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# Measuring achievement goals : A methodological contribution based on mouse-tracking data

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## Introduction

Developing and sustaining students' motivation to learn represents an essential educational challenge for teachers, parents, and policy-makers alike, because this motivation should foster learning and achievement. [1]

Although it has been assumed that the motivation to learn – or mastery (approach) goal endorsement – and to perform better than others – or performance (approach) goal endorsement - predicts learning and achievement, findings are still inconsistent in the literature. One explanation may be related to response biases, and more specifically *social desirability bias*.

The aim of this research was to develop an implicit measure of mastery and performance goals by recording computer mouse movements. Mouse-tracking allows measuring participants' hand movements, which reflect underlying cognitive processes, including neural competition involved in decision making dynamics. [2]

In this study, Area Under the Curve (AUC) was used to measure implicit achievement goals. Convergent validity between the implicit measure and achievement goals' explicit, self-reported equivalent measures was tested.

## Method studies 1 & 2

**Participants.** Study 1 : 142 psychology students (*Age* = 20.3, *SD* = 3.4) Study 2 : 133 psychology students (*Age* = 20.9, *SD* = 2.78)

1) **Pre-test**: 10 words for performance goals (**COMPETITION**) and 10 for mastery goals (**COMPREHENSION**),  $\chi^2 (p < .05)$ .

2) **Implicit measure (Imp)**.

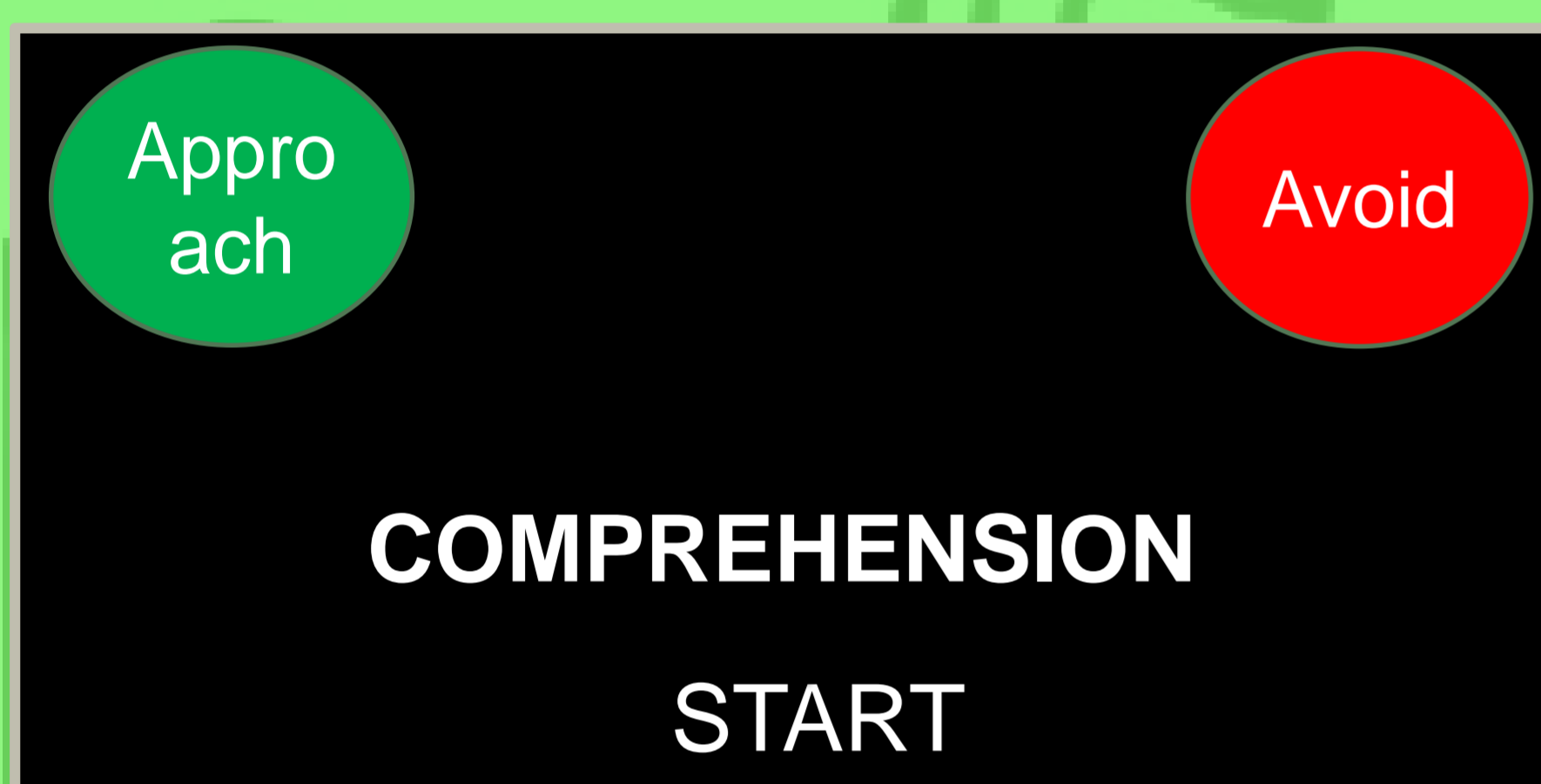


Figure 1. Sample item

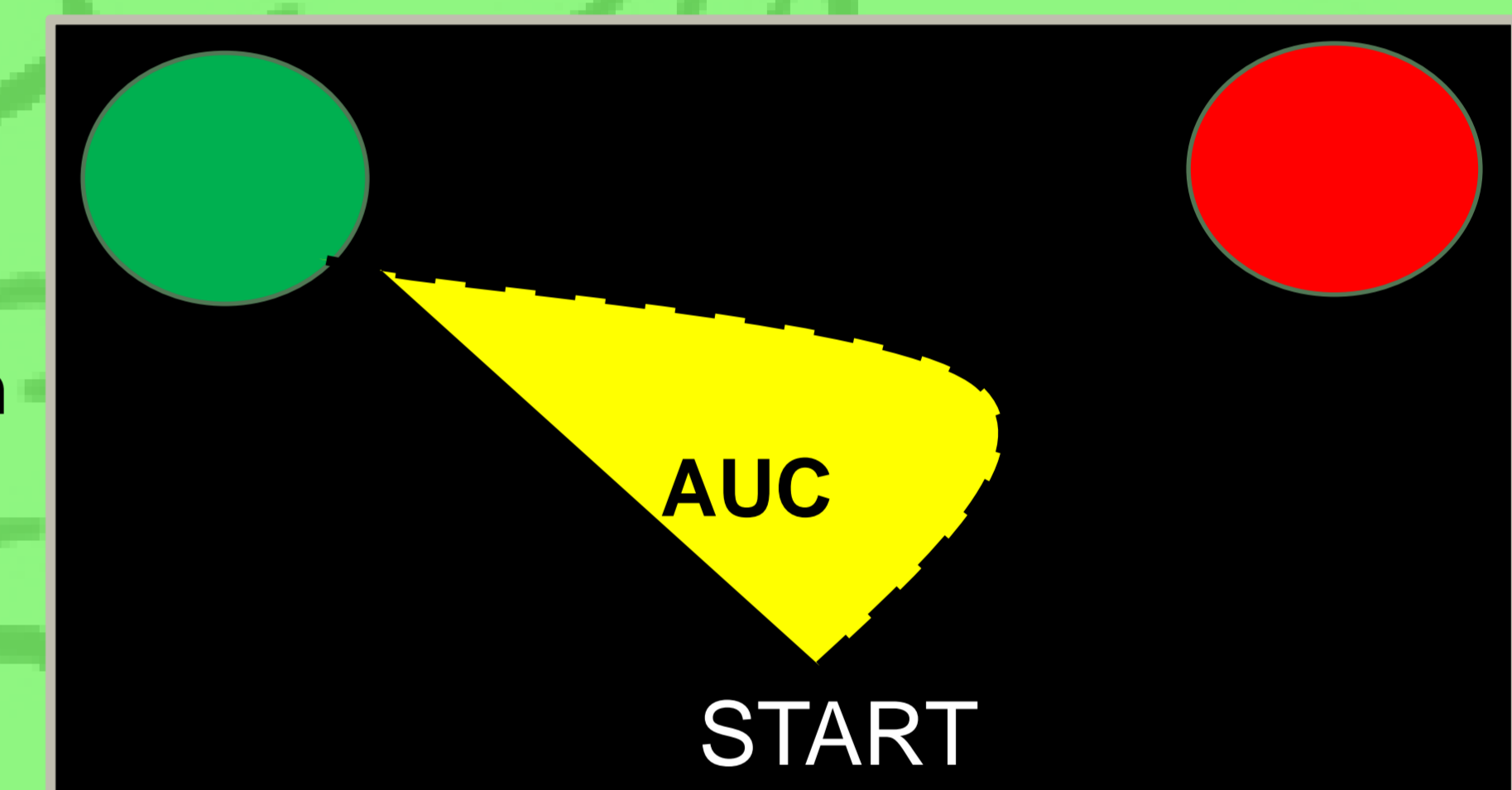


Figure 2. Sample illustration of the AUC

3) **Self report measure (Exp)**. 2x2 scale of achievement goals Elliot & Murayama (2008)

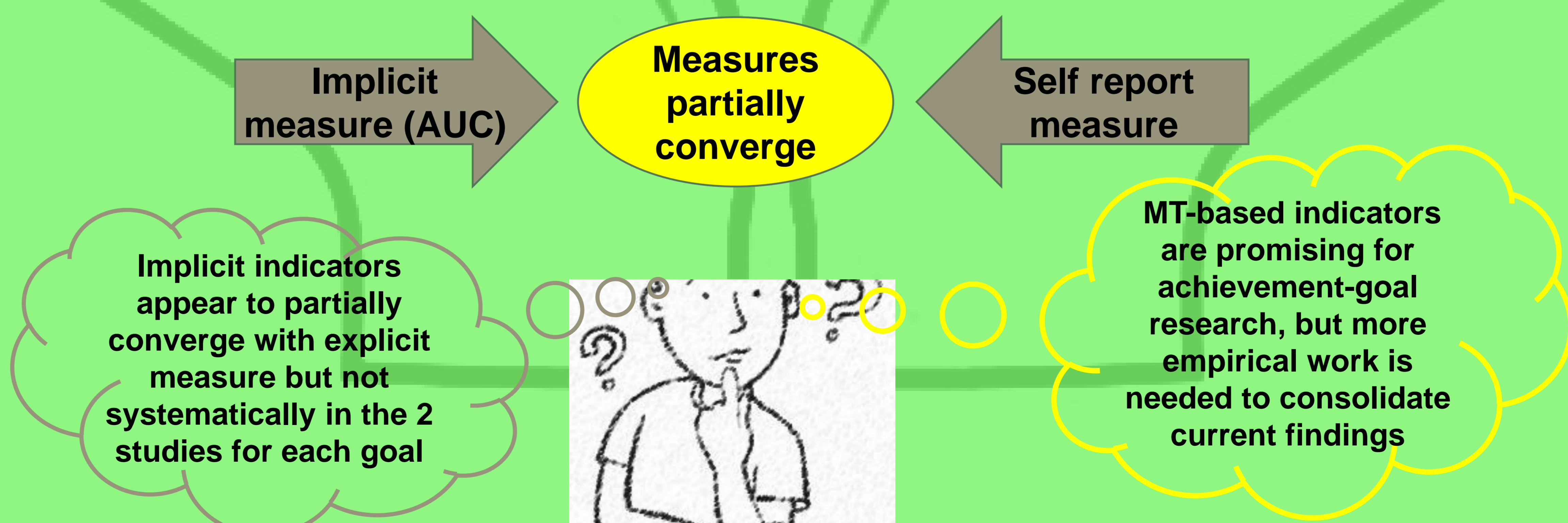
My goal is to learn as much as possible in my studies.  1  2  3  4  5  6  7

## Results

Variables	Mastery-Implicit	Mastery-Explicit	Performance-Explicit	Performance-Implicit	AUC_Performance	AUC_Mastery
Mastery_Implicit	-	.14	.08	.05	.15	<b>-.26**</b>
Mastery_Explicit	<b>.22*</b>	-	.13	.09	.01	-.11
Performance_Explicit	.03	<b>.26*</b>	-	<b>.50*</b>	<b>-.36**</b>	<b>-.23*</b>
Performance_Implicit	.17	.17	<b>.54**</b>	-	<b>-.42**</b>	<b>-.44**</b>
AUC_Performance	.03	-.08	<b>-.19*</b>	<b>-.38**</b>	-	<b>.34**</b>
AUC_Mastery	<b>-.24*</b>	<b>-.24*</b>	.04	-.13	.50	-

Table 1. Values above the diagonal refer to the Study 1 / values below the diagonal refer to Study 2. \* indicate significant correlations.  $p < .05$  \*.  $p < .001$  \*\*.

## Discussion



[1] Hulleman, C., Bodmann. S., Schrager, M., Harackiewicz, J. (2010). A Meta-Analytic Review of Achievement Goal Measures: Different Labels for the Same Constructs or Different Constructs With Similar Labels? *Psychological Bulletin*, 136, 3, 422–449.

[2] Freeman, J. B. & Ambady, N. (2010). MouseTracker : software for studying real-time mental processing using a computer mouse-tracking method, *Behavior research methods*, 42 (1), 226-241.

[3] Elliot, A. J., Murayama, K., & Pekrun, R. (2011). A 3 × 2 achievement goal model. *Journal of Educational Psychology*, 103(3), 632–648.