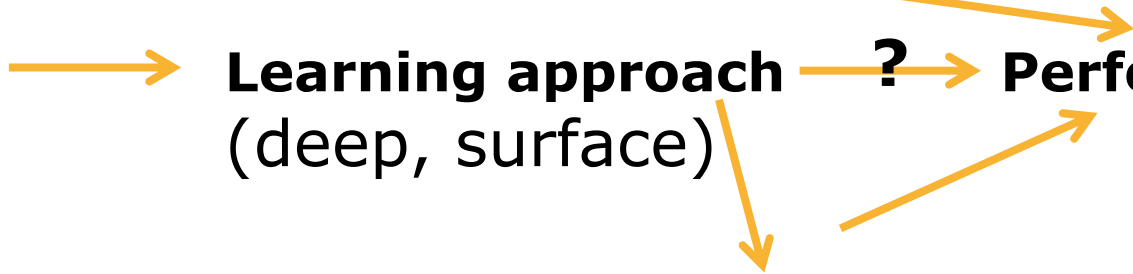
Learning outcomes

Ability, Gender

Motivation

Learning approach — ? — **Performance**
(deep, surface)

Time spent



Motivation -> Learning Approach

Intrinsic motivation: refers to motivation that comes from *inside* an individual (interest, curiosity)

Extrinsic motivation: refers to motivation that comes from *external or outside* rewards (grades, money)

(Ryan & Deci, 2000; Lucas, 2001; Säljö, 1979)

H1a: **High intrinsic** motivation results in a more **deep** approach of learning

H1b: **High extrinsic** motivation results in a more **surface** approach of learning



Learning approach -> Performance

Deep learning: in-dept

Surface learning: memorization

(Duff, 2004; Jackling 2005)

H2a: A **deep learning approach** results in
higher academic performance

H2b: A **surface learning approach** results in
lower academic performance



Learning Approach -> Time spent

Scarce empirical literature

(Doumen et al., 2014: self-study time)

- H3a: A **deep learning approach** results in *higher* time spent by the student.
- H3b: A **surface learning approach** results in *low* time spent by the student.



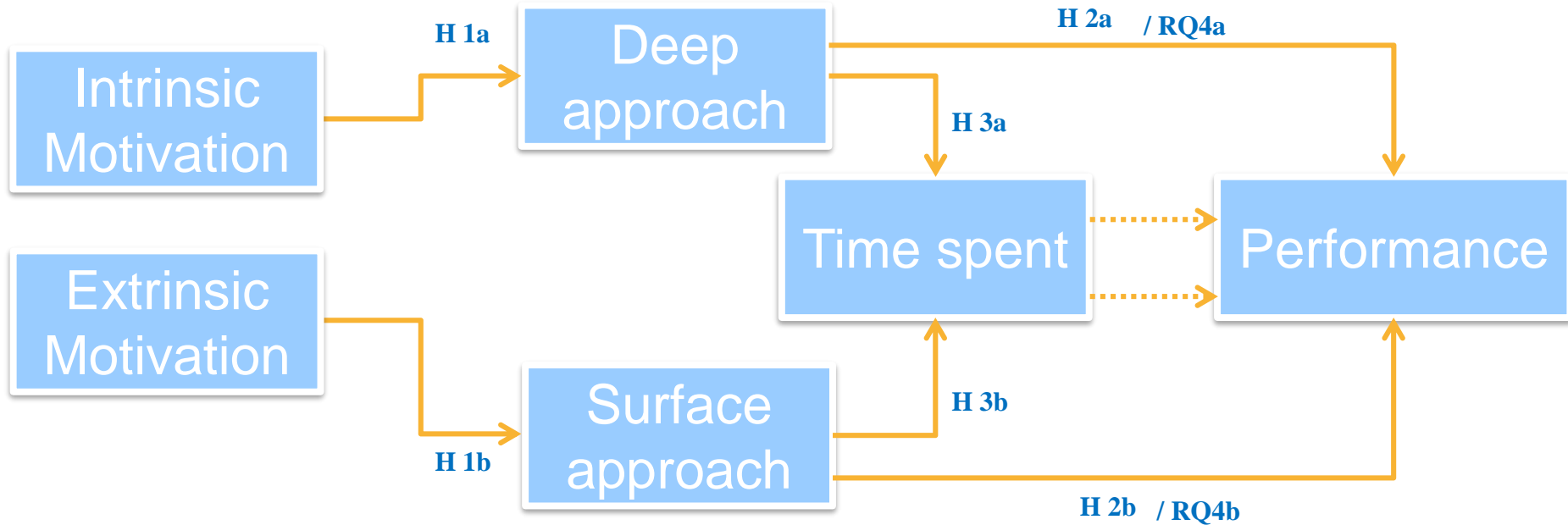
Learning approach -> Performance (while controlling for Time Spent)

RQ4a: Does the **deep learning** still result in higher academic **performance (H2a)**, when taking into account the time spent by the students.

RQ4b: Does the **surface learning approach** still result in lower **academic performance (H2b)**, when taking into account the time spent by the students.



Hypotheses



*Control variables: Gender and Ability



Surveys + records

1st sem

Ability

Advanced accounting

February 2014

Week 1

Week 2

Motivation

Week 1- Week 12:
Classes Accounting:
Theory and tutorials

Week 7

Learning approach

Week 12

Time spent

June 2014

Exam Accounting

Performance

2nd sem



- **Dataset:**
 - Academic year 2013-2014
 - First year undergraduate students (N=246)

Variables

Measurement

Ability

GPA previous semester without score for accounting, mark on 480

Gender

0 for male, 1 for female

Intrinsic motivation
Extrinsic motivation

MSLQ, Pintrich et al 1991

Deep learning approach
Surface learning approach

R-SPQ-2F; Biggs et al 2001

Performance

Score on Acc II; mark on 60

Time spent

Average number of minutes per week

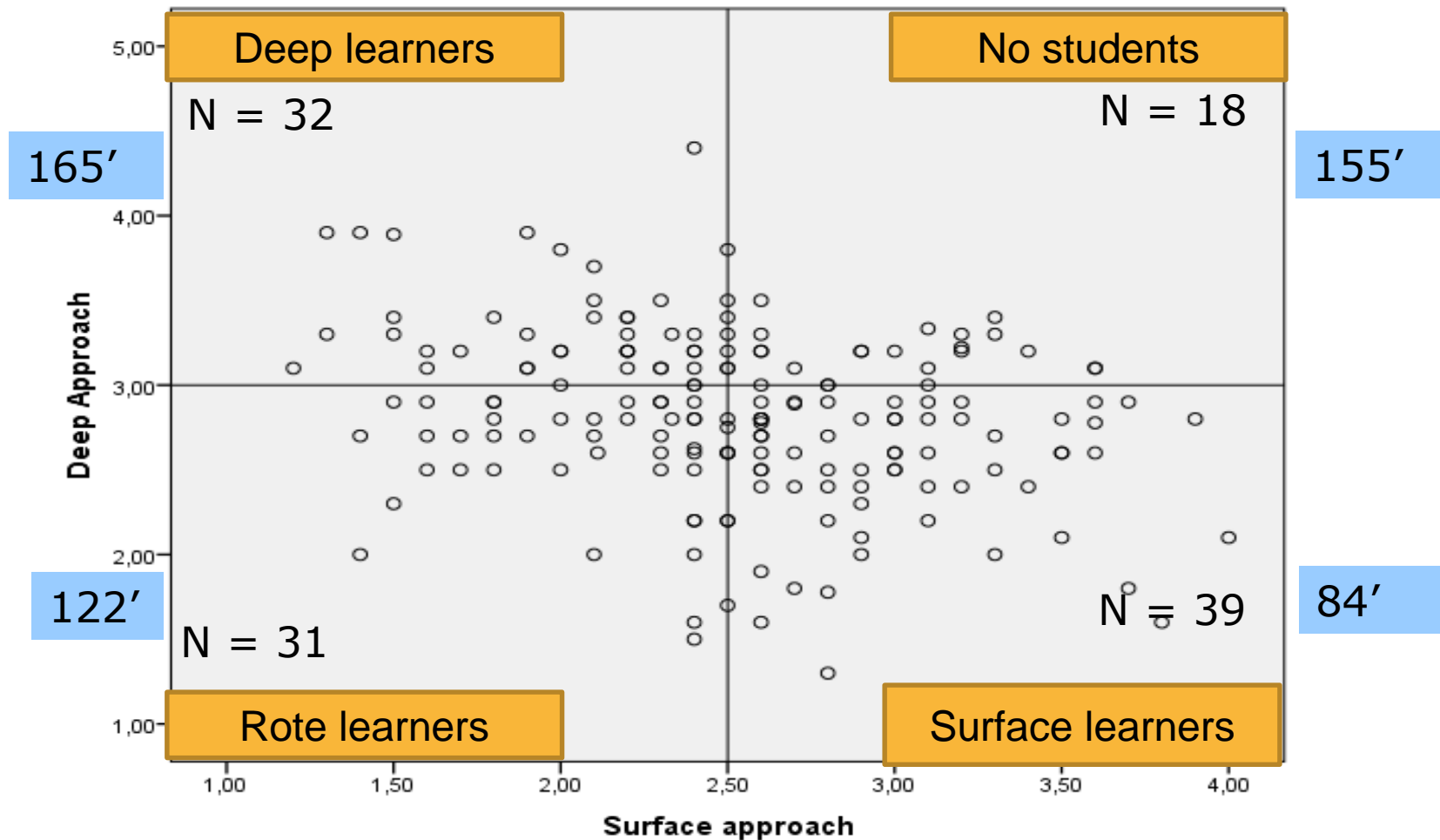
Descriptives

Variable	Mean	Minimum	Maximum	Standard-deviation	N
Academic performance	29.02	1.00	60.00	13.99	388
Intrinsic motivation ^a	4.87	1.75	7.00	.88	328
Extrinsic motivation ^a	4.98	2.25	6.75	.82	328
Deep approach	2.87	1.30	4.40	.48	277
Surface approach	2.45	1.20	4.00	.58	277
Ability	250.16	68.00	390.00	66.03	388
Time spent ^b	142.32	5.00	700	103.24	248

^a Some students who filled out the questionnaire of the learning approaches did not fill out the questions on the motivation, consequently the number of students dropped for these variables.

^b This was an open question in the post-questionnaire. Some students did not answer this question.

Plot learning approaches



Gender differences

Variable	Mean men	Mean women	t-value ^{a b}	p-value
Academic performance ^c	28.28	29.95	-1.16	.245
Intrinsic motivation ^c	4.82	4.91	-0.93	.352
Extrinsic motivation ^c	4.92	5.04	-1.35	.179
Deep approach ^d	2.86	2.88	-.50	.621
Surface approach ^d	2.60	2.29	4.58	.000
Ability ^c	251.27	248.77	0.37	.712
Time spent ^e	118.73	166.30	-3.72	.000

ANCOVA	Estimated marginal Mean men	Estimated marginal Mean women	F-value	p-value
Academic performance	28.12	30.16	4.201	.041

H1: Motivation

Variable	t-value	p-value
Constant	2.35	.020
Intrinsic motivation	7.53	.000
Extrinsic motivation	4.27	.000
Ability	2.72	.007
Gender	-0.58	.560

Model summary

Dependent variable	Deep approach
F (model)	26.852
p-value (model)	.000
Adjusted R ²	.299

Variable	t-value	p-value
Constant	10.73	.000
Intrinsic motivation	-4.061	.000
Extrinsic motivation	0.81	.419
Ability	-2.18	.030
Gender	-4.13	.000

Model summary

Dependent variable	Surface approach
F (model)	11.722
p-value (model)	.000
Adjusted R ²	.150

H2: Performance

Variable	t-value	p-value
Constant	-6.11	.000
Deep approach	3.86	.000
Ability	18.20	.000
Gender	1.46	.144
Model summary		
Dependent variable	Academic performance	
F (model)	119.653	
p-value (model)	.000	
Adjusted R ²	.566	



H2: Performance

Variable		t-value	p-value
Constant		-0.90	.369
Surface approach		-2.69	.008
Ability		0.76	.445
Gender		-0.90	.369
Model summary			
Dependent variable	Academic performance		
F (model)	1114.048		
p-value (model)	.000		
Adjusted R ²	.553		



H3a: Time spent

Variable	Coefficient	t-value	p-value
Constant		-1.84	.068
Deep approach		3.93	.000
Ability		1.76	.080
Gender		3.50	.001
Model summary			
Dependent variable		Time Spent	
F (model)		10.153	
p-value (model)		.000	
Adjusted R ²		.120	



H3b: Time spent

Variable	Coefficient	t-value	p-value
Constant		3.1	.002
Surface approach		-2.508	.013
Ability		1.499	.136
Gender		2.607	.010
Model summary			
Dependent variable		Time Spent	
F (model)		6.898	
p-value (model)		.000	
Adjusted R ²		.081	



H4a: Performance

Variable	t-value	p-value
Constant	-5.112	.000
Time spent	2.106	.053
Deep approach	1.948	.036
Ability	15.946	.000
Gender	0.547	.585
Model summary		
Dependent variable	Academic performance	
F (model)	71.187	
p-value (model)	.000	
Adjusted R ²	.581	

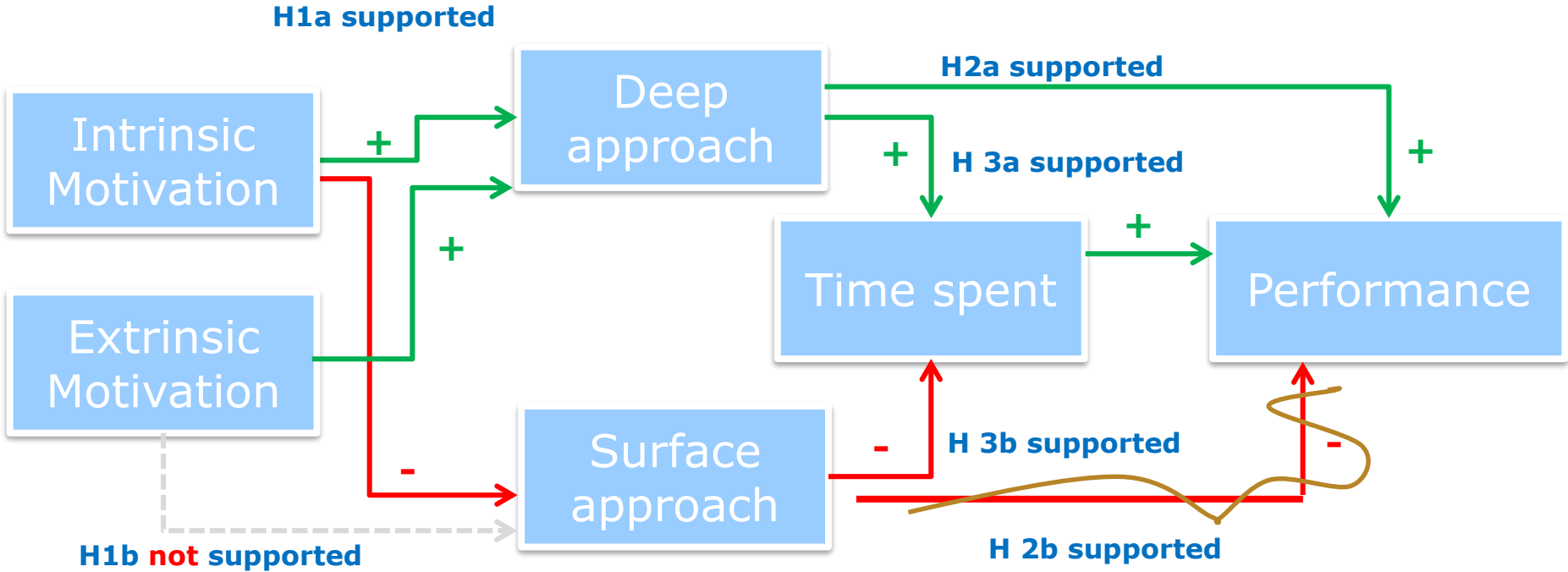


H4b: Performance

Variable	t-value	p-value
Constant	-2.372	.019
Time spent	2.305	.022
Surface approach	-1.412	.159
Ability	15.504	.000
Gender	0.062	.951
Model summary		
Dependent variable	Academic performance	
F (model)	69.635	
p-value (model)	.000	
Adjusted R ²	.576	



Conclusion



*Controlvariables: Gender and Ability

- Limitations
 - Rather small Cronbach's Alfa for motivation
 - Low number of observations (n=246)
 - Self-reported measures
- Future research
 - Special group: 'Rote learners'
 - How to stimulate deep learning?



Main contribution

- “You should study differently!”
- Time spent!
- Still impact of deep approach on performance, even when taking into account time spent.



Good luck!
Questions?

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