

Applying the Multimedia Principle to Classroom Slide Presentations Positively Affects Student Learning



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Background:

Students learn more and are better able to apply what they have learned with words and pictures than with words alone (Mayer, 2010). Multimedia learning is the conceptual understanding that students develop from both words and pictures. Multimedia instruction, based on the science of learning, deals with effective and efficient ways of promoting multimedia learning through the successful application of multimedia principles.

Multimedia instructional materials are being used with increasing frequency in educational settings. Much of what we know about the learning benefits associated with the application of multimedia principles comes to us through a body of systematic, controlled, and well-documented laboratory experiments in which students were provided brief lessons (e.g., Harp & Mayer, 1997, 1998; Jamet & Le Bohec, 2007). These evidence-based accounts document that people learn more and are better able to apply what they have learned when they are instructed with both words and pictures than with words alone (Mayer, 2010).

We assessed whether the learning benefits associated with Mayer's (2010) Multimedia principle generalized to an authentic classroom setting, using course-related materials.

Prediction:

We predict that, consistent with prior research, there will be an immediate learning benefit for undergraduate students related to course material on slides that were modified using the Multimedia principles compared to course material using words alone.

Participants:

Students enrolled in an Introduction to Psychology course participated in this study for which they received course participation points toward completion of module requirements (viewing slides, then taking a quiz).

Procedure:

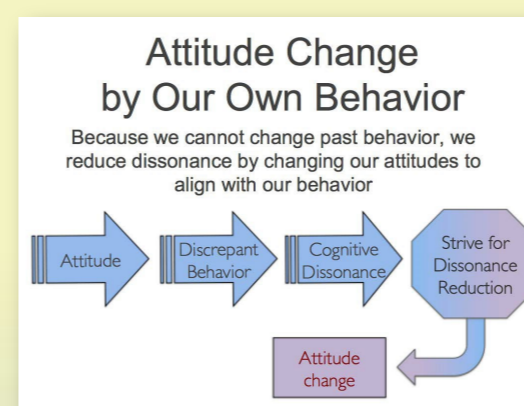
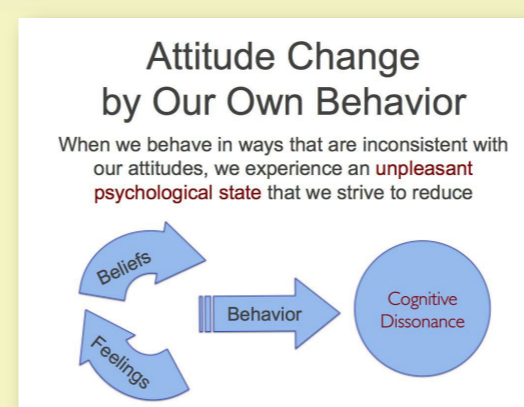
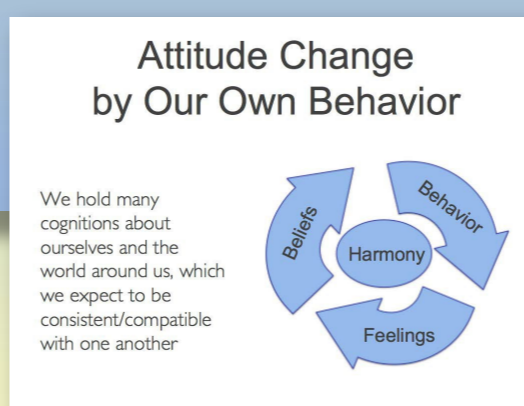
- We randomly assigned students, through *Blackboard*, into one of two groups at the beginning of the semester.
- Prior to in-class chapter presentation, students accessed and completed a learning module (comprising two sets of slides, each with a quiz), accompanying each of the first 3 introductory psychology textbook chapters.
- Randomized groups then viewed slides in either the *Word* condition or the *Multimedia* condition. Students who viewed the *Word* slides for the first set of slides, viewed the *Multimedia* slides for the second set; students who viewed the *Multimedia* slides for the first set of slides, viewed the *Word* slides for the second set (see example of conditions, left).
- Immediately after viewing a slide presentation, students took a quiz, also on *Blackboard*. In total, students viewed six sets of slides and took six quizzes.

Word
Condition

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

Multimedia
Condition

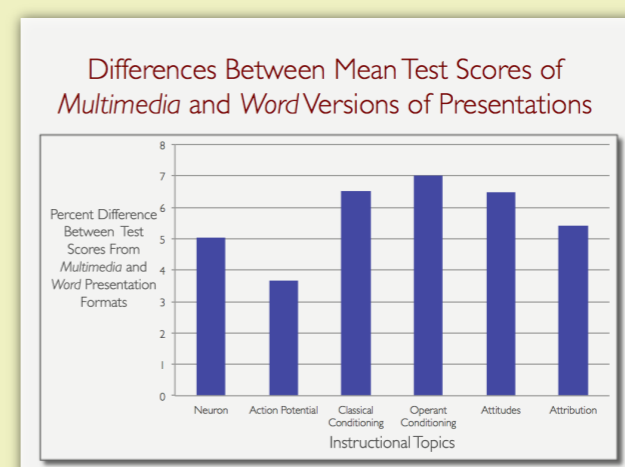


Presentation	Condition	N	M	s	Between Subjects t	df	Sig 1-tail	CI 95%		Cohen's d	Effect Size r
								Lower	Upper		
Neuron	MM	61	61.48	17.21	1.64	118	.05	-11.11	1.04	.30	.15
	Word	59	56.44	16.38							
Action Potential	MM	52	50.38	22.75	-.85	108	.20	-12.77	4.86	.16	.08
	Word	58	46.72	22.73							
Classical Conditioning	MM	63	53.33	19.43	2.01	127	.02	-12.91	-.11	.35	.17
	Word	66	46.82	17.29							
Operant Conditioning	MM	65	70.77	18.14	-1.96	127	.03	-14.10	.06	.35	.17
	Word	64	63.75	22.29							
Attitudes	MM	60	50.83	20.61	-1.75	120	.04	-13.81	.85	.32	.16
	Word	62	44.35	20.30							
Attribution	MM	60	48.00	18.94	-1.53	116	.06	-12.41	1.58	.28	.14
	Word	58	42.59	19.43							

Results:

- All mean quiz scores were in favor of the Multimedia Principle prepared slides (see table, above).
- Students who viewed the *Multimedia* slides performed better than students who viewed the *Word* slides, with 4 out of 6 module comparisons reaching significance ($p < .05$, 1-tailed).
- Percent difference between test scores of the *Multimedia* and *Word* presentations ranged from 3.6% to 7% (see graph at right).

Designing slides that are consistent with the principles of multimedia learning can produce learning gains in authentic classroom settings using course-related materials. The introductory psychology course provided an ideal setting to demonstrate the powerful effects of the Multimedia principle on a variety of topics: neuroscience, learning, and social psychology. Applying the science of learning in the form of Mayer's Multimedia principle to slides is an effective and efficient way to promote learning.



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