Center for Excellence and Innovation in Teaching and Learning

Design Your Slides with Cognitively-supported Multimedia Principles

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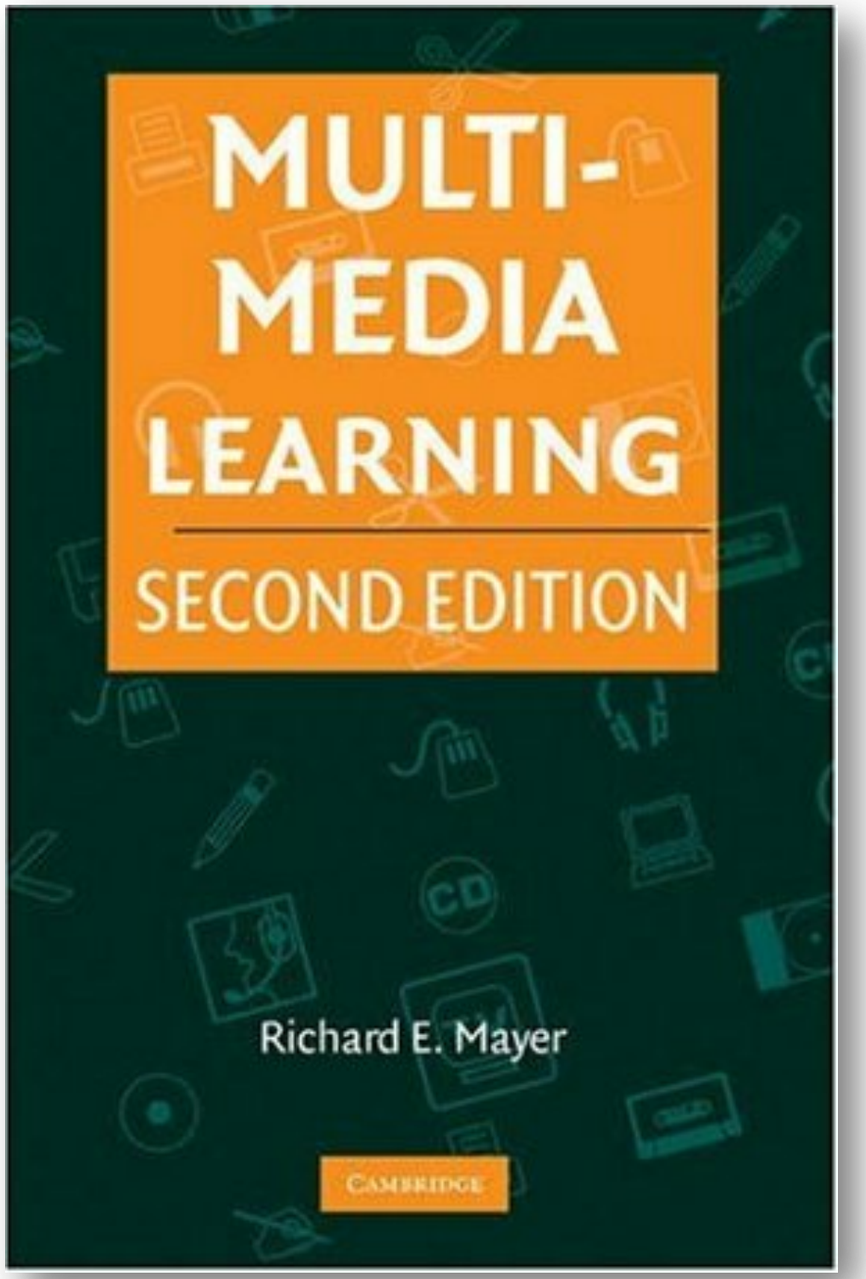
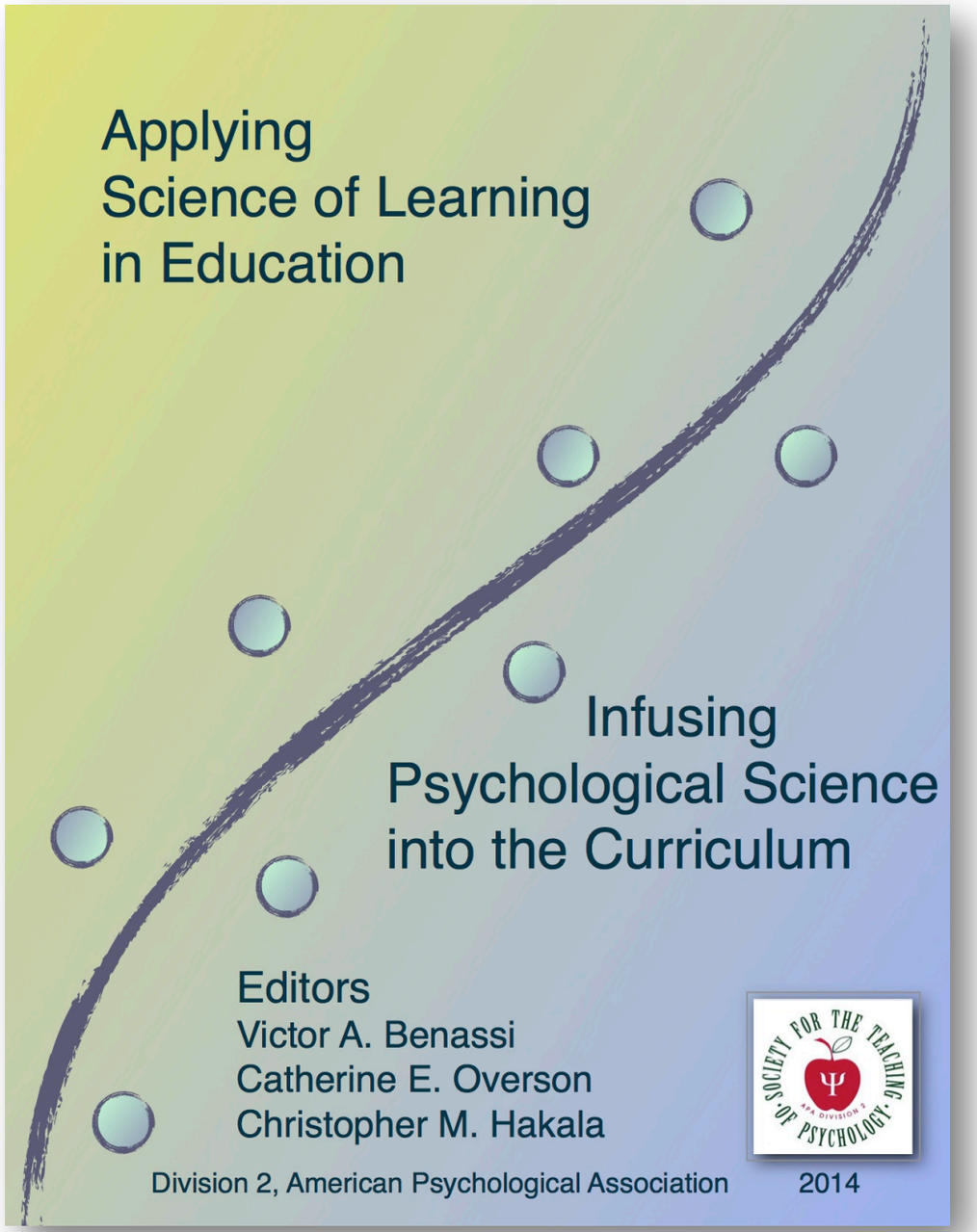
Resources





http://teachpsych.org/ebooks/asle2014/index.php

Cognitive Load Theory

- An instructional theory founded by John Sweller in the early 1980s
- The theory is based on a "cognitive architecture" within which we take in and process information (the cognitive processing load) in the limited capacity of our working memory

Cognitive Load

Extraneous Cognitive Load

- ✓Does not serve the instructional goal
- ✓Poor instructional design

Essential Cognitive Load

- ✓Represents essential material in working memory
- ✓Load depends on Complexity of material

Generative Cognitive Processing

- ✓Required for deep understanding of material (e.g., construction of schemas)
- ✓Good instructional design—increases student motivation to learn

Goals of Multimedia Instruction

Mayer, 2009; 2014

Minimize Extraneous Cognitive Load

- Information that does not serve the instructional goal

Manage Essential Cognitive Load

- Essential material in working memory

Foster Generative Cognitive Processing

- Aimed at making sense of essential material

Designing Your Slides

Choose a learning objective around something you want students to learn

Consider how you might present that material that meets the objective in a manner that bears in mind the Cognitive Load Theory of Multimedia Learing

Minimize Extraneous Load

Extraneous Cognitive Load

- ✓ Does not serve the instructional goal
- ✓ Poor instructional design

Table 2, Mayer, 2014 (page 62)

Principle	Description
Coherence	Delete extraneous material
Signaling	Highlight essential material
Redundancy	Don't add onscreen captions to narrated graphics
Spatial contiguity	Place printed words near corresponding part of graphic
Temporal contiguity	Present spoken words at same time as corresponding graphics

Manage Essential Load

Essential Cognitive Load

- ✓ Represents essential material in working memory
- ✓ Load depends on Complexity of material

Table 3, Mayer, 2014 (page 64)

Principle	Description
Segmenting	Break lesson into learner-paced parts
Pre-training	Present characteristics of key concepts before lesson
Modality	Use spoken words rather than printed words

Foster Generative Processing

Generative Cognitive Processing

- ✓ Required for deep understanding of material (e.g., construction of schemas)
- ✓ Good instructional design—increases student motivation to learn

Mayer, 2010

Principle	Description
Multimedia	Use both words and pictures to present key concepts
Personalization	Put words into conversational style rather than formal style
Image	Do not necessarily put an image of agent on the screen
Embodiment	Have onscreen agent use human-like gestures and movements

Personalization Principle

"People learn better from multimedia presentations when words are in conversational style rather than formal style."

Mayer, page 242

Learning Objective

Students will be able to describe how behavior can affect attitudes.

Attitude Change Can Follow Behavior

- **People** hold many cognitions (for example: beliefs, feelings, behavior) about **themselves** and the world around

- **People** expect cognitions to be in harmony with one another – that is, that attitudes and behaviors are consistent/compatible

- Sometimes **people** behave in ways that are inconsistent with **their** attitudes. These conflicting cognitions produce an unpleasant psychological state – cognitive dissonance – that **people** strive to reduce

- Because **people** cannot change past behavior, one way to reduce the dissonance is by changing **their** attitudes so that **they** are more in line with **their** behavior

MODIFIED MULTIMEDIA PRINCIPLE

Attitude Change by Our Own Behavior

- **We** hold many cognitions (for example: beliefs, feelings, and **our** behavior) about **ourselves** and the world around **us**

- **We** expect **our** cognitions to be in harmony with one another – that is, **we** expect that our attitudes and **our** behaviors are consistent/compatible

- Sometimes **we** behave in ways that are inconsistent with **our** attitudes. These conflicting cognitions produce an unpleasant psychological state – cognitive dissonance – that **we** strive to reduce

- Because **we** cannot change **our** past behavior, one way to reduce the dissonance is by changing **our** attitudes so that they are more in line with **our** behavior

Pulling the Principles Together

Coherence
Signaling
Redundancy
Spatial/Temporal Contiguity
Segmenting
Pre-training
Modality
Multimedia
Personalization

Attitude Change Can Follow Behavior

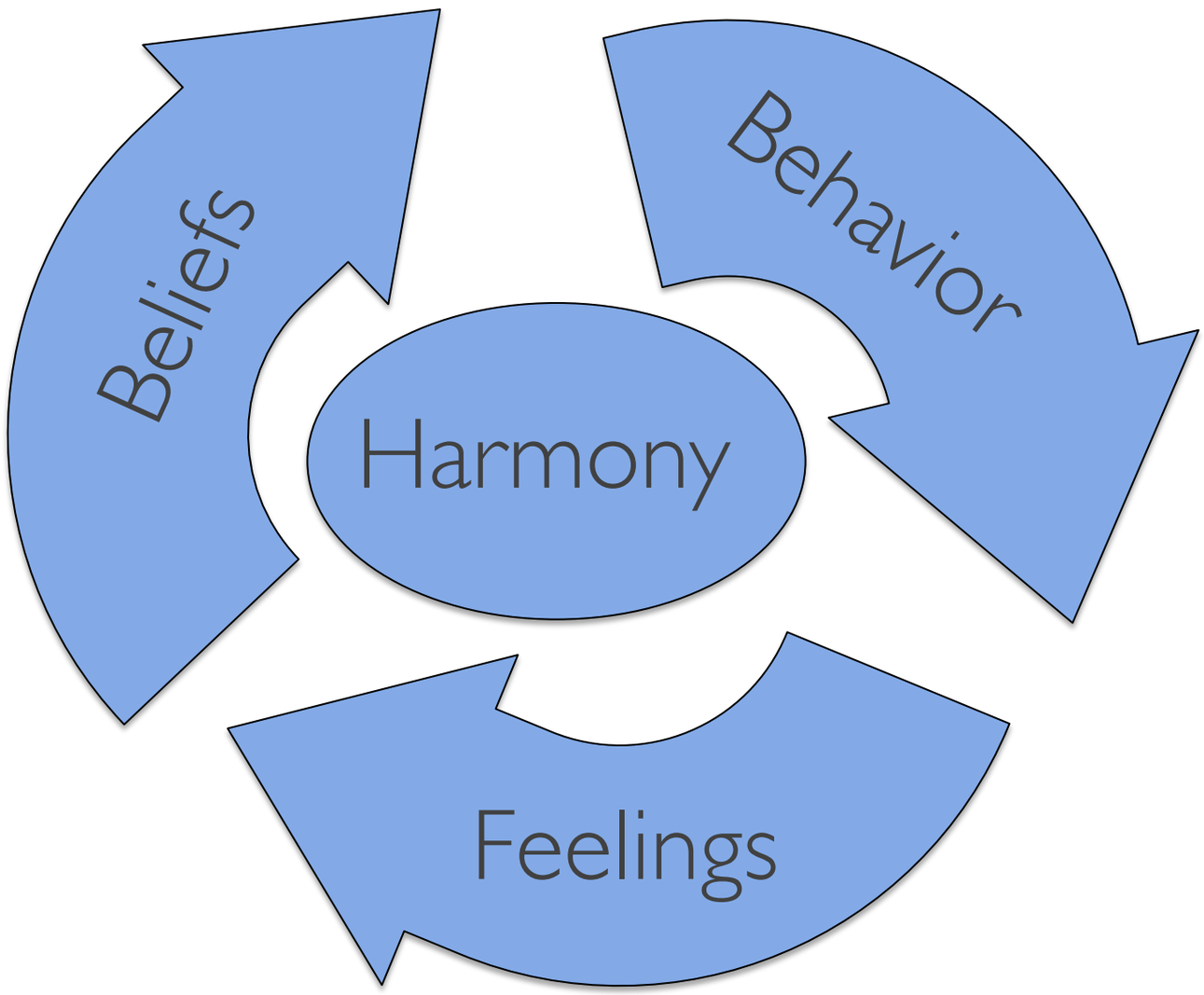
People hold many cognitions (for example: beliefs, feelings, behavior) about **themselves** and the world around

People expect cognitions to be in harmony with one another – that is, that attitudes and behaviors are consistent/compatible

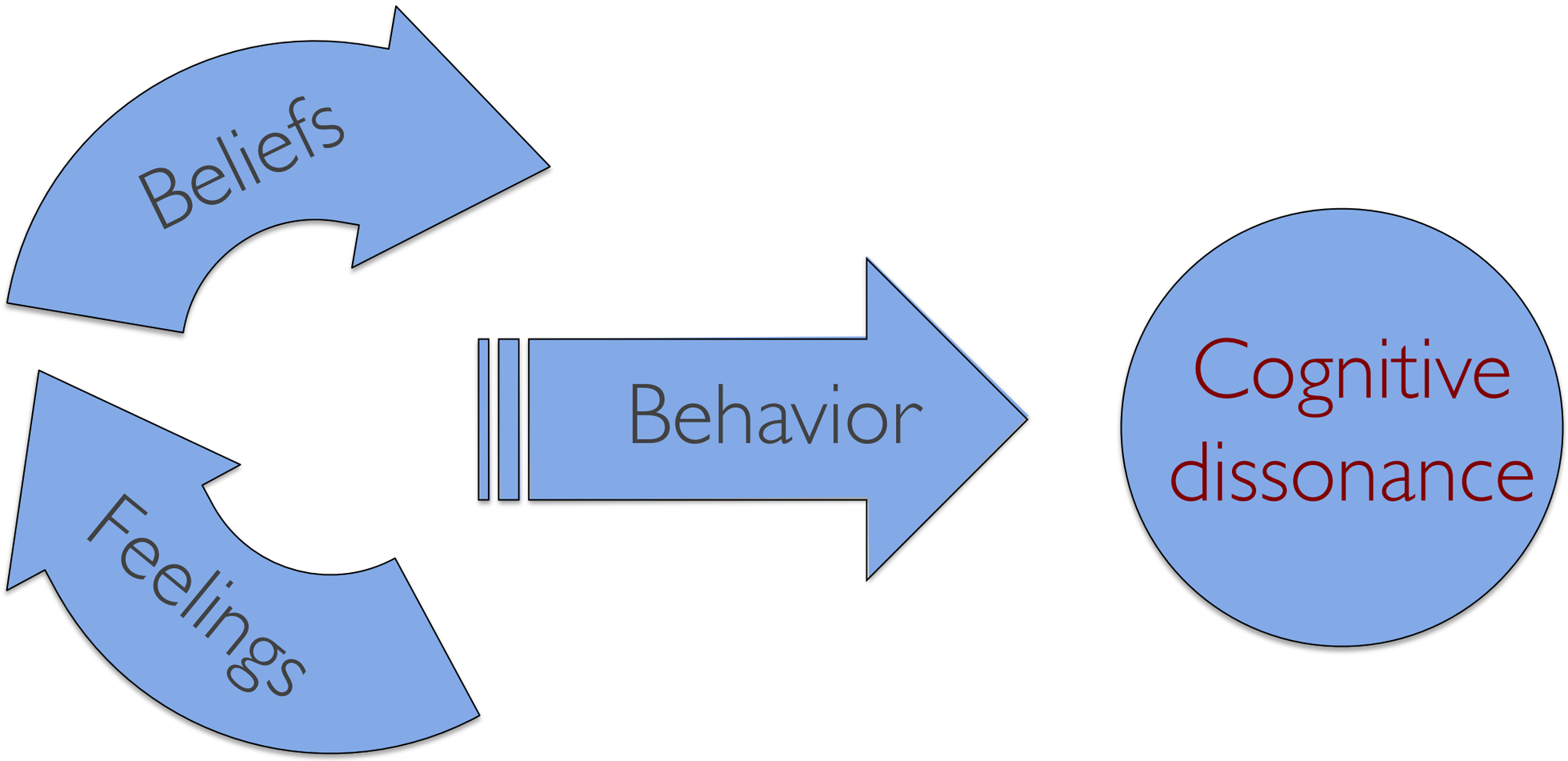
Sometimes **people** behave in ways that are inconsistent with **their** attitudes. These conflicting cognitions produce an unpleasant psychological state – cognitive dissonance – that **people** strive to reduce

Because **people** cannot change past behavior, one way to reduce the dissonance is by changing **their** attitudes so that **they** are more in line with **their** behavior

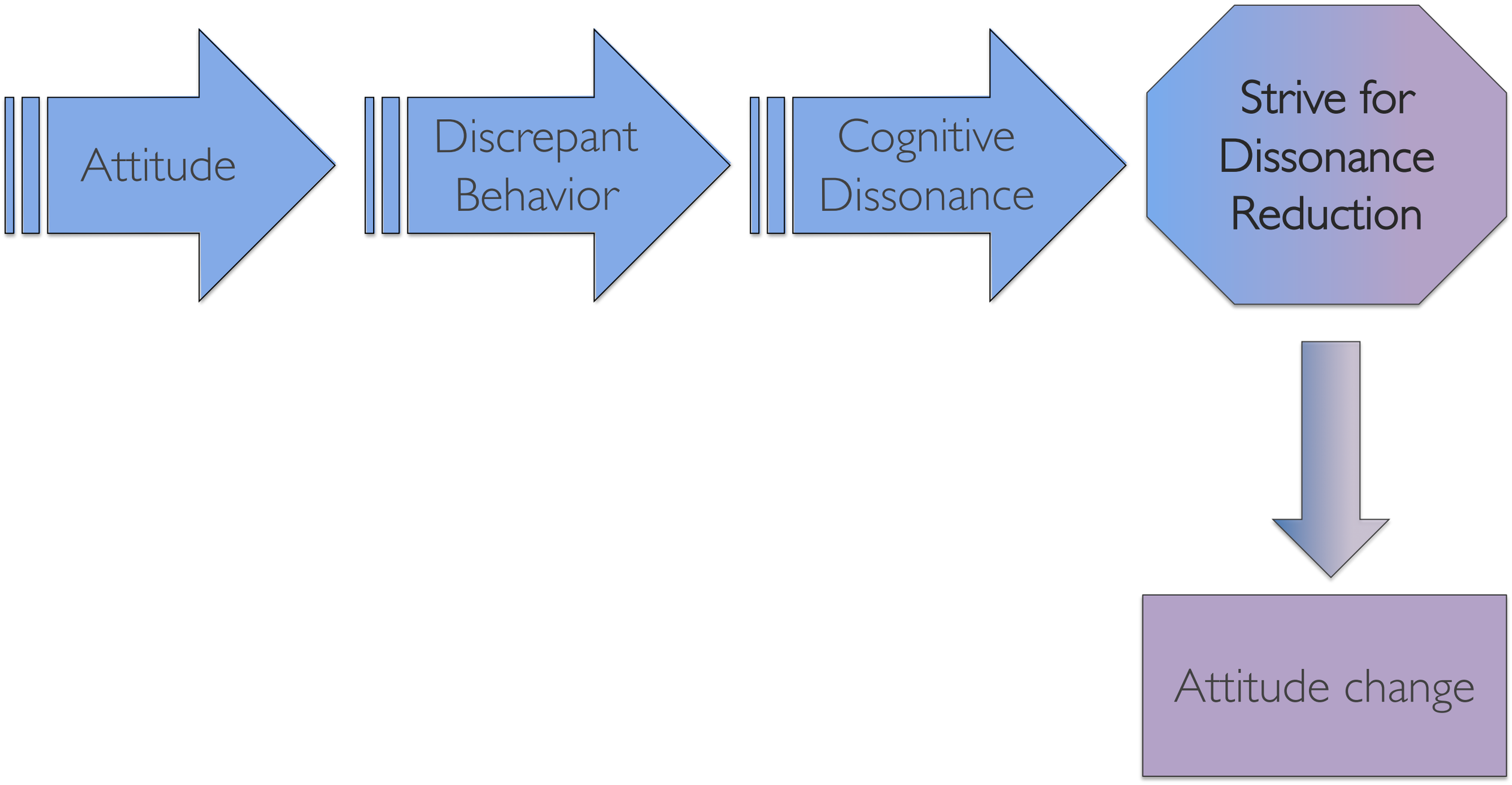
Attitude Change by Our Own Behavior



Attitude Change by Our Own Behavior



Attitude Change by Our Own Behavior



Educational Implications

- Boundary Conditions
  - ➢Background knowledge
  - ➢Novice learners
  - ➢Second language learners
  - ➢Complex
  - ➢Fast Paced
- Individual Difference
  - ➢Ability
  - ➢Need to belong (personalization)