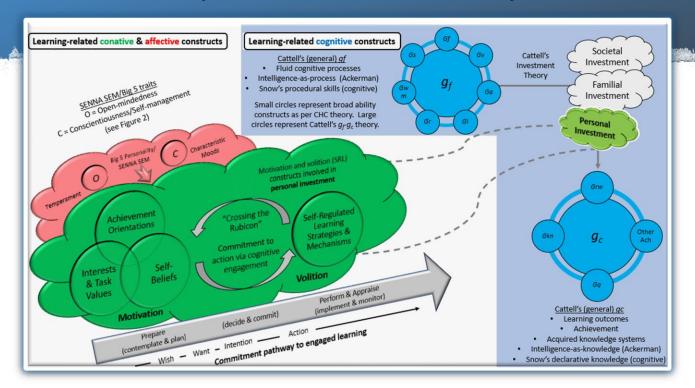# The Model of Achievement Competence Motivation (MACM):
Part D: The volition and self-regulated learning domain
(K. McGrew 01-11-2021)

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.

The Model of Achievement Competence Motivation (MACM):
The volition and self-regulated learning domain
(K. McGrew 01-06-2021)

This is the fourth in the MACM series of on-line PPT modules. The first, the Introduction to the model is available at:

https://www.slideshare.net/iapsych/the-model-of-achievement-competence-motivation-macm-part-a-introduction-of-series

The second, the Model Overview is available at:

https://www.slideshare.net/iapsych/the-model-of-achievement-competence-motivation-macm-part-b-an-overview-of-the-model
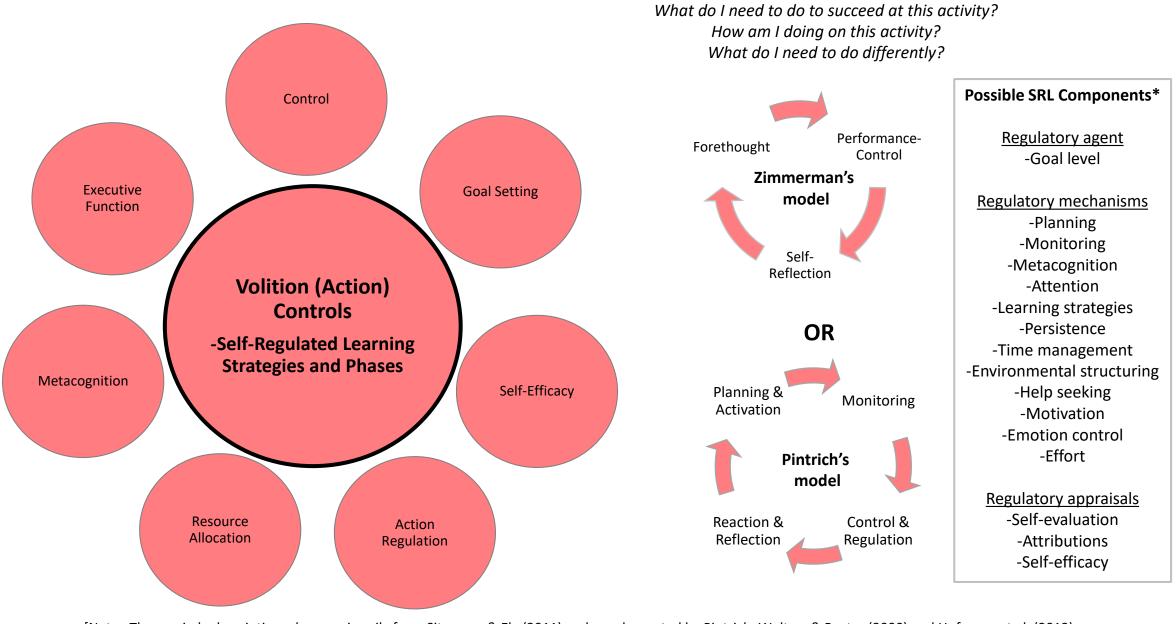
The third, the Motivation Domains Defined is available at:

https://www2.slideshare.net/iapsych/the-model-of-achievement-competence-motivation-macm-part-c-the-motivation-domains-defined

Volition

(Self-Regulated Learning)

Volition (Action) Controls

-Self-Regulated Learning Strategies and Phases

Control

Goal Setting

Executive Function

Self-Efficacy

Metacognition

Action Regulation

Resource Allocation

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?

Zimmerman's model

Forethought

Performance-Control

Self-Reflection

OR

Pintrich's model

Planning & Activation

Monitoring

Control & Regulation

Reaction & Reflection

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

[Note. Theory circle descriptions drawn primarily from Sitzmann & Ely (2011) and supplemented by Pintrich, Wolters & Baxter (2000) and Hofmann et al. (2012).
* Possible SRL components drawn from Sitzmann & Ely's (2011) comprehensive review of self-regulation theories. Brief definitions are available at http://iapsych.com/MACM/srlfdefs.pdf]

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

Learning-related conative constructs

Learning-related affective constructs

More proximal — Relative degree of influence on learning — More distal

Motivation

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?

Achievement Orientations
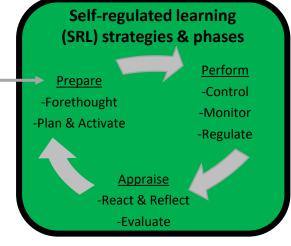-Intrinsic Motivation
-Academic Goal Orientation
-Academic Motivation
-Academic Goal Setting

Interests and Task Values
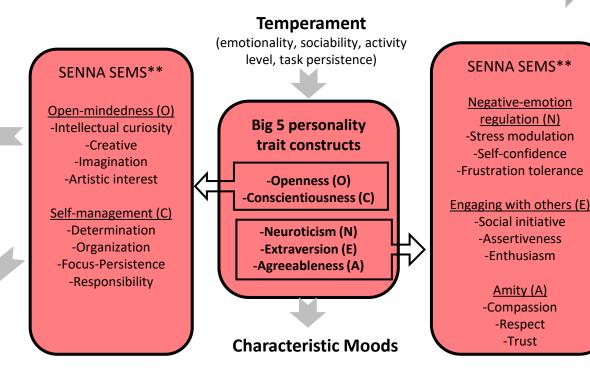-Need for Cognition
-Academic Interests
-Academic Values

Is this activity of interest to me?
Is this activity worth the effort?

Self-Beliefs
-Locus of Control (control)
-Academic Ability Conception (control)
-Academic Self-Efficacy (competence)
-Academic Self-Concept (competence)

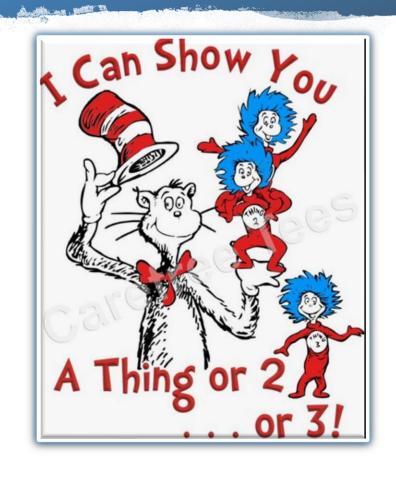*Can I be successful on this activity?*
Am I capable of doing this activity?
Can I control my success on this activity?

Temperament
(emotionality, sociability, activity level, task persistence)

SENNA SEMS**

Open-mindedness (O)
-Intellectual curiosity
-Creative
-Imagination
-Artistic interest

Self-management (C)
-Determination
-Organization
-Focus-Persistence
-Responsibility

Big 5 personality trait constructs

-**Openness (O)**
-**Conscientiousness (C)**

-**Neuroticism (N)**
-**Extraversion (E)**
-**Agreeableness (A)**

SENNA SEMS**

Negative-emotion regulation (N)
-Stress modulation
-Self-confidence
-Frustration tolerance

Engaging with others (E)
-Social initiative
-Assertiveness
-Enthusiasm

Amity (A)
-Compassion
-Respect
-Trust

Characteristic Moods

Volition*

Self-regulated learning (SRL) strategies & 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?

Prepare
-Forethought
-Plan & Activate

Perform
-Control
-Monitor
-Regulate

Appraise
-React & Reflect
-Evaluate

-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?"

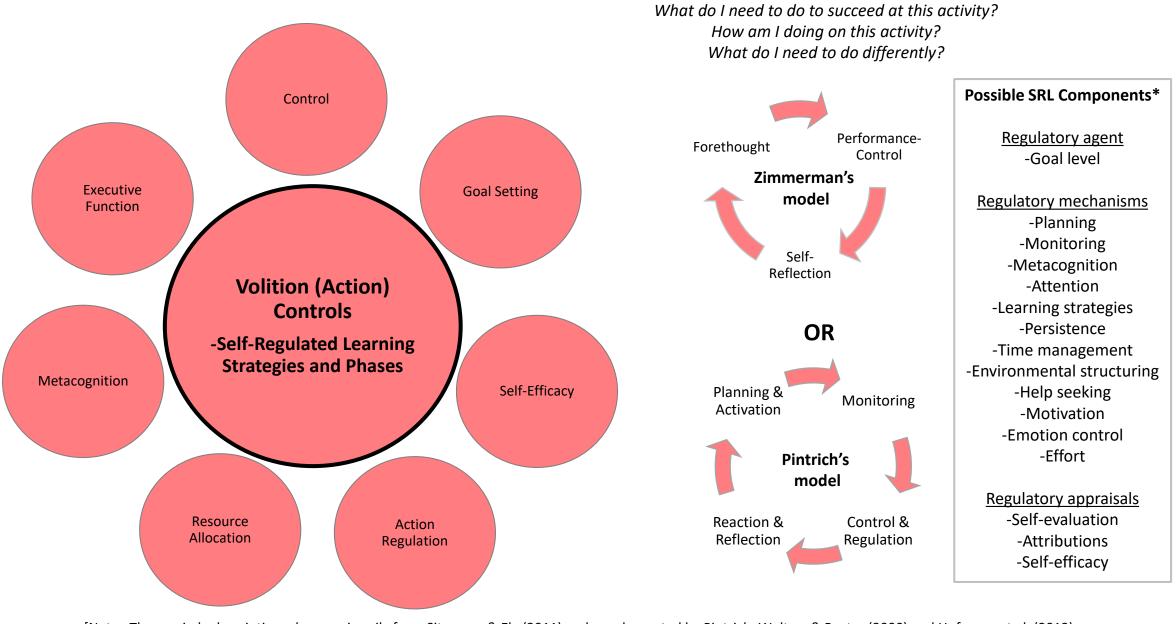"How am I doing on this activity?"

"What do I need to do different?"

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

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 & Phases

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?**).

Control

Executive Function

Goal Setting

Volition (Action) Controls

-Self-Regulated Learning Strategies and Phases

Self-Efficacy

Metacognition

Resource Allocation

Action Regulation

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?

Forethought

Performance-Control

Zimmerman's model

Self-Reflection

OR

Planning & Activation

Monitoring

Pintrich's model

Reaction & Reflection

Control & Regulation

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

[Note. Theory circle descriptions drawn primarily from Sitzmann & Ely (2011) and supplemented by Pintrich, Wolters & Baxter (2000) and Hofmann et al. (2012).
* Possible SRL components drawn from Sitzmann & Ely's (2011) comprehensive review of self-regulation theories. Brief definitions are available at http://iapsych.com/MACM/srlfdefs.pdf]

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 *

Departamento de Psicología Evolutiva y de la Educación, Facultad de Psicología, Universidad Autónoma de Madrid, Madrid, Spain

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

Relevant SRL theoretical research

Pintrich's Four Phase Model

Boekaerts Dual Processing 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?"

Jarvela & Hadwin Model

Winne & Hadwin Model

Efklides MASRL Model

Zimmerman's Cyclical Phases Model

Zimmerman's Cyclical Phases Model

FIGURE 3 | Current version Cyclical phases model. Adapted from Zimmerman and Moylan (2009).

Zimmerman's Cyclical Phases Model

CrossMark

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

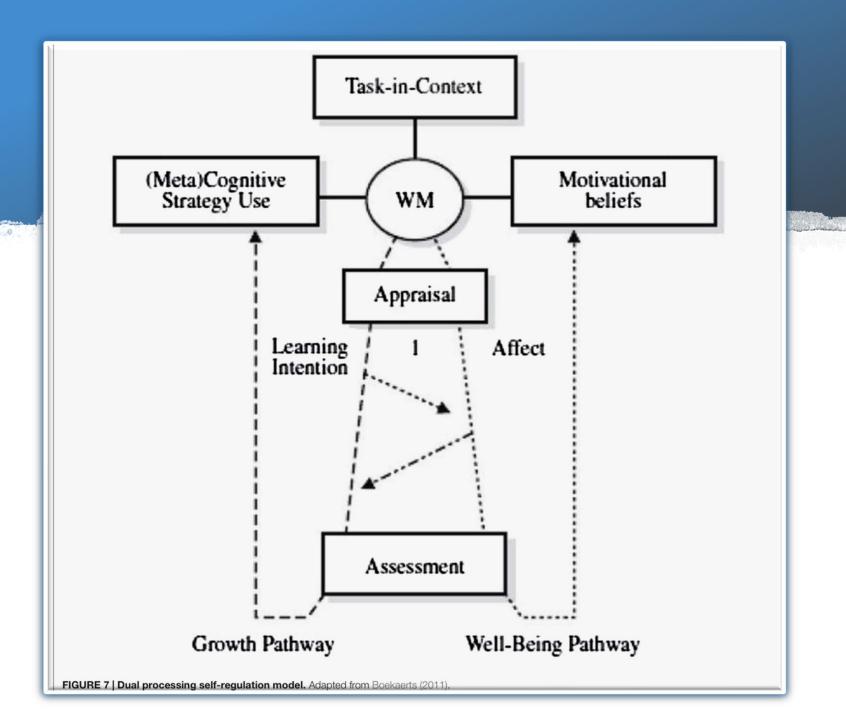Ernesto Panadero[1,2] · Jaclyn Broadbent[2] · David Boud[2,3,4] · Jason M. Lodge[5]
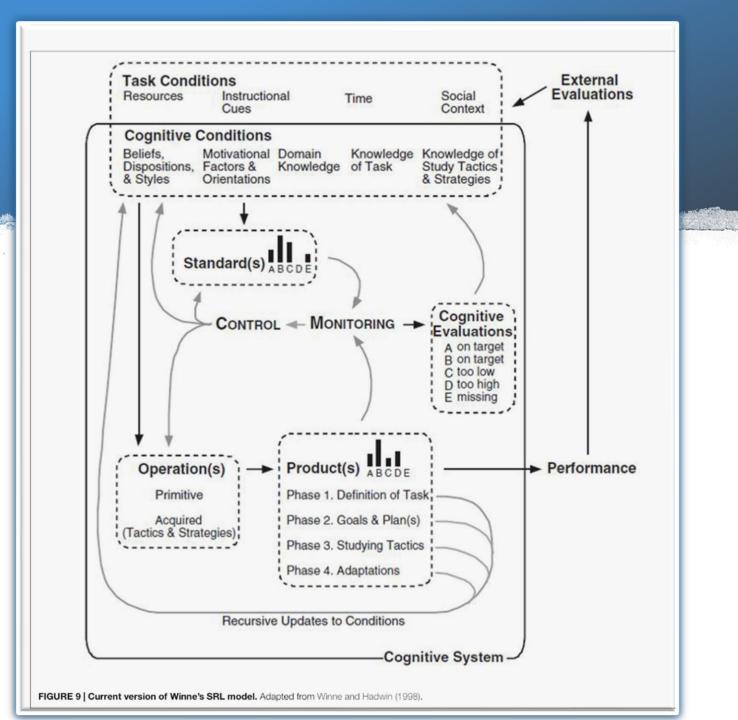
Performance Phase

3 **Self-observation**
Self-recording
Self-experimentation

4 **Self-control**
Imagery
Self-instructions
Attention focusing
Task strategies

Forethought Phase

1 **Task Analysis**
Goals and Objectives
Strategic Planning

2 **Self-Motivation**
Self-efficacy
Outcome expectations
Intrinsic interest/value
Learning goals orientation

Self-Reflection Phase

5 **Self-Judgement**
Self-evaluation
Causal attribution

6 **Self-Reaction**
Self-satisfaction/affect
Adaptive/defensive

1 Evaluative judgment influences how students set their goals based on their knowledge about assessment criteria, standards and quality.

2 Motivational beliefs are affected positively by evaluative judgment: more realistic goals, higher self-efficacy, etc.

3 Higher monitoring accuracy of the progress because of clearer learning goals and comparison to standards and quality.

4 More strategic use of learning strategies and motivational /emotional states.

5 Identification of needed actions to close the gap and more realistic causal attributions.

6 More emotionally and motivationally balance response to the self-evaluation results and higher motivation for future task performances.

Fig. 1 Effects of evaluative judgement on Zimmerman's model

Pintrich's Four Phase Model

TABLE 1 Phases and Areas for Self-Regulated Learning

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

Boekaerts Dual Processing Model

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

Winne & Hadwin Model

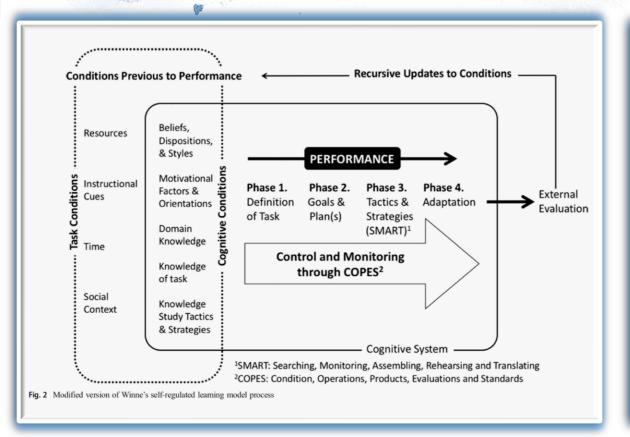FIGURE 9 | Current version of Winne's SRL model. Adapted from Winne and Hadwin (1998).
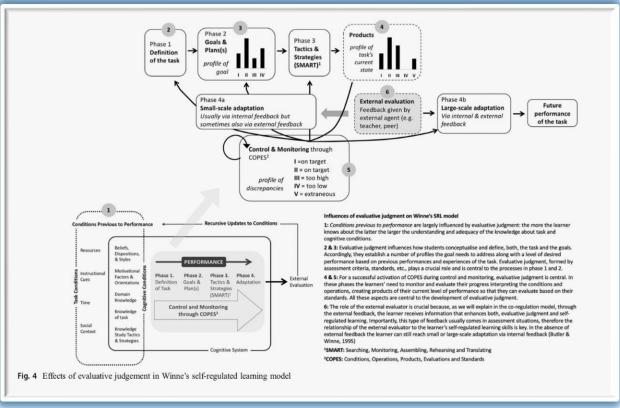
Winne & Hadwin Model

European Journal of Psychology of Education (2019) 34:535–557
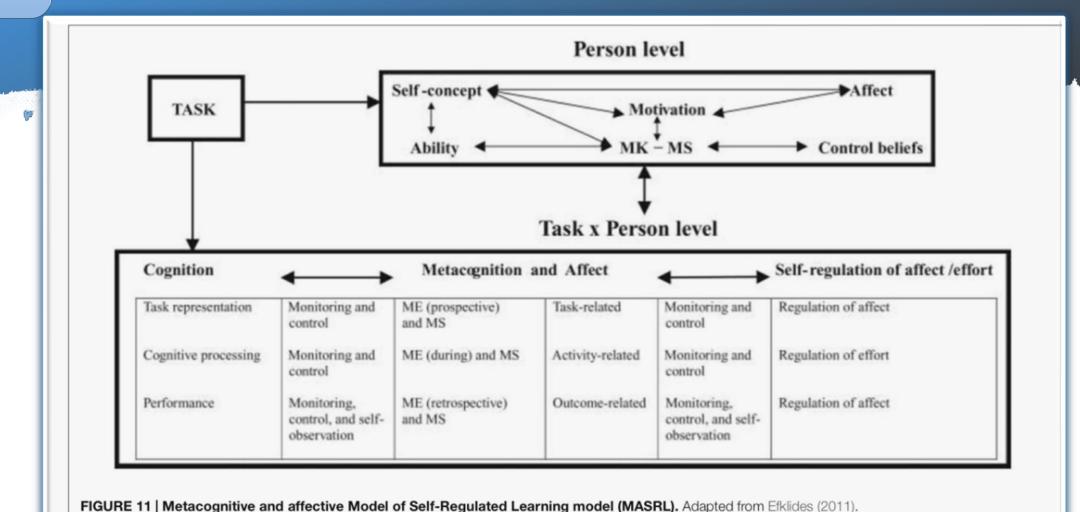https://doi.org/10.1007/s10212-018-0407-8

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

Ernesto Panadero [1,2] · Jaclyn Broadbent [2] · David Boud [2,3,4] · Jason M. Lodge [5]

Fig. 2 Modified version of Winne's self-regulated learning model process

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

Efklides MASRL Model

FIGURE 11 | Metacognitive and affective Model of Self-Regulated Learning model (MASRL). Adapted from Efklides (2011).

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).
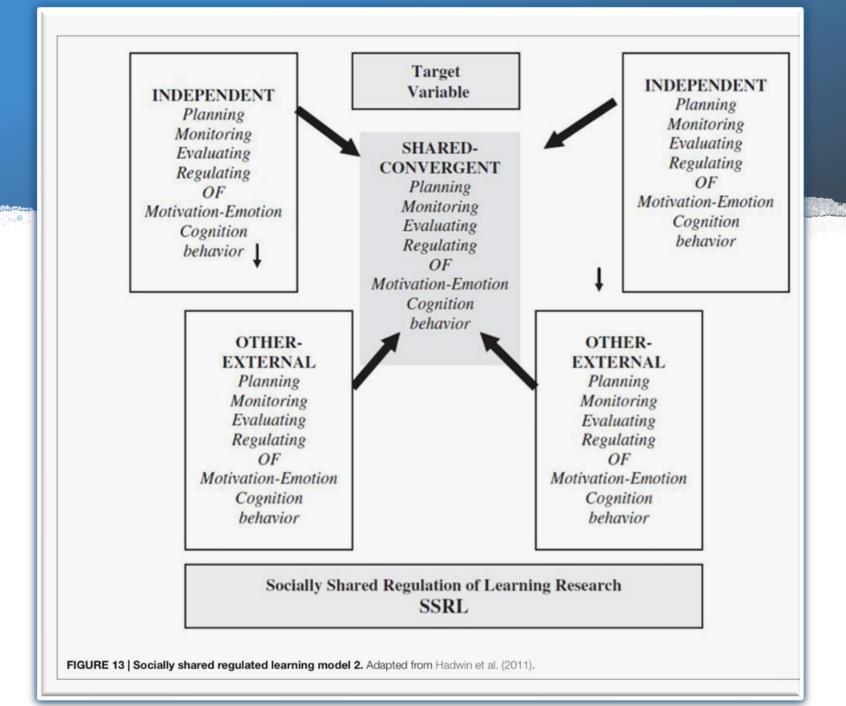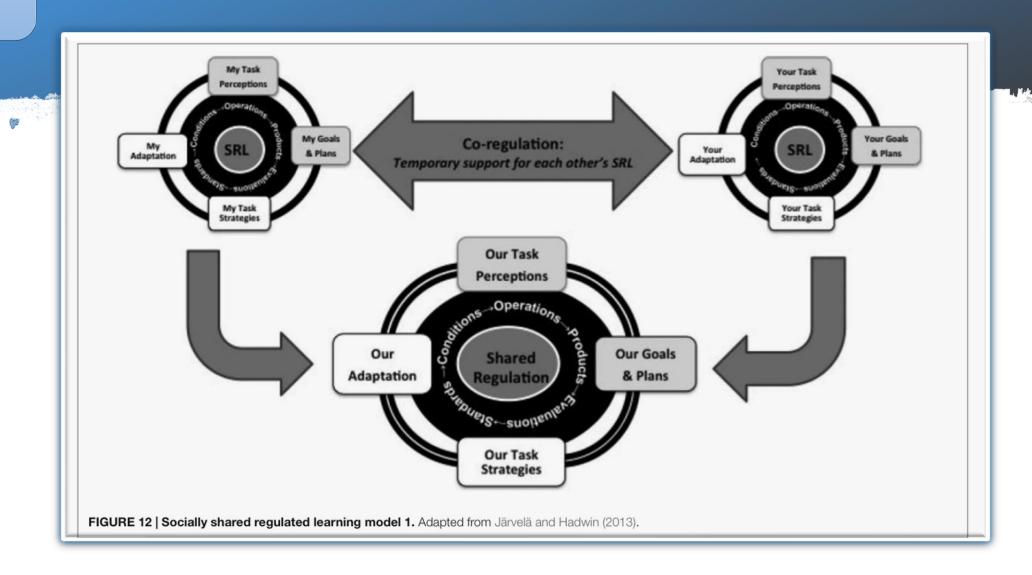
SRL Models: Frequency of Publication Citations

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

Model	Publication	Total citations	Citations year*
Boekaerts	Boekaerts and Corno, 2005	1011	84.25
Efklides	Efklides, 2011	251	41.83
Hadwin et al.	Hadwin et al., 2011	196	32.67
Pintrich	Pintrich, 2000	3416	200.94
Winne and Hadwin	Winne and Hadwin, 1998	1037	54.58
Zimmerman	Zimmerman, 2000	4169	245.24

*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.*
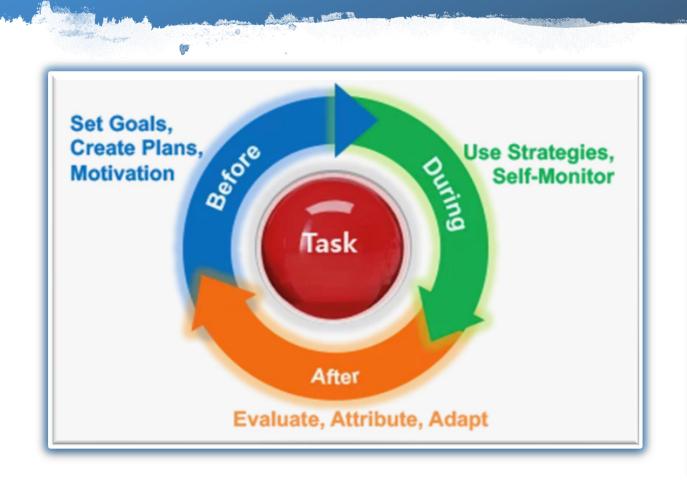
SRL Models: Common Phases
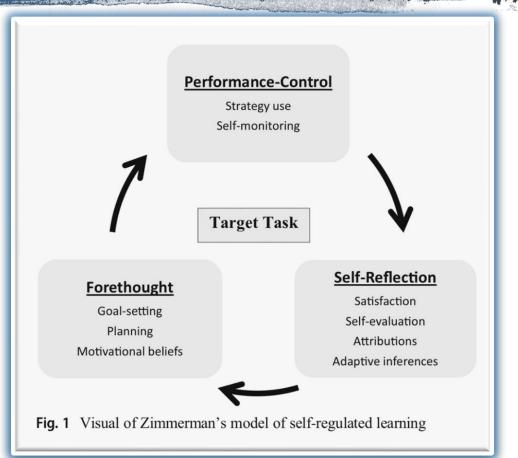
TABLE 2 | Models' phases.

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

*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

Set Goals, Create Plans, Motivation — **Before**

Use Strategies, Self-Monitor — **During**

Task

Evaluate, Attribute, Adapt — **After**

Performance-Control
Strategy use
Self-monitoring

Target Task

Self-Reflection
Satisfaction
Self-evaluation
Attributions
Adaptive inferences

Forethought
Goal-setting
Planning
Motivational beliefs

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).

Pintrich's Four Phase Model

TABLE 1 Phases and Areas for Self-Regulated Learning

Phases	Areas for regulation			
	Cognition	Motivation/affect	Behavior	Context
1. Forethought, planning, and activation	Target goal setting	Goal orientation adoption	[Time and effort planning]	[Perceptions of task]
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		Task value activation		
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			Self-observation of behavior	
3. Control	Selection and adaptation of cognitive strategies for learning, thinking	Selection and adaptation of strategies for managing motivation and affect	Increase/decrease effort	Change or renegotiate task
			Persist, give up	Change or leave context
			Help-seeking behavior	
4. Reaction and reflection	Cognitive judgments	Affective reactions	Choice behavior	Evaluation of task
	Attributions	Attributions		Evaluation of context

Pintrich's Four Phase SRL Model

Self – Regulated Learning Strategies & Phases

Planning & Activation

Monitoring Strategies

Control & Regulation Strategies

Reaction & Reflection 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 metacognitve 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

Planning & Activation

Monitoring Strategies

Control & Regulation Strategies

Reaction & Reflection Strategies

Pintrich's Four Phase SRL Model

Self – Regulated Learning Strategies & Phases

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

| Areas for self-direction	**Phases of self-direction**			
	Phase 1: Planning, forethought	Phase 2: Monitoring	Phase 3: Control	Phase 4: Reaction and Reflection
Cognition	Target goal setting. Prior content knowledge activation. Metacognitive knowledge activation.	Metacognitive awareness and monitoring of cognition.	Selection and adaptation of cognitive strategies for learning, thinking.	Cognitive judgments. Attributions.
Motivation/Affect	Goal orientation adoption. Efficacy judgments. Perceptions of task difficulty. Task value activation. Interest activation.	Awareness and monitoring of motivation and affect.	Selection and adaptation of strategies for managing, motivation, and affect.	Affective reactions. Attributions.
Behavior	Time and effort planning. Planning for self-observation of behavior.	Awareness and monitoring of effort, time use, need for help. Self-observation of behavior.	Increase/decrease effort. Persist, give up. Help-seeking behavior.	Choice behavior.
Context	Perceptions of task. Perceptions of context.	Monitoring changing task and context conditions.	Change or renegotiate task. Change or leave context.	Evaluation of task. Evaluation of context.
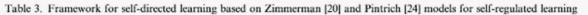
Planning & Activation

Reaction & Reflection Strategies

Monitoring Strategies

Control & Regulation Strategies
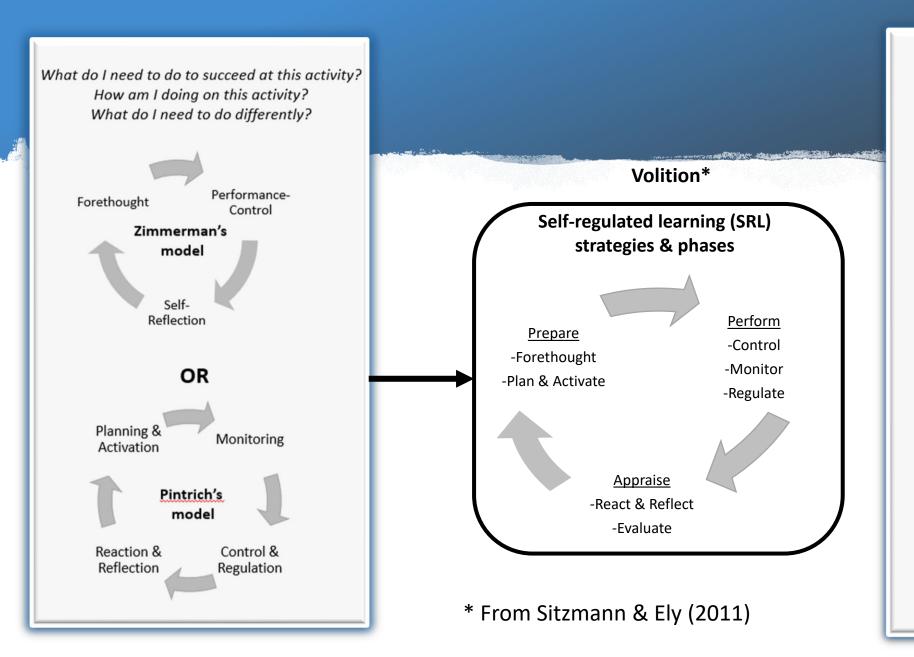
Combined Zimmerman and Pintrich SRL Model

Self – Regulated Learning Strategies & Phases

Table 3. Framework for self-directed learning based on Zimmerman [20] and Pintrich [24] models for self-regulated learning

Areas for self-direction	Phases of self-direction			
	Intention	Planning, forethought	Monitoring, control	Reflection, reaction
Cognition	Need recognition. Opportunity assessment. Choice of topic.	Task analysis. Goal-setting. Prior content knowledge activation. Metacognitive knowledge activation. Selection of strategies, resources, evaluations.	Metacognitive awareness. Monitoring of cognition. Self-recording. Self-observation. Judgments of learning. Adaptation of cognitions and strategies.	Knowledge of understanding and learning outcomes. Self-evaluations of performance and outcomes.
Motivation	Self-actualizing tendency. Desire for growth. Positive self view. Perceptions of choice, ownership, control. Intrinsic goal framing.	Goal orientations and internalization. Outcome expectations. Self-efficacy. Self-regulatory efficacy Perceptions of task difficulty, value. Task interest.	Awareness of self-efficacy, interests, anxieties. Positive self-talk. Anxiety control. Self-rewards. Adjustment of process based on motivations.	Efforts to enhance motivation. Attribution of achievement to motivations. Affective responses. Ownership, connection to outcomes.
Behavior	Choice to engage. Identification of a suitable learning environment. Allocation of learning time.	Time, effort planning to attain goals. Deadlines setting. Self-assessment planning.	Time and effort management and adjustment. Acquisition and use of resources. Adaptive help-seeking. Persisting, effort focusing.	Self-evaluation of efforts and actions. Attribution of outcomes to behaviors and actions.
Context	Choice of physical and social context. Flexibility to learn in different settings. Striving for cohesion between personal interests and social context.	Perceptions of context. Perceptions of assigned tasks, grading practices. Establishing social/ teaming interactions.	Monitoring and modification of context. Elimination of distractions. Negotiation of tasks and requirements. Managing social interactions.	Evaluation of task demands. Evaluations of contextual factors. Change of environment.

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

Volition*

Self-regulated learning (SRL) strategies & phases

Prepare
-Forethought
-Plan & Activate

Perform
-Control
-Monitor
-Regulate

Appraise
-React & Reflect
-Evaluate

* From Sitzmann & Ely (2011)

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?

Forethought

Performance-Control

Zimmerman's model

Self-Reflection

OR

Planning & Activation

Monitoring

Pintrich's model

Reaction & Reflection

Control & Regulation

SRL mechanisms suggested by Sitzmann & Ely's (2011) comprehensive research synthesis

Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin, 137*(3), 421.

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; Puustinen & 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), Corno (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 (interrater 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. Interrater 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 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.

**SRL:
Prepatory
Phase**

The metacognitive processes involved in **setting initial goals** and activating prior domain-relevant knowledge and task relevant strategies.

**SRL
Planning &
Activation**

Effective self-regulated students use **forethought** 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)

**SRL
Performance
Phase**

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 & Regulation Strategies

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)

**SRL
Appraisal
Phase**

The metacognitive processes in **self-judging and making causal attributions** to personal performance.

SRL Reaction & Reflection Strategies

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)

SRL Monitoring Strategies

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

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

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.
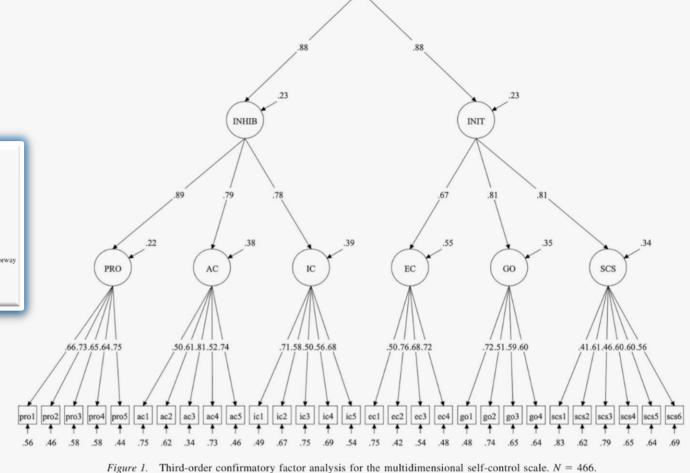[a] Reversed item. [b] Item in the BMSCS.

SRL Monitoring Strategies

The Multidimensional Self-Control Scale (MSCS):
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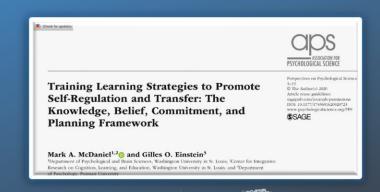Norwegian Armed Forces Joint Medical Services, Oslo, Norway

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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.

Self-Regulated Learning

Mark A. McDaniel[1,2] and Gilles O. Einstein[3]
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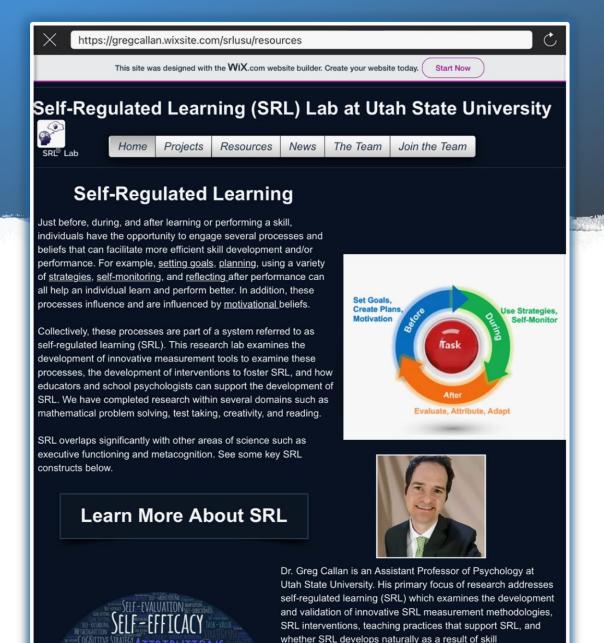of Psychology, Furman University

Table 1. Overview of the Ingredients Needed in a Comprehensive Intervention Designed to Train the Self-Regulated Use of Strategies

Intervention ingredient	Component	Effects
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	Knowledge	Helps students understand the strategy, the evidence behind its effectiveness, and how to apply the strategy to their educational demands
Demonstration: Concrete demonstration in which students experience the learning consequences (with explicit feedback) when they do and do not use the trained strategy	Belief/commitment	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
Utility-value intervention: Intervention in which learners think through the value of using the trained strategy	Commitment	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
Implementation intention: Procedure in which students form plans that force them to think through when, where, and how they will use the trained strategy	Planning	By associatively linking situational cues with strategy use, implementation intentions help learners follow through on their study plans

Self – Regulated Learning

Good resource

SRL: New, emerging or related research and theory: Interest self-regulation

Self – Regulated Learning

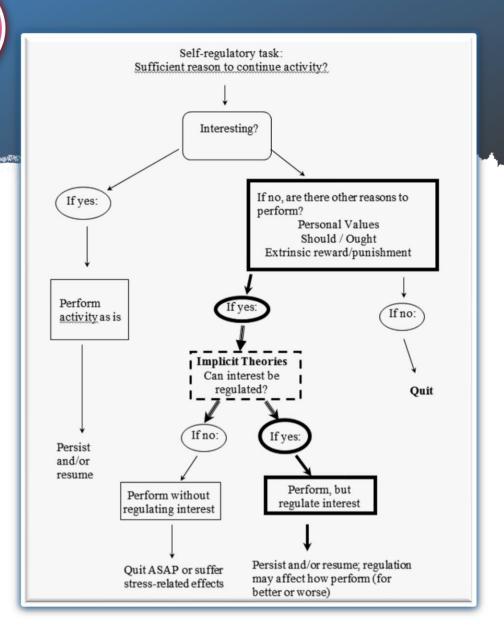## Implicit Theories of Interest Regulation

Dustin B. Thoman
San Diego State University

Carol Sansone
University of Utah

Jennifer A. Robinson
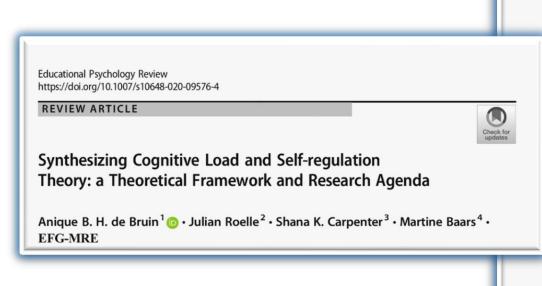Chaffey College

Jonathan L. Helm
San Diego State University

Beliefs that human qualities are malleable or fixed play important roles in motivation, personality, and development (Dweck, 1999; Dweck, Chiu, & 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, 1996; 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 (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.
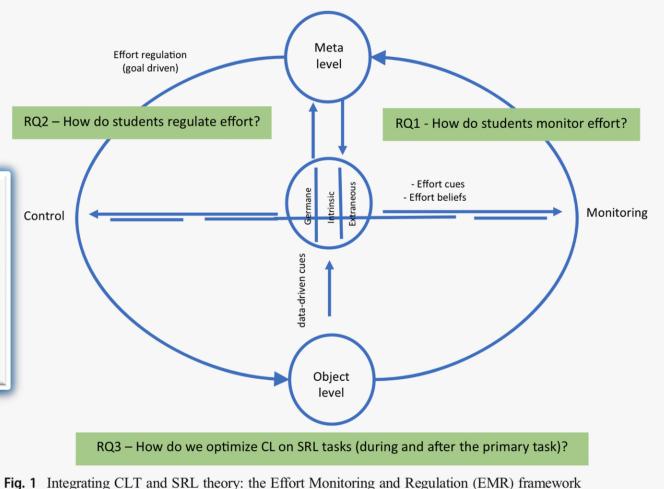
Keywords: interest, implicit theory, self-regulation, intrinsic motivation, metamotivation

Self-regulatory task:
Sufficient reason to continue activity?

Interesting?

If yes: — Perform activity as is — Persist and/or resume

If no, are there other reasons to perform?
Personal Values
Should / Ought
Extrinsic reward/punishment

If yes: — Implicit Theories: Can interest be regulated?

If no: Quit

If no: Perform without regulating interest — Quit ASAP or suffer stress-related effects

If yes: Perform, but regulate interest — Persist and/or resume; regulation may affect how perform (for better or worse)

SRL: New, emerging or related research and theory

Self – Regulated Learning

Educational Psychology Review
https://doi.org/10.1007/s10648-020-09576-4

REVIEW ARTICLE

Check for updates

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

Anique B. H. de Bruin[1] · Julian Roelle[2] · Shana K. Carpenter[3] · Martine Baars[4] ·
EFG-MRE

RQ2 – How do students regulate effort?

RQ1 - How do students monitor effort?

Effort regulation (goal driven)

Meta level

Control

Germane
Intrinsic
Extraneous

- Effort cues
- Effort beliefs

Monitoring

data-driven cues

Object level

RQ3 – How do we optimize CL on SRL tasks (during and after the primary task)?

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

SRL: New, emerging or related research and theory

Self – Regulated Learning

Self-Regulated Learning: The Continuous-Change Conceptual Framework and a Vision of New Paradigm, Technology System, and Pedagogical Support

Yeol Huh[1] and Charles M. Reigeluth[2]

SRL: New, emerging or related research and theory

Self – Regulated Learning

Huh and Reigeluth