HOW DEEP IS YOUR APPROACH TO LEARN?

A STUDY WITH UNDERGRADUATE PSYCHOLOGY STUDENTS.

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IASE 2019

BACKGROUND

- Undergraduate psychology students have to pass an introductory statistics exam *before* the psychometrics course

- Some statistical basics serve as a prerequisite to learn psychometrics, i.e. theory and techniques of psychological measurement

BACKGROUND

- However psychology students:
  - fail to understand the relevance of statistics
  - tend to have negative feelings toward statistics
  - show low self-efficacy, effort, and interest

  ⇨ are less likely to engage in useful learning behaviors

Students have **negative attitudes** & adopt **poor learning approaches**

BACKGROUND

- **Learning approaches** refer to the level of engagement or depth of processing applied during learning (Tait, Entwistle &McCune, 1998)
  - Personal interest and commitment to learning, need to understanding and reasoning (**deep approach**)
  - Lack of engagement in the learning process, rote memorizing, and lack of understanding (**surface approach**)
  - Hands-on strategies to maximize the chances of passing the exam (**strategic approach**)

BACKGROUND

- **Attitude toward statistics** is a disposition to respond favourably or unfavourably to objects, situations, or people related to statistics (Shau, 2003). It's a multidimensional construct:
  - **Affective component**
    - students' positive and negative feelings about statistics
  - **Cognitive component**
    - beliefs about the discipline and the skills needed to learn statistics (self-efficacy)
  - **Behavioural component**
    - students' interest and effort spent to learn statistics

AIM 1

- Since some statistics basics serve as a prerequisite to learn psychometrics, psychology students have to handle them. Thus, the **first aim** was:

To identify the learning approach associated with better knowledge of statistics prerequisites

AIM 1: Prediction

- Previous studies on the relation between learning approaches and achievement showed that a **strategic approach** helped in ***avoiding failures*** and obtaining higher ***grades*** (Chiesi & Primi, 2017, 2018)
- In the current study, the focus was on student's ***statistics knowledge*** when entering the psychometrics course

Students with better knowledge should have adopted a **deep approach** to learn

AIM 2

- Since **approaches to learning** are affected by students' individual characteristics and their perception of the learning situation (e.g., Baeten et al., 2010) , the **second aim** was:

To explore attitudes, self-efficacy, and learning and teaching conceptions of deep approach students

AIM 2: Predictions

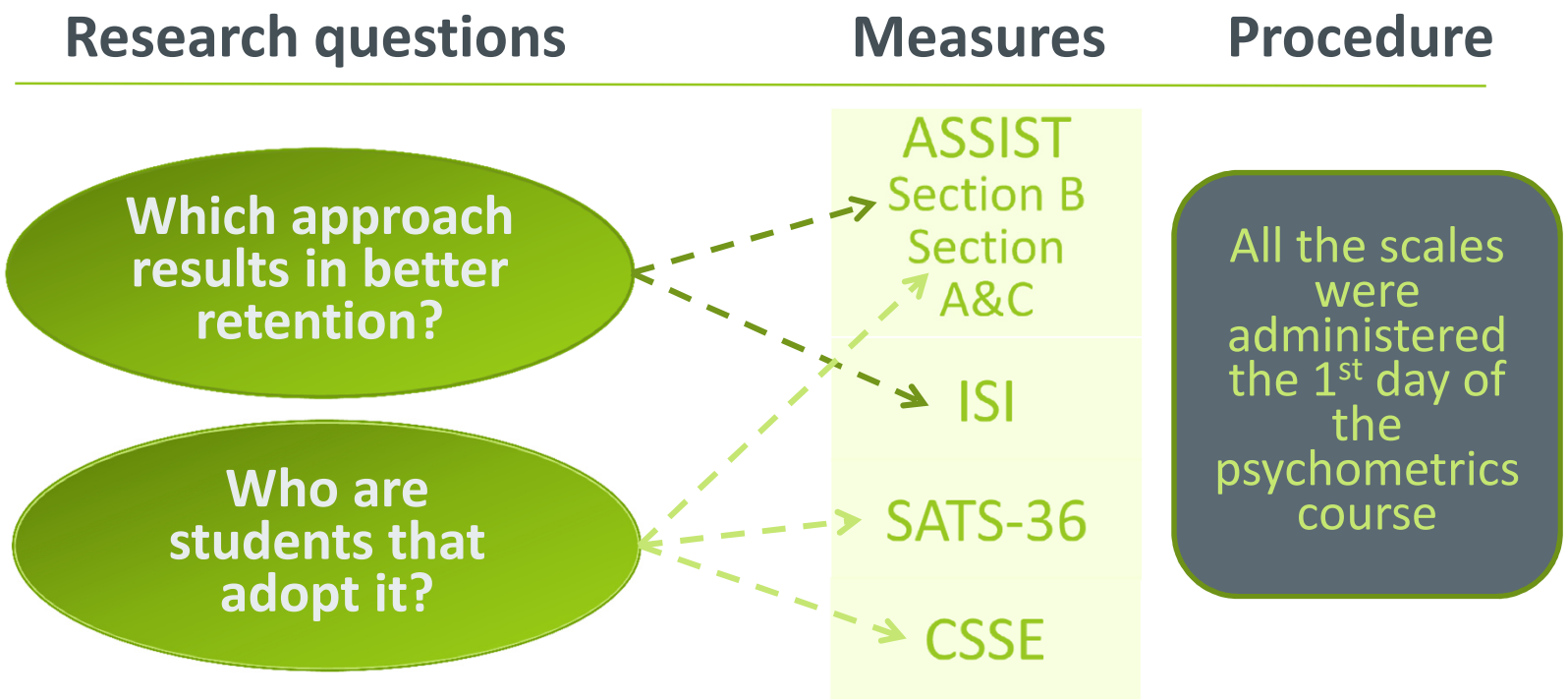
- Students who adopt a **deeper approach** when learning are expected to:

  - Show more positive attitudes
  - Have higher self-efficacy
  - Conceive learning as personal understanding and development
  - Prefer teaching methods that encourage understanding and reasoning

METHODS

Participants

Second-year psychology students (N = 200, 87% F; mean age 21.10 yrs, *SD* = 3.05, range 19-48).



METHODS: ASSIST- Section B

- *Approaches and Study Skills Inventory for Students* (ASSIST) – **Section B** contains 32 items and three subscales:
  - ***Deep* scale** (12 items, e.g., "I usually set out to understand for myself the meaning of what we have to learn")
  - ***Surface* scale** (12 items, e.g., "I find I have to concentrate on just memorizing a good deal of what I have to learn")
  - ***Strategic* scale** (8 items, e.g., "I manage to find conditions for studying which allow me to get on with my work easily")

METHODS: ASSIST- Section A

- **Section A (conceptions of learning)** consists of 6 items and two subscales:
  - ***Learning as Reproducing*** (3 items, e.g., "Building up knowledge by acquiring fact and information")
  - ***Learning as Transforming*** (3 items, e.g., "Understanding new material for yourself")

METHODS: ASSIST- Section C

- **Section C (preferences for teaching types)** consists of 8 items and two subscales:
  - ***Transmitting Information*** (4 items, e.g., "Courses in which it's made very clear just which book we have to read")
  - ***Supporting Understanding*** (4 items, e.g., "Lecturers who encourage us to think for ourselves and show us how they themselves think.")

METHODS: SATS-36

- *Survey of Attitudes toward Statistics* (Schau, 2003) consists of six subscales:
  - ***Affect*** (6 items, e.g. “I like statistics”)
  - ***Cognitive Competence*** (6 items, e.g., “I can learn statistics”)
  - ***Value*** (9 items, e.g., “Statistical skills will make me more employable”)
  - ***Difficulty*** (7 items, e.g., “Statistics formulas are easy to understand”)
  - ***Interest*** (4 items, e.g. “I am interested in using statistics”);
  - ***Effort*** (4 items, “I work hard in my statistics course”)

METHODS: CSSE

- *Current Statistics Self-Efficacy scale* (CSSE, Finney & Schraw, 2003; Italian version: Chiesi, Primi, & Galli, 2007) refers to the self-perceived ability to complete specific statistics tasks (**task-specific self-efficacy**)
  - It contains 14 items (e.g., “Distinguish between the information given by the three measures of central tendency”)

METHODS: ISI

- The *Introductory Statistics Inventory* (ISI, Chiorri et al., 2009) consists of multiple-choice items (one correct out of four choices) on introductory statistics topics:
  - Ten questions were selected to assess **knowledge** about the prerequisites for the psychometrics course (e.g., descriptive indices, *z*-values, regression)

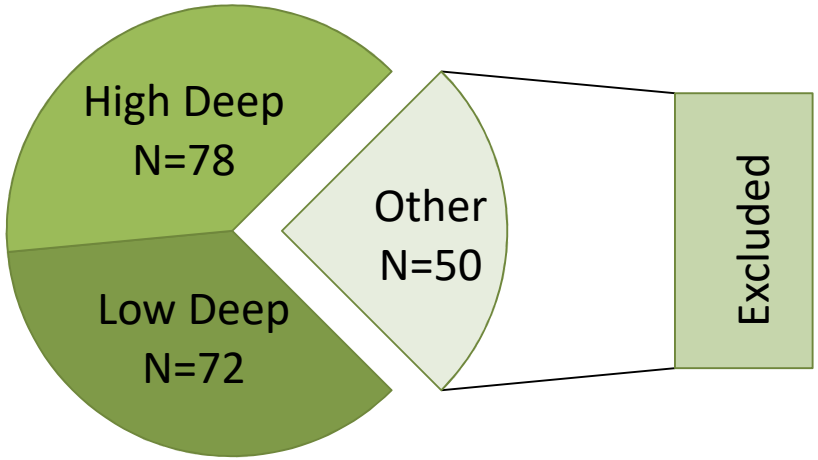
RESULTS: Approaches & Knowledge

	1	2	3
1 Deep Approach	--		
2 Surface Approach	-.36**	--	
3 Strategic Approach	.36**	-.34	--
4 Statistics Knowledge	**.27****	**-.14***	**-.08**

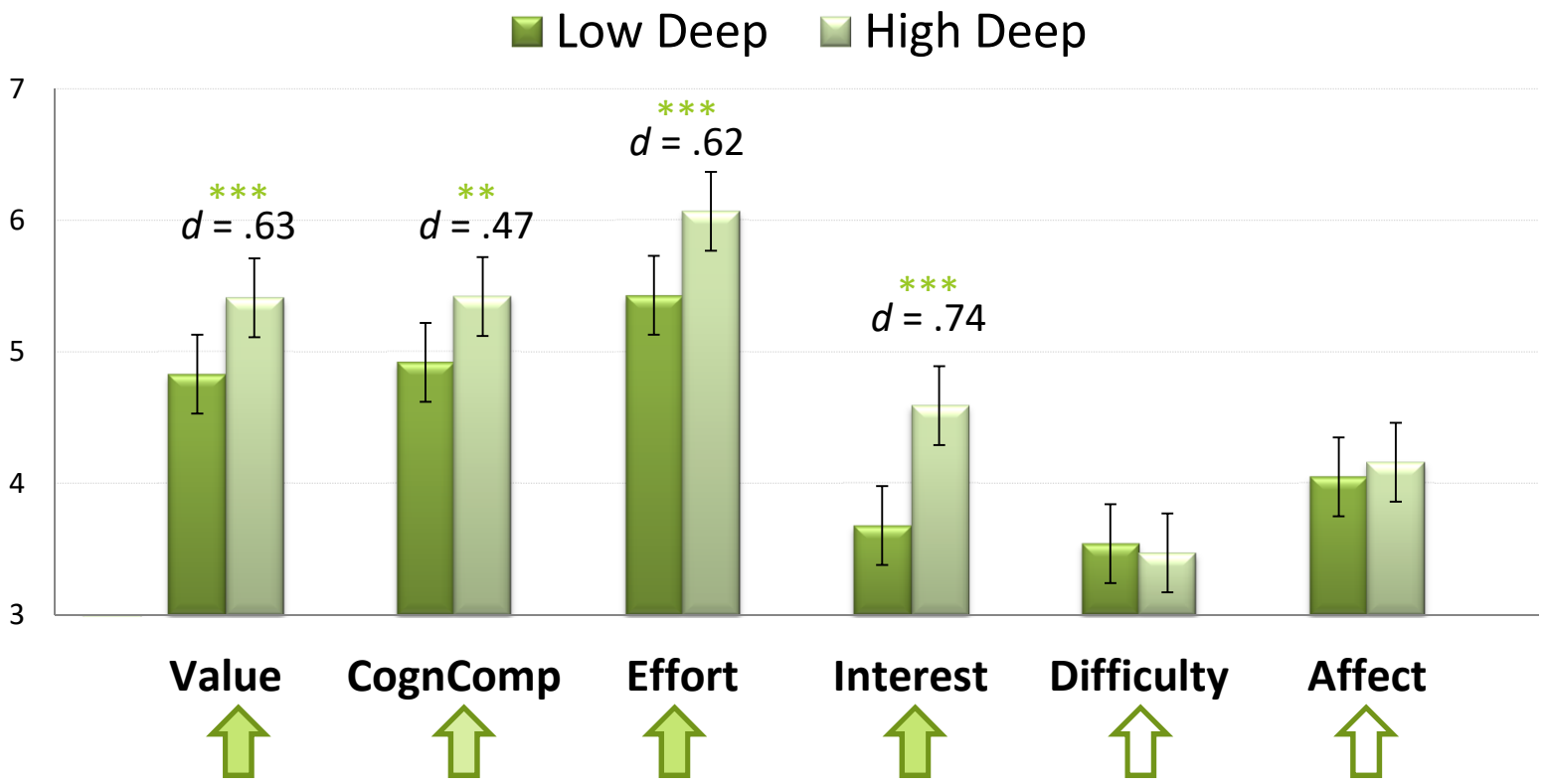
*$p < .05$, **$p < .01$

RESULTS: Low *vs* High Deep

- Two groups were created:
  - Low Deep: Deep score ≤ 35th percentile
  - High Deep: Deep score ≥ 65th percentile

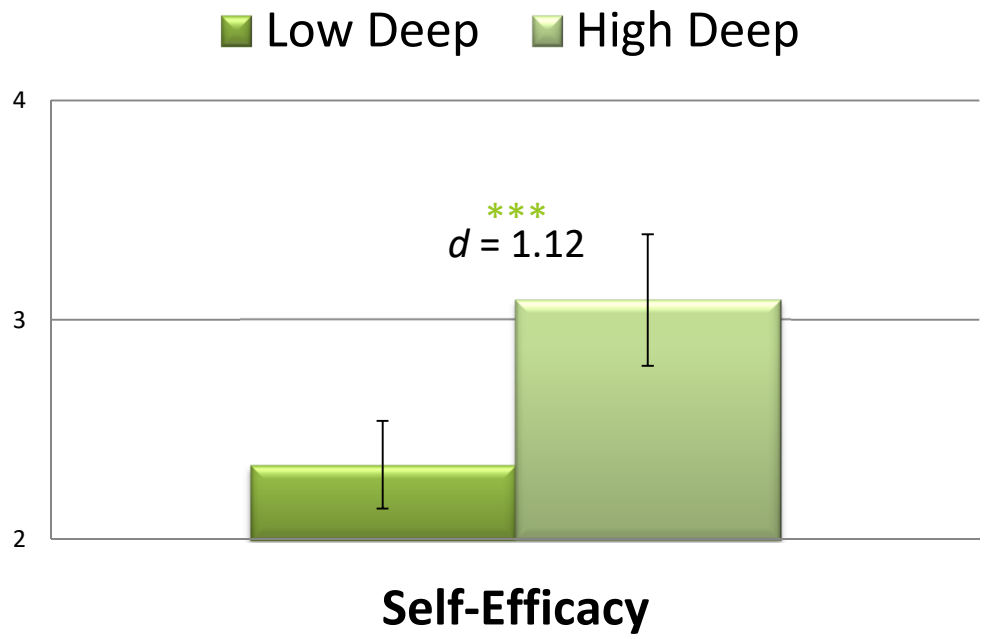


RESULTS: Deep & Attitudes



**p< .01, ***p< .001

RESULTS: Deep & Self-Efficacy



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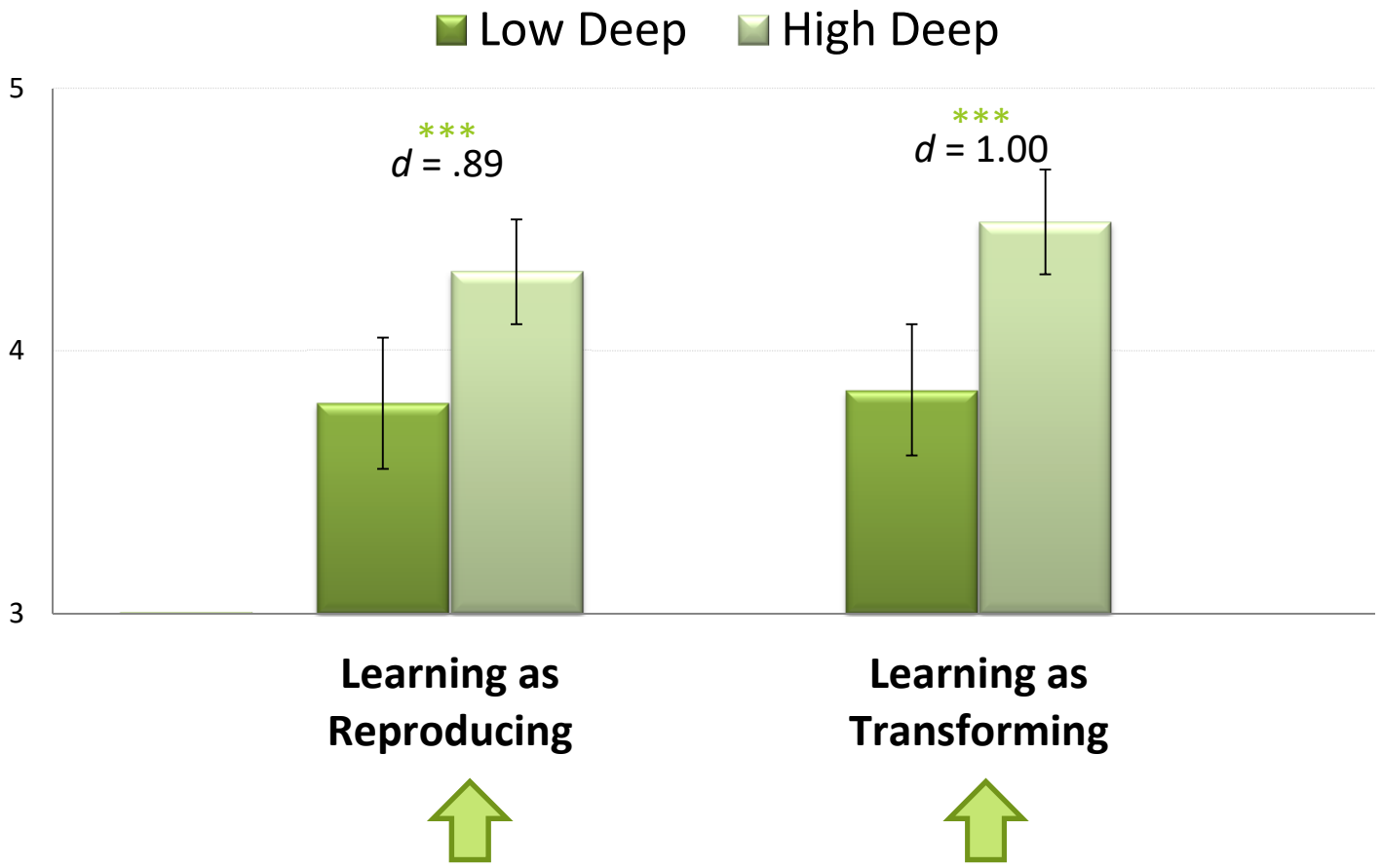
RESULTS: Deep & Learning Conceptions



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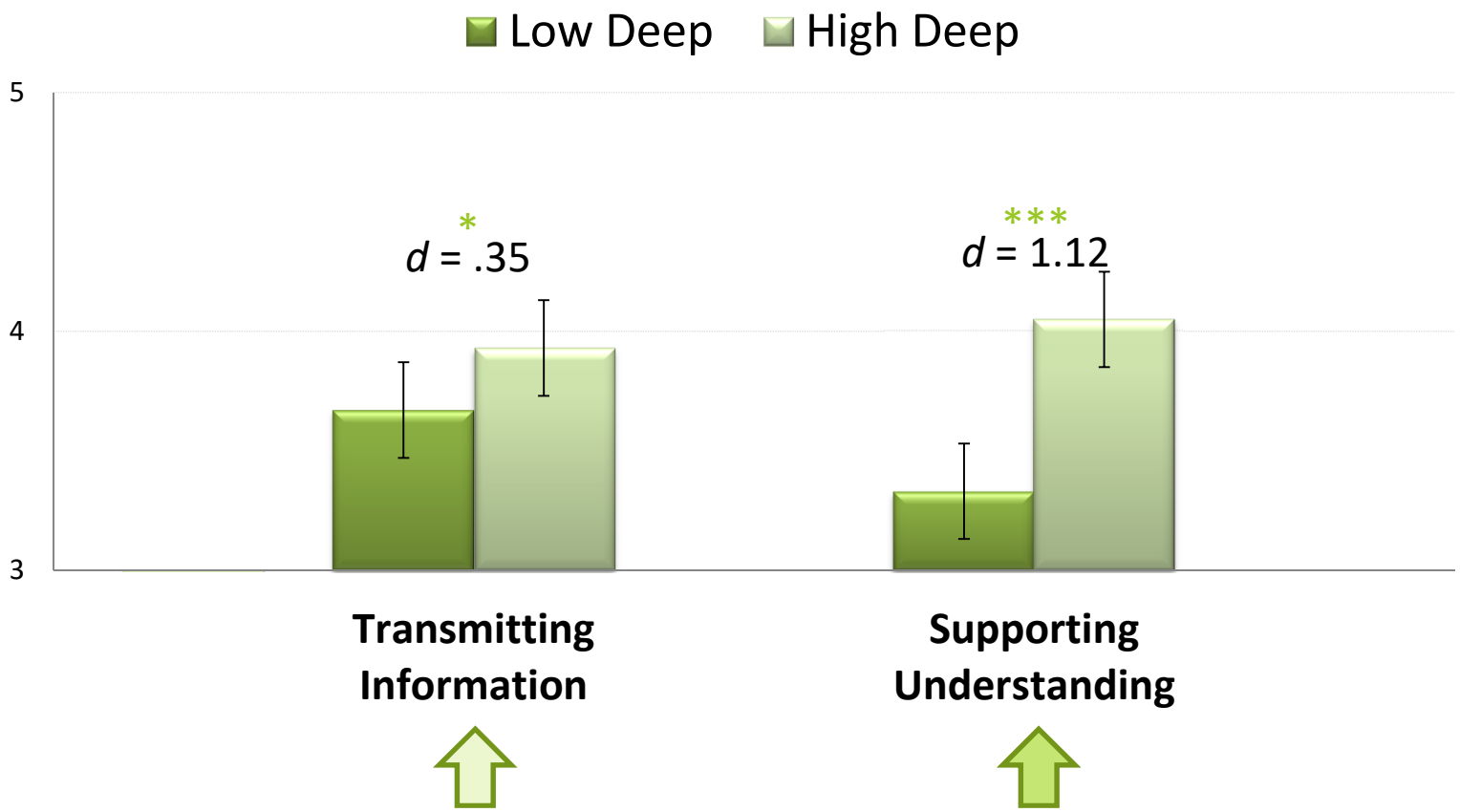
RESULTS: Deep & Teaching Preferences



*p< .05, ***p< .001

DISCUSSION

- This study contributes to the state of knowledge on factors that impact on statistics education:
  - ➡ intervention strategies
- Results suggest that a **deep approach** is more likely to results in retention of statistics concepts:
  - ➡ teachers should help students in choosing this approach

DISCUSSION

- Based on students who adopt a deep approach in learning, intervention strategies should focus on:
  - value, interest, effort, and self- efficacy (general and task-specific)
  - understanding, reasoning, and transforming knowledge

CONCLUSION

- Although the current study has some limitations (e.g., the specific sample characteristics), it offers some insights on **factors that impact on statistics education** and they suggest **areas of intervention**.