


**NINTH GRADERS' MOTIVATION FOR PHYSICAL ACTIVITY AND ENERGY BALANCE KNOWLEDGE**

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**Rationale**

- ▣ Positive energy imbalance leads to weight increase (Katz, 2011).
- ▣ It is important to learn knowledge and behaviors related to energy-balanced living (Camoos, Oliveira, & Lopes, 2011).
- ▣ Motivation to learn energy balance knowledge and adopt energy-balanced behavior is crucial.

**The Expectancy-Value Theory**  
(Eccles & Wigfield, 1995; Xiang et al., 2003)

*Expectancy belief*: Perception of success

*Task values*: Reasons for doing/not doing an activity

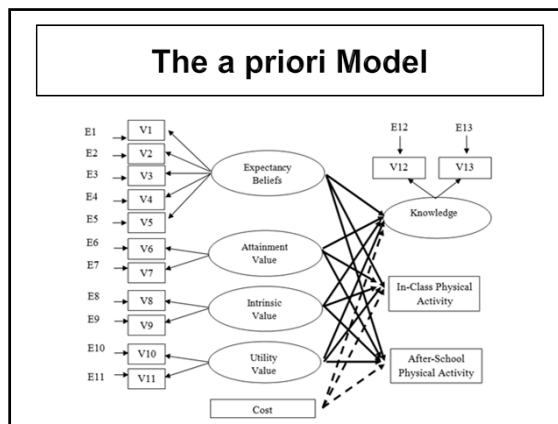
- Attainment: Perception of importance
- Intrinsic: Perception of interestingness
- Utility: Perception of usefulness
- Cost: Expense or negative consequences of doing an activity

**Literature Review**

- ▣ EBs and TVs are strong motivators in PE (Chen et al., 2012)
- ▣ Intrinsic value and attainment value - Intention for future running (Xiang et al., 2004)
- ▣ EB - PACER performance; EB and intrinsic value - engagement and perceived satisfaction (Gao, 2008)
- ▣ EBs or TVs ≠ fitness knowledge and skill gains (Zhu & Chen, 2010)
- ▣ Attainment - fitness knowledge; moderated by PA (Chen & Chen, 2010)

**Literature Review**

- ▣ Cost derives from multiple sources (Chen & Liu, 2009; Xiang et al., 2006)
- ▣ Cost undermines intrinsic value (Chen & Liu, 2009)



## Research Question

To what extent do expectancy-value constructs influence EB knowledge, in-class and after-school physical activity?

## Research Hypotheses

- ▣ EBs, attainment, intrinsic, and utility values would positively predict energy balance knowledge and physical activity.
- ▣ Cost, as a de-motivator, would undermine energy balance knowledge and physical activity.

## Method - Research Setting

- ▣ Two high schools in a southeastern U.S. state
  - race/ethnicity (~ 40% Caucasian)
  - eligibility ratio for free/reduced lunch (~ 40%)
  - school size (> 1,400)
  - pupil/teacher ratio (~15:1)
- ▣ Certified teachers (7-28yrs experiences)
- ▣ Healthful-living course:
  - Multi-activity PE curriculum
  - Lecture-based health classes

## Method – The Sample

- ▣ 195 9<sup>th</sup> Graders (Male: n = 80; Female: n = 115)
- ▣ 12 Classes
- ▣ Reason for choosing 9<sup>th</sup> grade:
  - Last year of mandatory PE in the state
  - No PE beyond this point for a majority of students
  - Important to understand their motivation, knowledge competence, and physical activity level
- ▣ IRB and district approved

## Method – Measurements

- ▣ EV motivation (EVQ, Zhu et al., 2012)
  - 11 items on 5-point scale
  - 2 open-ended items (quantified into 0-2: Expert Panel)
- ▣ In-class PA (ActiGraph GT3X, Shalimar, FL)
  - VM counts/min
- ▣ After-school PA (3DPAR, Weston et al., 1997)
  - Minutes of MVPA (2011 Compendium of PAs, Ainsworth, 2011)
- ▣ Energy balance knowledge (Concept mapping, McClure et al., 1999; Novak, 2005)
  - 0-3: level of knowledge (Expert Panel)

## Scoring Rubric Cost Responses

*Parameters to Consider in Scoring Cost Perceptions in PE:*

(a) Number of costs and degree of cost reported on Item 12 and 13 of the Questionnaire:

- 0, [0-1 cost & lower degree perception = Lower cost]
- 1, [2 cost & lower degree perception = Moderate cost]
- 2, [1 = costs & higher degree perception = Higher cost]

(b) Scores of EBTV Motivation

- 0, [ > 4.0 = Lower cost]
- 1, [3.0-4.0 = Moderate cost]
- 2, [ < 3.0 = Higher cost]

(c) Intention for future enrollment with PE on Item 13 of the Questionnaire

- 0, [Positive intention = lower cost]
- 1, [“It depends” = Moderate cost]
- 2, [Negative intention = Higher cost]

Assign scores to each reference parameter individually and then average the coded scores. For instance, Senlin coded “2” for (a), “1” for (b), and “2” for (c), the final code is (2+1+2)/3=1.67.

0 No Cost  
1 Moderate Cost  
2 High Cost

*Note:* Range of scale: 0 – 2

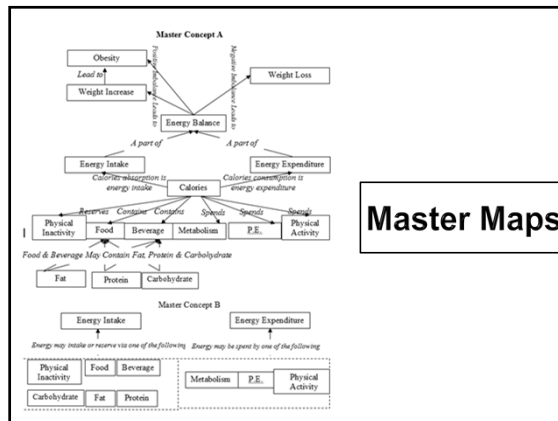
Intra-rater  
reliability for  
“Cost in PE”:  
 $r = .94$

### Core Concepts for Energy Balance

*The Energy-Balance Concepts for Concept-Mapping*

Concepts			
Energy Balance	Energy Intake	Energy Expenditure	Food
Beverage	Obesity	Weight increase	Weight Loss
Fat	P.E.	Physical Activity	Metabolism
Carbohydrate	Protein		

*Note:* Concepts extracted from Chapter 8 of Friedman et al. (2009).



**Master Maps**

### Scoring Rubric Concept Maps

<b>Scientifically Correct Concept Cluster</b> (Write down the concepts in the right place)	0 Blank or no correct cluster 1 1-4 correct clusters 2 5-8 correct clusters 3 9+ correct clusters
<b>Scientifically Correct Concept Propositions</b> (Make and describe scientifically correct connections)	0 Blank or no correct connection 1 1-4 correct connections 2 5-8 correct connections 3 9+ correct connections

*Note:* Range of scale: 0-3

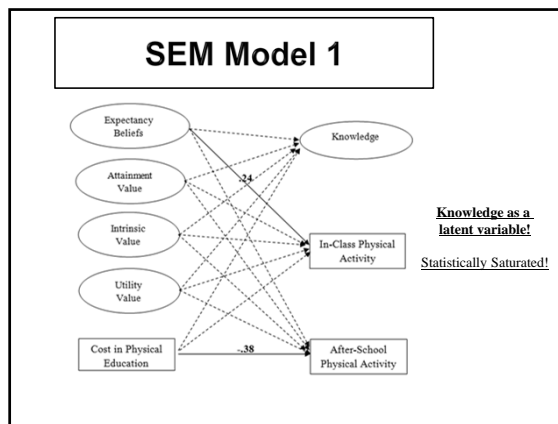
Intra-rater reliability for "Concept Clusters":  $r = .90$   
 Intra-rater reliability for "Concept Propositions":  $r = .90$

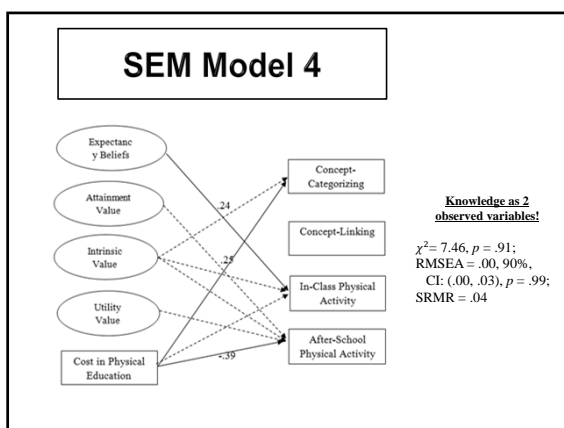
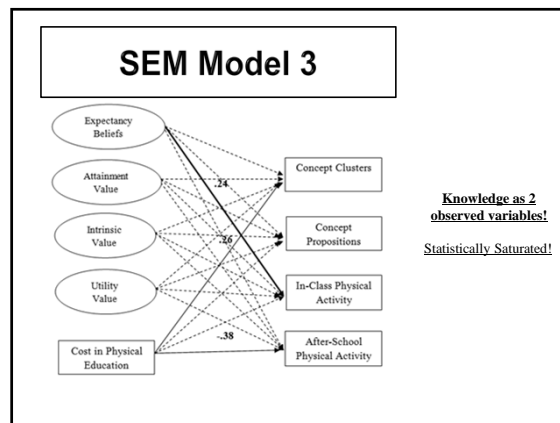
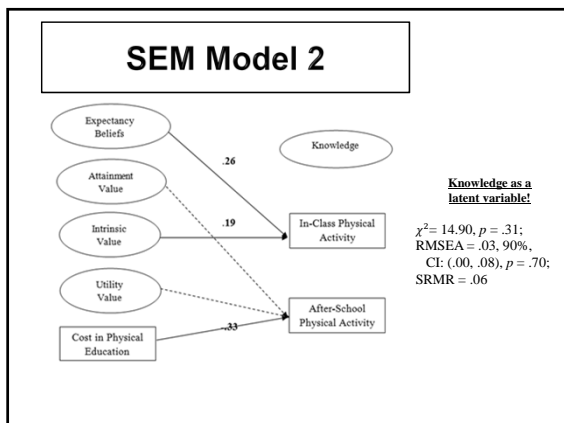
### Descriptive Results

Variables	N	M	SD	Range	Skewness	Kurtosis
Expectancy Beliefs	167	4.07	.70	1-5	-.62	-.41
Attainment Value	169	3.43	1.13	1-5	-.47	-.59
Intrinsic Value	171	3.67	1.07	1-5	-.51	-.45
Utility Value	170	3.58	1.01	1-5	-.37	-.45
Cost in PE	165	.67	.55	0-2	.64	-.42
Concept Clusters	173	2.35	.81	0-3	-1.13	.60
Concept Propositions	173	1.10	1.16	0-3	.46	-1.32
In-Class Physical Activity	190	1890	604	-	.98	.91
After-School Physical Activity	195	79.03	62.37	-	.71	-.05

*Note:* The unit of in-class physical activity is counts/minute; The unit for after-school physical activity is minite.

## 4 Competing SEM Models





### Taken Models Together

Path Origin	Path End	Model 1	Model 2	Model 3	Model 4
EB	IPA	.24**	.26**	.24**	.24**
IV	IPA	.19**	.19**	.26**	.25**
CPE	CC	-.38**	-.33**	-.38**	-.39**
CPE	APA	-.38**	-.33**	-.38**	-.39**

Note: EB = Expectancy beliefs; IV = Intrinsic value; CPE = Cost in PE; IPA = In-class physical activity; CC = Concept cluster; APA = After-school physical activity; \*  $p < .05$ ; \*\*  $p < .01$ .

- ### Overall Findings
1. Expectancy beliefs and intrinsic value positively predicted in-class physical activity
  2. Cost perceived in PE undermined after-school physical activity
  3. Cost perceived in PE positively predicted concept clusters

- ### Implications
- ❑ Create educational environments that could strengthen students' expectancy beliefs and intrinsic value as well as alleviates their negative perceptions/experiences for PA promotion.
  - ❑ Bridge the separation between PE and health content so that students could make sense of the essential healthful-living knowledge through their lived experiences (Moje et al., 2004)

## Thank You!

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