# Reciprocal Effects between Self-Determined U Motivation and Engagement in Mathematics

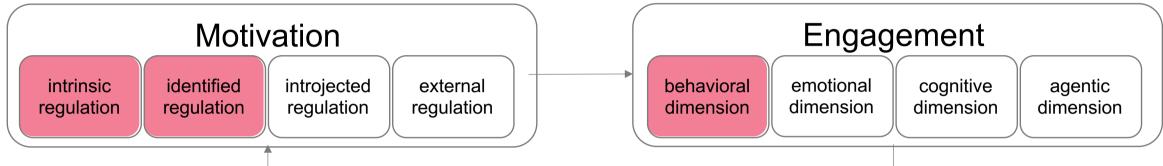
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- Student motivation and engagement are key requirements for successful learning processes
- Results revealed effects between self-determined motivation and effort, inattention, and procrastination across time
- Motivation influence behavioral engagement, and students' behavioral engagement may also influence future motivation

# **Theoretical background**

**Motivation** describes goal-directed behavior including all **Engagement** comprises the extent of active involvement of processes for initiating, maintaining, or changing activity students in a learning activity and is viewed as a multi-(Heckhausen, 2018). Motivation can be conceptualized as the dimensional construct (Reeve, 2012; Reeve & Lee, 2014; latent cause for engagement as observable behavior (Skinner Wang & Degol, 2014). et al., 2009).



# **Research Question**

Are there reciprocal effects between self-determined motivation (intrinsic and identified regulation) and behavioral engagement (measured by the indicators of effort, inattention, and procrastination) in mathematics in lower secondary education?

#### **Results**

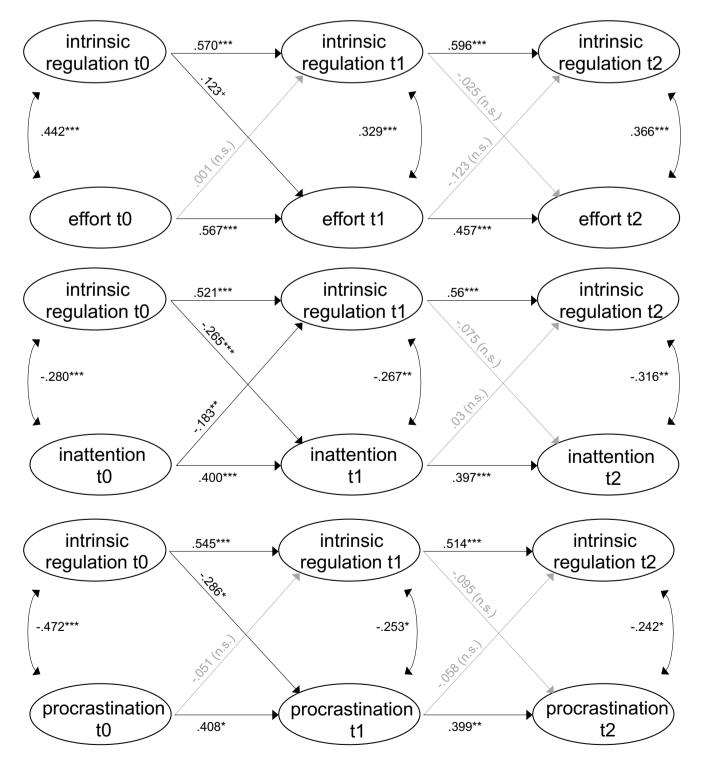
# Methodology

Data from 348 students in the lowest ability tier of lower secondary education were used. Students completed surveys at three measurement points during Grades 7 and 8 (48.6% male;  $M_{aget0} = 12.75$  years [SD = .64]). The present study is part of the project entitled "Maintaining and fostering students' positive learning emotions and learning motivation in maths instruction during early adolescence" funded by the Swiss National Science Foundation.

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# **References and Contact**

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Results revealed positive effects between intrinsic and identified regulation and effort. Intrinsic regulation at t0 positively predicted effort at t1. In turn, effort at t0 positively predicted identified regulation at t1.

Cross-lagged effects were revealed between intrinsic regulation and inattention between the first two measurement points. Regarding identified regulation and inattention, results revealed a negative effect of inattention at t0 on identified regulation at t1.

Regarding procrastination results revealed that intrinsic regulation at t0 negatively predicted procrastination at t1.

All constructs demonstrated significant autoregressive relations and correlations within all time points.

# **Discussion**

There are positive relations between self-determined motivation and effort and negative relations between selfdetermined motivation and inattention and procrastination across time. These results suggest that, in addition to the effect of motivation on behavioral engagement, students' behavioral engagement in learning activities in mathematics may also influence his or her future motivation for mathematics learning. An increase in behavioral engagement may increase motivation and a decrease may mitigate motivation (Haerens et al., 2015, Reeve & Lee, 2014).

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