
These slides are provided as supplements to *The Model of Achievement Competence Motivation (MACM): Standing on the shoulders of giants* (McGrew, in press, 2021—for special issue on motivation in *Canadian Journal of School Psychology*). The slides in this PPT/PDF module can be used without permission for educational (not commercial) purposes.
This is the fourth in the MACM series of on-line PPT modules. The first, the Introduction to the model is available at:


The second, the Model Overview is available at:


The third, the Motivation Domains Defined is available at:

https://www2.slideshare.net/iapsych/the-model-of-achievement-competence-motivation-macm-part-c-the-motivation-domains-defined
The Model of Achievement Competence Motivation (MACM)
(K. McGrew 01-06-2021)

Volition

(Self-Regulated Learning)
Volition (Action) Controls
-Self-Regulated Learning Strategies and Phases

What do I need to do to succeed at this activity?
How am I doing on this activity?
What do I need to do differently?

Possible SRL Components*

Regulatory agent
-Goal level

Regulatory mechanisms
-Planning
-Monitoring
-Metacognition
-Attention
-Learning strategies
-Persistence
-Time management
-Environmental structuring
-Help seeking
-Motivation
-Emotion control
-Effort

Regulatory appraisals
-Self-evaluation
-Attributions
-Self-efficacy

A proposed Model of Achievement Competence Motivation (MACM): Integration of Snow’s affective (aff) and conative (con) construct domains (affcon) (McGrew, 2020)

- **Motivation**: Achievement Orientations - Intrinsic Motivation - Academic Goal Orientation - Academic Motivation - Academic Goal Setting
- **Interests and Task Values**: - Need for Cognition - Academic Interests - Academic Values
- **Self-Beliefs**: - Locus of Control (control) - Academic Ability Conception (control) - Academic Self-Efficacy (competence) - Academic Self-Concept (competence)

- **Learning-related conative constructs**
- **Learning-related affective constructs**

- **Volition***
- **Self-regulated learning (SRL) strategies & phases**
  - Prepare
    - Forethought
    - Plan & Activate
  - Perform
    - Control
    - Monitor
    - Regulate
  - Appraise
    - React & Reflect
    - Evaluate

- **Temperament** (emotionality, sociability, activity level, task persistence)
  - Big 5 personality trait constructs
    - - Openness (O)
      - - Intellectual curiosity
      - - Creative
      - - Imagination
      - - Artistic interest
    - - Conscientiousness (C)
      - - Determination
      - - Organization
      - - Focus-Persistence
      - - Responsibility
    - - Neuroticism (N)
    - - Extraversion (E)
    - - Agreeableness (A)

- **Characteristic Moods**
  - SENNA SEMS**
    - Open-mindedness (O)
    - - Intellectual curiosity
    - - Creative
    - - Imagination
    - - Artistic interest
  - - Conscientiousness (C)
    - - Determination
    - - Organization
    - - Focus-Persistence
    - - Responsibility
  - - Neuroticism (N)
    - - Stress modulation
    - - Self-confidence
    - - Frustration tolerance
  - - Extraversion (E)
    - - Social initiative
    - - Assertiveness
    - - Enthusiasm
  - - Agreeableness (A)
    - - Amity (A)
    - - Compassion
    - - Respect
    - - Trust

- **SENNA SEMS**
- **Motivation as a set of key questions**
  - Do I want to do this activity? Why do I want to do this activity? What are my goals for this activity?
  - Is this activity of interest to me? Is this activity worth the effort?
  - Can I be successful on this activity? Am I capable of doing this activity? Can I control my success on this activity?
  - What do I need to do to succeed at this activity? How am I doing on this activity? What do I need to do differently?

- **Relative degree of influence on learning**
  - More proximal
  - Relative
  - More distal

* Bold font designates constructs or domains drawn or adapted from Richard Snow’s model of aptitude (Corno et al, 2002).
* Wide shaded arrows represent causal relations or cyclical phase stages.
* Snow model included “conative styles” under volition. This construct domain is not included in the MACM model given the lack of robust validity research regarding work and learning styles.
* ** SENNA SEMS = SENNA social-emotional skills measurement scale and model.**
Motivation: Thing 3
Motivation: As a Set of Key Questions

“What do I need to do to succeed at this activity?”

“How am I doing on this activity?”

“What do I need to do different?”
The term “volition” refers to both the strength of will needed to complete a task, and the diligence of pursuit (Corno, 1993). Kuhl (e.g., 1987) argued that many motivational theorists have ignored volitional processes by assuming that motivation leads directly to outcomes. He argued instead that motivational processes only lead to the decision to act. Once the individual engages in action, volitional processes take over and determine whether or not the intention is fulfilled (see also Zimmerman 1989).

Eccles & Wigfield (2012)
Self-regulated learning strategies and phases: The processes, during the post-decisional monitoring and appraisal phases of learning, where a person actively maintains goal directed action over time (i.e., action control; strength of will) via strategies to regulate learning and to protect learning goals in the face of competing goals or negative affect. The regulatory processes engaged to preserve and protect the intention-action system. Processed during the last stage of the wish-->want-->intention-->action commitment sequence (i.e., what do I need to do to succeed at this activity?; how am I doing on this activity; what do I need to do differently?).
**Note.** Theory circle descriptions drawn primarily from Sitzmann & Ely (2011) and supplemented by Pintrich, Wolters & Baxter (2000) and Hofmann et al. (2012).

Conative: Self-regulation, defined as voluntary action management, seems to have become the overarching conative concept. Volition is action control (Snow 1996)

A Review of Self-regulated Learning: Six Models and Four Directions for Research

Ernesto Panadero

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Self-regulated learning (SRL) includes the cognitive, metacognitive, behavioral, motivational, and emotional/affective aspects of learning. It is, therefore, an extraordinary umbrella under which a considerable number of variables that influence learning (e.g., self-efficacy, volition, cognitive strategies) are studied within a comprehensive and holistic approach. For that reason, SRL has become one of the most important areas of research within educational psychology. In this paper, six models of SRL are reviewed.
Relevant SRL theoretical research

- Pintrich’s Four Phase Model
- Boekaerts Dual Processing Model
- Jarvela & Hadwin Model
- Winne & Hadwin Model
- Efklides MASRL Model
- Zimmerman’s Cyclical Phases Model
- Hadwin Socially Shared Model

“What do I need to do to succeed at this activity?”

“How am I doing on this activity?”

“What do I need to do different?”
Zimmerman’s Cyclical Phases Model

**Performance Phase**
- Self-Control
  - Task strategies
  - Self-instruction
  - Imagery
  - Time management
  - Environmental structuring
  - Help-seeking
  - Interest incentives
  - Self-consequences
- Self-Observation
  - Metacognitive monitoring
  - Self-recording

**Forethought Phase**
- Task Analysis
  - Goal setting
  - Strategic planning
- Self-Motivation Beliefs
  - Self-efficacy
  - Outcome expectations
  - Task interest/value
  - Goal orientation

**Self-Reflection Phase**
- Self-Judgment
  - Self-evaluation
  - Causal attribution
- Self-Reaction
  - Self-satisfaction/affect
  - Adaptive/defensive

*FIGURE 3 | Current version Cyclical phases model. Adapted from Zimmerman and Moylan 2009.*
Fig. 1 Effects of evaluative judgement on Zimmerman’s model
### Pintrich’s Four Phase Model

**TABLE 1 Phases and Areas for Self-Regulated Learning**

<table>
<thead>
<tr>
<th>Phases</th>
<th>Cognition</th>
<th>Motivation/affect</th>
<th>Behavior</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Forethought, planning, and activation</td>
<td>Target goal setting</td>
<td>Goal orientation adoption</td>
<td>[Time and effort planning]</td>
<td>[Perceptions of task]</td>
</tr>
<tr>
<td></td>
<td>Prior content knowledge activation</td>
<td>Efficacy judgments</td>
<td>[Planning for self-observations of behavior]</td>
<td>[Perceptions of context]</td>
</tr>
<tr>
<td></td>
<td>Metacognitive knowledge activation</td>
<td>Ease of learning judgements (EOLs); perceptions of task difficulty</td>
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<td>Task value activation</td>
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<td>Interest activation</td>
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</tr>
<tr>
<td>2. Monitoring</td>
<td>Metacognitive awareness and monitoring of cognition (FOKs, JOLs)</td>
<td>Awareness and monitoring of motivation and affect</td>
<td>Awareness and monitoring of effort, time use, need for help</td>
<td>Monitoring changing task and context conditions</td>
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<tr>
<td>3. Control</td>
<td>Selection and adaptation of cognitive strategies for learning, thinking</td>
<td>Selection and adaptation of strategies for managing motivation and affect</td>
<td>Increase/decrease effort</td>
<td>Change or renegotiate task</td>
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<tr>
<td>4. Reaction and reflection</td>
<td>Cognitive judgments</td>
<td>Affective reactions</td>
<td>Persist, give up</td>
<td>Change or leave context</td>
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<td></td>
<td>Attributions</td>
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<td>Help-seeking behavior</td>
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<td>Choice behavior</td>
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<td>Evaluation of task</td>
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<td>Evaluation of context</td>
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</tr>
</tbody>
</table>
Boekaerts Dual Processing Model

Boekaerts Dual Processing Model

FIGURE 7 | Dual processing self-regulation model. Adapted from Boekaerts (2011)
Winne & Hadwin Model
Winne & Hadwin Model

Using formative assessment to influence self- and co-regulated learning: the role of evaluative judgement

Ernesto Panadero 1, 2, * - Jaclyn Broadbent 1 - David Boud 2, 3, 4, 5 - Jason M. Lodge 6

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**Influence of evaluative judgment on Winne’s RK model**

1. Conditions previous to the task are largely influenced by evaluative judgment: the more the learner knows about the topic the larger the understanding and awareness of the knowledge about task and domains.

2. A: If evaluative judgment influences how students conceptualize and define, what, the task and the goals, knowledge, they establish a number of profiles of the goal model to address along with a task of actual performance based on previous performances and experiences of the task. Evaluative judgment, formed by assessment criteria, standards, etc., which refers to an attitude toward the processes of phases 1 and 2.

3. B: If for a successful activation of COPEs during control and monitoring, evaluative judgment is central. In these phases the learners need to monitor and evaluate their progress in determining the conditions and operations, creating products of their current level of performance so they can evaluate based on their standards. All these aspects are central in the development of evaluative judgment.

4. If the learner has difficulties in the processes of phases 1 and 2, the evaluative judgment produced changes in the external feedback, the learner receives information that enhances both, evaluative judgment and self-regulated learning, importantly, the type of feedback quality varies in assessment situations, therefore the relationship of the external evaluation to the learner’s self-regulated learning skills is key. In the absence of external feedback the learner can still reach a small or large scale adaptation via internal feedback (Raths & Boud 1999).

**Fig. 2** Modified version of Winne’s self-regulated learning model

**Fig. 4** Effects of evaluative judgement in Winne’s self-regulated learning model

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**Fig. 2**: Modified version of Winne’s self-regulated learning model

**Fig. 4**: Effects of evaluative judgement in Winne’s self-regulated learning model
Efklides MASRL Model

Hadwin Socially Shared Model

Figure 13: Socially shared regulated learning model 2. Adapted from Hadwin et al. (2011).
Jarvela & Hadwin Model

FIGURE 12 | Socially shared regulated learning model 1. Adapted from Järvelä and Hadwin (2013).
## SRL Models: Frequency of Publication Citations

### TABLE 1 | Number of citations of the different SRL models main publication.

<table>
<thead>
<tr>
<th>Model</th>
<th>Publication</th>
<th>Total citations</th>
<th>Citations year*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boekaerts</td>
<td>Boekaerts and Corno, 2005</td>
<td>1011</td>
<td>84.25</td>
</tr>
<tr>
<td>Efklides</td>
<td>Efklides, 2011</td>
<td>251</td>
<td>41.83</td>
</tr>
<tr>
<td>Hadwin et al.</td>
<td>Hadwin et al., 2011</td>
<td>196</td>
<td>32.67</td>
</tr>
<tr>
<td>Pintrich</td>
<td>Pintrich, 2000</td>
<td>3416</td>
<td>200.94</td>
</tr>
<tr>
<td>Winne and Hadwin</td>
<td>Winne and Hadwin, 1998</td>
<td>1037</td>
<td>54.58</td>
</tr>
<tr>
<td>Zimmerman</td>
<td>Zimmerman, 2000</td>
<td>4169</td>
<td>245.24</td>
</tr>
</tbody>
</table>

Data as in 20th of March 2017. Search performed via Google Scholar. *The average citation per year was calculated dividing the total number of citation by the resulting number of subtracting to 2017 -the current year- the year of publication of the reference.
# SRL Models: Common Phases

<table>
<thead>
<tr>
<th>Models</th>
<th>Preparatory phase</th>
<th>Performance phase</th>
<th>Appraisal phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boekaerts</td>
<td>Identification, interpretation, primary and secondary appraisal, goal setting</td>
<td>Goal striving</td>
<td>Performance feedback</td>
</tr>
<tr>
<td>Efklides</td>
<td>Task representation</td>
<td>Cognitive processing, performance</td>
<td>Regulating</td>
</tr>
<tr>
<td>Hadwin et al., 2011</td>
<td>Planning</td>
<td>Monitoring, control</td>
<td>Adaptation</td>
</tr>
<tr>
<td>Hadwin et al. (in press)*</td>
<td>Negotiating and awareness of the task</td>
<td>Strategic task engagement</td>
<td>Reaction and reflection</td>
</tr>
<tr>
<td>Pintrich</td>
<td>Forethought, planning, activation</td>
<td>Monitoring, control</td>
<td>Adapting metacognition</td>
</tr>
<tr>
<td>Winne and Hadwin</td>
<td>Task definition, goal setting and planning</td>
<td>Applying tactics and strategies</td>
<td>Self-reflection (self-judgment, self-reaction)</td>
</tr>
<tr>
<td>Zimmerman</td>
<td>Forethought (task analysis, self-motivation)</td>
<td>Performance (self-control self-observation)</td>
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</tbody>
</table>

*The early draft provided by the authors did not provide the exact names for the phases but it could be implied the phases are similar to Winne and Hadwin’s. Therefore, this review comparison will be based on their 2011 publication.*
Zimmerman’s Cyclical Phases Model

Fig. 1 Visual of Zimmerman’s model of self-regulated learning
Zimmerman’s Cyclical Phases Model

**Performance Phase**
- **Self-Control**
  - Task strategies
  - Self-instruction
  - Imagery
  - Time management
  - Environmental structuring
  - Help-seeking
  - Interest incentives
  - Self-consequences
- **Self-Observation**
  - Metacognitive monitoring
  - Self-recording

**Forethought Phase**
- **Task Analysis**
  - Goal setting
  - Strategic planning
- **Self-Motivation Beliefs**
  - Self-efficacy
  - Outcome expectations
  - Task interest/value
  - Goal orientation

**Self-Reflection Phase**
- **Self-Judgment**
  - Self-evaluation
  - Causal attribution
- **Self-Reaction**
  - Self-satisfaction/affect
  - Adaptive/defensive

*FIGURE 3: Current version Cyclical phases model. Adapted from Zimmerman and Moylan 2009.*
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<td></td>
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<tr>
<td></td>
<td>cognition (FOKs, JOKs)</td>
<td>motivation and affect</td>
<td>conditions</td>
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</tr>
<tr>
<td>3. Control</td>
<td>Selection and adaptation of cognitive</td>
<td>Selection and adaptation of strategies</td>
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</table>
Pintrich’s Four Phase SRL Model

Planning & Activation

Reaction & Reflection Strategies

Monitoring Strategies

Control & Regulation Strategies
Pintrich’s Four Phase SRL Model

Planning & Activation: The metacognitive processes involved in setting initial goals and activating prior domain-relevant knowledge and task relevant strategies.

Monitoring Strategies: The metacognitive processes involved in self-awareness of personal cognition and the monitoring of various components of one’s thinking during task performance.

Control & Regulation Strategies. The metacognitive processes involved in selecting and adapting cognitive strategies to reduce the relative discrepancy between immediate student goals and self-generated performance feedback.

Reaction & Reflection Strategies: The metacognitive processes in self-judging and making causal attributions to personal performance.
# Pintrich’s Four Phase SRL Model

<table>
<thead>
<tr>
<th>Areas for self-direction</th>
<th>Phase 1: Planning, forethought</th>
<th>Phase 2: Monitoring</th>
<th>Phase 3: Control</th>
<th>Phase 4: Reaction and Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prior content knowledge activation.</td>
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<td>Metacognitive knowledge activation.</td>
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<td>Interest activation.</td>
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<tr>
<td><strong>Behavior</strong></td>
<td>Time and effort planning.</td>
<td>Awareness and monitoring of effort, time use, need for help.</td>
<td>Increase/decrease effort.</td>
<td>Choice behavior.</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Perceptions of task.</td>
<td>Monitoring changing task and context conditions.</td>
<td>Change or renegotiate task.</td>
<td>Evaluation of task.</td>
</tr>
</tbody>
</table>

Table 2. Pintrich conceptual framework for studying self-regulation. [24]

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**Self – Regulated Learning Strategies & Phases**

- Planning & Activation
- Monitoring Strategies
- Reaction & Reflection Strategies
- Control & Regulation Strategies
### Combined Zimmerman and Pintrich SRL Model


<table>
<thead>
<tr>
<th>Areas for self-direction</th>
<th>Phases of self-direction</th>
<th>Intention</th>
<th>Planning, forethought</th>
<th>Monitoring, control</th>
<th>Reflection, reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition</strong></td>
<td></td>
<td>Need recognition.</td>
<td>Task analysis.</td>
<td>Metacognitive awareness.</td>
<td>Knowledge of understanding and learning outcomes.</td>
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<td></td>
<td></td>
<td></td>
<td>Metacognitive knowledge activation.</td>
<td>Self-observation.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Selection of strategies, resources, evaluations.</td>
<td>Judgments of learning.</td>
<td></td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td></td>
<td>Self-actualizing tendency.</td>
<td>Goal orientations and internalization.</td>
<td>Awareness of self-efficacy, interests, anxieties.</td>
<td>Efforts to enhance motivation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrinsic goal framing.</td>
<td>Perceptions of task difficulty, value.</td>
<td>Adjustment of process based on motivations.</td>
<td></td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td></td>
<td>Choice to engage.</td>
<td>Task interest.</td>
<td>Time and effort management and adjustment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Identification of a suitable learning environment.</td>
<td>Time, effort planning to attain goals.</td>
<td>Acquisition and use of resources.</td>
<td></td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td></td>
<td>Choice of physical and social context.</td>
<td>Perceptions of context.</td>
<td>Monitoring and modification of context.</td>
<td>Evaluation of task demands.</td>
</tr>
</tbody>
</table>
Combined Zimmerman and Pintrich SRL Model

Possible SRL Components*

- Regulatory agents
  - Goal level

- Regulatory mechanisms
  - Planning
  - Monitoring
  - Metacognition
  - Attentional control
  - Learning strategies
  - Persistence
  - Time management
  - Environmental structuring
  - Help seeking
  - Motivation
  - Emotion control
  - Effort

- Regulatory appraisals
  - Self-evaluation
  - Attributions
  - Self-efficacy

* From Sitzmann & Ely (2011)
SRL mechanisms suggested by Sitzmann & Ely’s (2011) comprehensive research synthesis


Abstract: Researchers have been applying their knowledge of goal-oriented behavior to the self-regulated learning domain for more than 30 years. This review examines the current state of research on self-regulated learning and gaps in the field’s understanding of how adults regulate their learning of work-related knowledge and skills. Self-regulation theory was used as a conceptual lens for deriving a heuristic framework of 16 fundamental constructs that constitute self-regulated learning. Meta-analytic findings ($k=430, N=90,380$) support theoretical propositions that self-regulation constructs are interrelated—30% of the corrected correlations among constructs were .50 or greater. Goal level, persistence, effort, and self-efficacy were the self-regulation constructs with the strongest effects on learning. Together these constructs accounted for 17% of the variance in learning, after controlling for cognitive ability and pretraining knowledge. However, 4 self-regulatory processes—planning, monitoring, help seeking, and emotion control—did not exhibit significant relationships with learning. Thus, a parsimonious framework of the self-regulated learning domain is presented that focuses on a subset of self-regulatory processes that have both limited overlap with other core processes and meaningful effects on learning. Research is needed to advance the field’s understanding of how adults regulate their learning in an increasingly complex and knowledge-centric work environment. Such investigations should capture the dynamic nature of self-regulated learning, address the role of self-regulation in informal learning, and investigate how trainees regulate their transfer of training.
SRL mechanisms suggested by Sitzmann & Ely’s (2011) comprehensive research synthesis

Description of procedures for developing SRL mechanism framework (presented in footnote #2 on page 423). To develop the heuristic framework, we identified the most frequently cited and influential theories in the adult self-regulated learning domain. First, we identified 15 self-regulation theories that were included in previous self-regulation review articles (e.g., Diefendorff & Lord, 2008; Kanfer, 1990; Paas, 1992; Pulkkinen & Pulkkinen, 2001; Vancouver, 2000). From this list we eliminated content theories, which do not focus on the components of self-regulation (i.e., Deci & Ryan, 2000; Dweck, 1986; Higgins, 1997). Then the seven aforementioned theories as well as Boekaerts and Niemivirta (2000), Borkowski (1996), Cormier (1993), Kuhl (1992), and Winne and Hadwin (1998) were compared in terms of their number of citations in Web of Science and Google Scholar. There was a clear cutoff in the number of hits per theory such that those included in our review received more than 100 citations in Web of Science and more than 200 citations in Google Scholar and those not included in the review fell below both of these criteria. After choosing the theories, each theory was reviewed by two independent raters to establish which constructs constitute the self-regulated learning domain. The raters independently developed a list of the core constructs in each of the theories (intrarater agreement was .89) and then reached a consensus on the construct lists. There is a range of constructs included in self-regulation theories, and many theories include constructs that do not have analogous components in other theories (e.g., orientation in Frese & Zapf, 1994, and context evaluation in Pintrich, 2000). Thus, each of the constructs included in the heuristic framework was a component of at least two of the reviewed theories. The next step in the rating process involved classifying the constructs as regulatory agents, mechanisms, and appraisals. Intrarater agreement was .93, and once again a consensus was reached regarding all coding discrepancies.
SRL mechanisms suggested by Sitzmann & Ely’s (2011) comprehensive research synthesis

**Regulatory agents:**

“Regulatory agents are instrumental for initiating self-regulated learning. Goals are regulatory agents....Goals reflect the standard for successfully accomplishing a task, and self-regulation theories agree that goals provide a criterion for monitoring, evaluating, and guiding self-regulatory activity” (p. 423)

- **Goal level:** Setting an initial standard for the successful accomplishment of goals.
Regulatory mechanisms

“Regulatory mechanisms are the crux of self-regulated learning because they are largely under the control of trainees and have an instrumental role in determining whether trainees make progress toward their goals in an efficient and organized manner. Furthermore, the majority of these constructs have been subjected to extensive empirical investigations” (p. 424).

- **Planning:** Thinking through, often at a formative or preliminary level, what needs to be learned and the specific steps or strategies needed to reach learning goals.

- **Monitoring:** Paying attention to one’s performance, including feedback of what is being learned, that leads to changes in strategies, affect or behavior.

- **Metacognition:** Depending on theory, a construct that subsumes all, or just a handful of, self-regulation constructs

- **Attentional control:** The ability to maintain cognitive focus, concentration, and attention during learning. The ability to divide cognitive resources between on- and off-task relevant and irrelevant information.
• **Learning strategies**: Includes a variety of strategies for enhancing learning such as elaboration, integrating new knowledge into existing stores of acquired knowledge, breaking tasks into smaller subtasks, reorganization, etc.

• **Persistence**: The ability to maintain effort and concentration during learning despite boredom, frustration, or failure.

• **Time management**: Allocating, monitoring, or scheduling time to different tasks during learning activities.

• **Environmental structuring**: Selecting or designing a location or environment conducive to learning (e.g., free from distractions). Monitoring and modifying the environment as needed.

• **Help seeking**: Seeking assistance when experiencing difficulty during learning. Knowing when, why, and whom to approach for help.

• **Motivation**: Willingness to engage in learning based on a person’s beliefs about the incentives or value for learning a task.
• **Emotion control**: Monitoring and controlling the intrusion of negative affective states (e.g., anxiety, frustration) which impact attentional control, during task performance, via engagement in appropriate strategies (e.g., relaxation exercises, self-encouragement, and self-talk, etc.).

• **Effort**: Self-control of the amount of effort and concentration to devote to learning based on self-monitoring (feedback) during performance, particularly when detecting a goal-performance discrepancy.

**Regulatory appraisals**

“Regulatory appraisals are instrumental in assessing goal progress as well as determining whether trainees will either begin or continue striving to make progress toward their goals. A scarcity of empirical evidence exists regarding the role of two regulatory appraisal constructs—self-evaluation and attributions—in self-regulated learning, but extensive research has focused on the third regulatory appraisal: self-efficacy.

• **Self-evaluation**: Evaluating one’s progress during learning via the comparison of current learning efficiency or success and final desired goal state.

• **Attributions**: The process of attributing causation (e.g., ability, effort) to failure or success in attaining the desired goal outcome.

• **Self-efficacy**: Appraisal or evaluation, during or after performance, that contributes to an individual’s confidence in the ability to solve problems or accomplish tasks.
The metacognitive processes involved in setting initial goals and activating prior domain-relevant knowledge and task relevant strategies.
Effective self-regulated students use **foreshought** when approaching a task in order to develop a plan and to activate relevant prior knowledge necessary for successful task performance.

**Planning and activation is defined** as the processes of: (a) setting initial task specific goals (goal setting); (b) activating (often automatically without conscious thought) prior relevant knowledge in the relevant task domain; and (c) activating task relevant metacognitive strategies (e.g., rehearsal, elaboration, comprehension monitoring) (Pintrich, 2000b; Pintrich & Zusho, 2002).

(McGrew et al., 2004)
The metacognitive processes involved in self-awareness of personal cognition and the monitoring of various components of one’s thinking during task performance. The activation of strategies for selecting, adapting, and changing cognitive strategies to reduce the relative discrepancy between immediate goals and self-generated performance feedback judgments. (The list of possible control strategies is relatively large and represents the most researched component of SRL--see table footnote.)

(McGrew et al., 2004)
SRL control and regulation activities are defined as the activation of metacognitive strategies for selecting, adapting, and changing cognitive strategies to reduce the relative discrepancy between immediate student goals and self-generated performance feedback judgments (Pintrich, 2002a). The list of possible control strategies is relatively large and represents the most researched component of SRL. Example control and regulation strategies include paraphrasing, outlining, summarizing, rehearsal, question generating, visualizing (imagery), drawing of cognitive or semantic maps, note taking, and using mnemonic devices to name but a few.

(McGrew et al., 2004)
The metacognitive processes in self-judging and making causal attributions to personal performance.
The final SRL phase involves a student **evaluating and judging their performance and making causal attributions for their performance**. Students who do not self-evaluate their performance or who are not cognizant of the importance of self-evaluation, tend to engage in surface (vs deep) processing in learning and also tend to display more negative affect and lower effort (Pintrich, 2002). Taking time to reflect on one's learning and learning processes is associated with more successful academic outcomes. Stated briefly, SRL reaction and reflection strategies are defined as a student's self-judging their performance and making causal attributions for their performance.

(McGrew et al., 2004)
Drawing largely on the research of Nelson and Narens (1990), a variety of metacognitive judgments have been postulated to occur during **performance monitoring** (Pintrich, 2000a; Winne & Jamieson-Noel, 2002). According to Pintrich (2000b), **judgments of learning (JOLs)** encompasses a variety of monitoring activities such as the student: (a) becoming aware that they are not comprehending what they have just read or heard; (b) becoming aware they are reading or studying too quickly or slowly; (c) engaging in self-questioning to self-check understanding; and (d) performing a self-memory test on material to check on readiness for an exam, etc. **Feelings (judgments) of knowing (FOK)** describe the metacognitive process of the student assigning a probability to the “information that is believed to be stored in memory but that the learner cannot recall at the moment” (Winne & Jamieson-Noel, 2002, p. 552)....In SRL, monitoring includes the metacognitive components of being aware of one's personal cognition and the monitoring of various aspects of one's cognition during task performance (Pintrich, 2000b).

(McGrew et al., 2004)
The Multidimensional Self-Control Scale (MSCS): Development and Validation

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Table 1
Factor Loadings for Principal Component Analysis With Promax Rotation of the MSCS

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I postpone things*</td>
<td>.82</td>
</tr>
<tr>
<td>2. If there is something I should do, I get to it before attending to lesser tasks</td>
<td>.74</td>
</tr>
<tr>
<td>3. I put things off for so long that my well-being or efficiency suffers unnecessarily a,b</td>
<td>.68</td>
</tr>
<tr>
<td>4. I spend my time wisely</td>
<td>.64</td>
</tr>
<tr>
<td>5. I have a hard time to get started a,b</td>
<td>.61</td>
</tr>
<tr>
<td>6. It is hard for me to concentrate a,b</td>
<td>.74</td>
</tr>
<tr>
<td>7. I have a good ability to concentrate</td>
<td>.74</td>
</tr>
<tr>
<td>8. I can concentrate, even with many disturbances</td>
<td>.73</td>
</tr>
<tr>
<td>9. I can regulate my focus during a task</td>
<td>.61</td>
</tr>
<tr>
<td>10. I have problems to stay focused on what is said during a talk a</td>
<td>.60</td>
</tr>
<tr>
<td>11. Bodily impulses do sometimes have too much control over me a</td>
<td>.76</td>
</tr>
<tr>
<td>12. I am easily disturbed by my impulses a,b</td>
<td>.73</td>
</tr>
<tr>
<td>13. Sometimes, it is hard to restrain myself a</td>
<td>.73</td>
</tr>
<tr>
<td>14. When I am confronted with an unwanted impulse, I have problems to stop thinking about it a</td>
<td>.69</td>
</tr>
<tr>
<td>15. I often act without thinking though other alternatives a</td>
<td>.65</td>
</tr>
<tr>
<td>16. I try to think about something else when an unpleasant thought is bothering me</td>
<td>.85</td>
</tr>
<tr>
<td>17. When I feel sad, I try to think about something positive a</td>
<td>.78</td>
</tr>
<tr>
<td>18. When I feel down, I try to do something I like</td>
<td>.76</td>
</tr>
<tr>
<td>19. If I get angry, I try to focus on something else</td>
<td>.59</td>
</tr>
<tr>
<td>20. When I set a goal, I make concrete plans of how to reach it</td>
<td>.74</td>
</tr>
<tr>
<td>21. I make plans for when, where, and how to reach my goals</td>
<td>.74</td>
</tr>
<tr>
<td>22. I focus daily on my long-term goals a</td>
<td>.60</td>
</tr>
<tr>
<td>23. I know what I have to do to reach my goals a</td>
<td>.44</td>
</tr>
<tr>
<td>24. I try anything to get me stared when I am uncertain of how to solve a task</td>
<td>.70</td>
</tr>
<tr>
<td>25. When I feel stuck, I try to look at the situation from another perspective a</td>
<td>.66</td>
</tr>
<tr>
<td>26. I try to conquer the fear if I do something scary</td>
<td>.63</td>
</tr>
<tr>
<td>27. When it is hard to get started on a task, I try to find something to get me going</td>
<td>.55</td>
</tr>
<tr>
<td>28. When it is hard to for me to concentrate on what I read, I try different ways of increasing my concentration</td>
<td>.52</td>
</tr>
<tr>
<td>29. I often look for new solutions by redefining the situation</td>
<td>.40</td>
</tr>
</tbody>
</table>

Note. N = 483. Factor loadings < .3 are not displayed. MSCS = Multidimensional Self-Control Scale; PRO = procrastination; IC = impulse control; AC = attentional control; EC = emotional control; GO = goal orientation; SCS = self-control strategies.

* Reversed item.  a,b Item in the BMCS.
The Multidimensional Self-Control Scale (MSCS): Development and Validation

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Figure 1. Third-order confirmatory factor analysis for the multidimensional self-control scale. N = 466.

SC = Self-Control; INHIB = Inhibition; INIT = Initiation; PRO = Procrastination; AC = Attentional Control; IC = Impulse Control; EC = Emotional Control; GO = Goal Orientation; SCS = Self-Control Strategies
Table 1. Overview of the Ingredients Needed in a Comprehensive Intervention Designed to Train the Self-Regulated Use of Strategies

<table>
<thead>
<tr>
<th>Intervention ingredient</th>
<th>Component</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture: Lecture that conveys the nature of the trained strategy, its effectiveness, when to use it, and how to apply it (with practice) to realistic educational tasks</td>
<td>Knowledge</td>
<td>Helps students understand the strategy, the evidence behind its effectiveness, and how to apply the strategy to their educational demands</td>
</tr>
<tr>
<td>Demonstration: Concrete demonstration in which students experience the learning consequences (with explicit feedback) when they do and do not use the trained strategy</td>
<td>Belief/commitment</td>
<td>Helps convince students that the strategy works for them; demonstrations also help students appreciate the relationship between their strategy use and learning outcomes, thereby giving them a sense of self-efficacy over their learning outcomes</td>
</tr>
<tr>
<td>Utility-value intervention: Intervention in which learners think through the value of using the trained strategy</td>
<td>Commitment</td>
<td>Helps learners appreciate the value of using the trained strategy and the value of the learning objectives, thereby increasing learners' motivation to use the strategy</td>
</tr>
<tr>
<td>Implementation intention: Procedure in which students form plans that force them to think through when, where, and how they will use the trained strategy</td>
<td>Planning</td>
<td>By associatively linking situational cues with strategy use, implementation intentions help learners follow through on their study plans</td>
</tr>
</tbody>
</table>
Self-Regulated Learning (SRL) Lab at Utah State University

Self-Regulated Learning

Just before, during, and after learning or performing a skill, individuals have the opportunity to engage several processes and beliefs that can facilitate more efficient skill development and/or performance. For example, setting goals, planning, using a variety of strategies, self-monitoring, and reflecting after performance can all help an individual learn and perform better. In addition, these processes influence and are influenced by motivational beliefs.

Collectively, these processes are part of a system referred to as self-regulated learning (SRL). This research lab examines the development of innovative measurement tools to examine these processes, the development of interventions to foster SRL, and how educators and school psychologists can support the development of SRL. We have completed research within several domains such as mathematical problem solving, test taking, creativity, and reading.

SRL overlaps significantly with other areas of science such as executive functioning and metacognition. See some key SRL constructs below.

Learn More About SRL

Dr. Greg Callan is an Assistant Professor of Psychology at Utah State University. His primary focus of research addresses self-regulated learning (SRL), which examines the development and validation of innovative SRL measurement methodologies, SRL interventions, teaching practices that support SRL, and whether SRL develops naturally as a result of skill development. Dr. Callan is currently accepting applications from prospective graduate students interested in the School Psychology PhD and EdS Programs and the faculty of the SRL Lab.

Good resource
Implicit Theories of Interest Regulation

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Beliefs that human qualities are malleable or fixed play important roles in motivation, personality, and development (Dweck, 1999; Dweck, Chen, & Hong, 1995). The present research extends this distinction to individuals’ beliefs about the malleability of interest. The Self-Regulation of Motivation (SRM) model proposes that experiencing interest at least some of the time is essential for maintaining motivation over time. Therefore, when individuals face an uninteresting but valuable activity, choosing to regulate their experience of interest by changing how they work on the activity increases persistence and the likelihood of later reengagement (Sansone & Harackiewicz, 1990; Sansone & Smith, 2000; Sansone & Thoman, 2005). Implicit theories of interest regulation are proposed as mental frameworks that people use when deciding whether or not to regulate interest. Findings from experimental lab studies that measured implicit theories of interest regulation suggest that whether or not undergraduates believe that interest can be regulated influences their use of interest-enhancing strategies on a boring task. Study 1 or manipulated (Study 2) general implicit theories of interest regulation suggest that whether or not undergraduates believe that interest can be regulated influences their use of interest-enhancing strategies on a boring task. Study 3 utilized repeated within-person measures of implicit theories across several academic domains to reveal that undergraduates’ beliefs about the malleability of interest is highly variable across academic domains, and that students report greater use of interest-enhancing strategies when they encountered boring class assignments in domains in which they reported more malleable (v. fixed) implicit theories of interest. Theoretical implications are discussed for both the SRM model and recently growing work on the role of metamotivational variables in self-regulation.

Keywords: interest, implicit theory, self-regulation, intrinsic motivation, metamotivation
SRL: New, emerging or related research and theory

**Synthesizing Cognitive Load and Self-regulation Theory: a Theoretical Framework and Research Agenda**

Anique B. H. de Bruin · Julian Roelle · Shana K. Carpenter · Martine Baars · EFG-MRE

Fig. 1 Integrating CLT and SRL theory: the Effort Monitoring and Regulation (EMR) framework

Yeol Huh¹ and Charles M. Reigeluth²
SRL: New, emerging or related research and theory

Huh and Reigeluth

Planning
(Before effort)

Performing
(During effort)

Reflecting
(After effort)

Self-efficacy

From prior experience /knowledge
Continuous change in self-efficacy
From the result of the task Basis for future task

Meta Cognition + Action

Planning (Task goal setting)
Managing (Learning/Environment)
Monitoring (Learning/Environment)

Process goal setting
Strategy /action

Judgment/Evaluation
Task experience building

Motivational beliefs

Initial Interest /Value expectancy
Changing Interest /Value expectancy
New Interest /Value appraisal