

# Childhood Obesity Prevention: What should we be doing?

**Tom Baranowski, PhD**

Professor of Pediatrics (Behavioral Nutrition & PA)

USDA/ARS Children's Nutrition Research Center

Baylor College of Medicine

Houston, Texas, 77030, USA

[www.bcm.edu/cnrc/faculty/?PMID=9519](http://www.bcm.edu/cnrc/faculty/?PMID=9519)



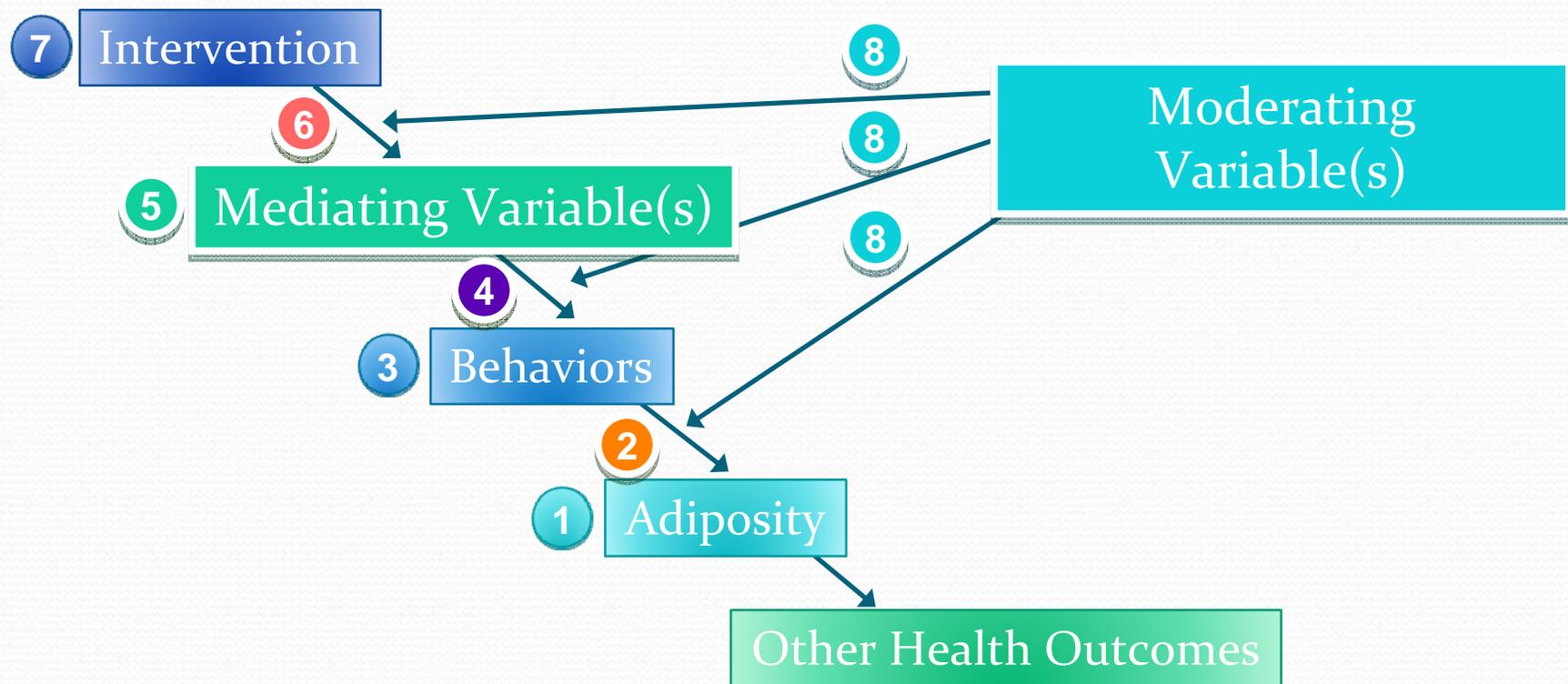
## Obesity Prevention Interventions (population based)

- Most are not working
- When work, very small changes
- Not clear what intervention components lead to change
  - Obesity prevention – children
    - (C Summerbell, et al, Cochrane Database Syst Rev, 2005 (3):CD001871)
  - Obesity prevention – adults
    - (VE Lemmens, et al, Obes Rev, Feb 19 2008)
  - Family based obesity prevention/PA promo
    - (TM O'Connor, et al, Am J Prev Med, submitted)

# Obesity Prevention Interventions (population based)

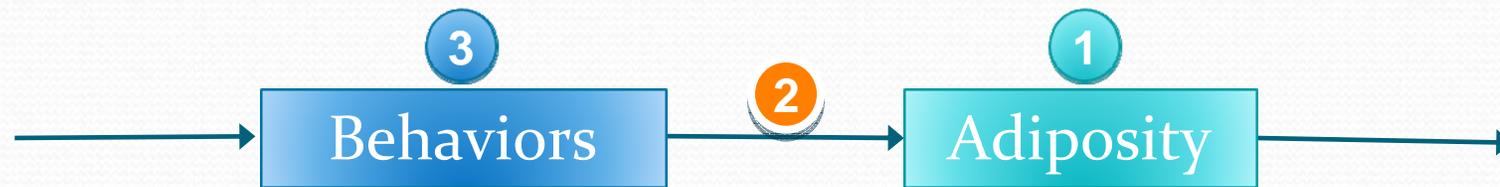
- Why are we in this situation?
- What should we be doing?

# Mediating-Moderating Variable Model (MMVM) Offers a Framework To Understand Why We Are Here

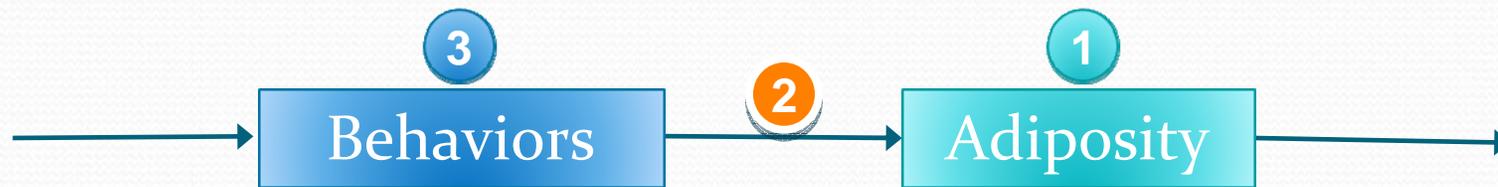


# Assumptions of the MMVM

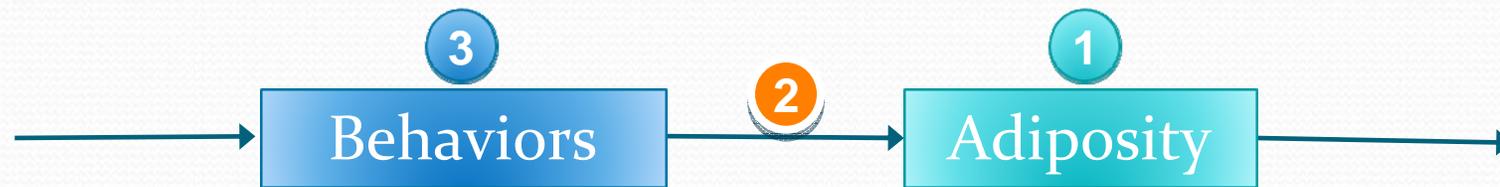
- Is pan-theoretical
- Interventions must be adequately implemented according to theory based protocol
- Interventions impact mediating variable(s)
  - Influences on behavior (personal, social, ecological, biological)
- Changes in mediating variables change behaviors
- Changes in behavior change adiposity
- Changes in adiposity change physiological outcomes
- Relationships are strong and causal
- Moderators: Variables accounting for differences



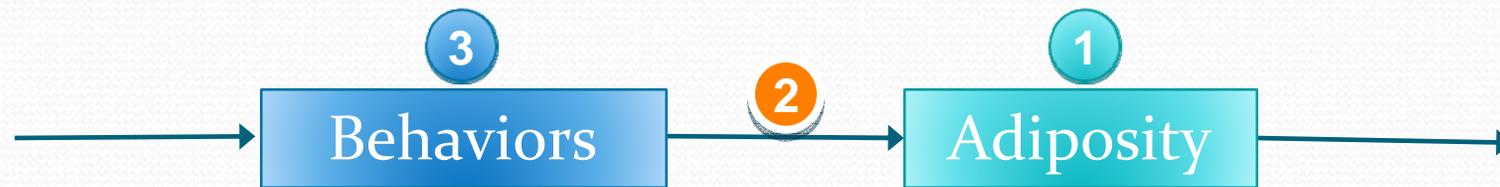
- 2a. What behaviors are most strongly and causally related to adiposity?
  - Targeted behaviors not related to adiposity, e.g. sweetened beverages
    - (C Bachman, et al, Nutr Rev, 2006;64:153-174)
  - Relationships of behaviors to adiposity change with age?
    - (R Jago, et al, Int J Obes, 2005;29(6):557-564)
  - Hard to find patterns over time
    - (T Nicklas, et al, Am J Prev Med, 2003;25(1):9-16)
    - (T Nicklas, et al, J Am Coll Nutr, 2001;20:599-608)
    - (T Nicklas, et al, J Am Diet Assoc, 2004;104:753-761)
    - (T Nicklas, et al, J Am Diet Assoc, 2004;104:1127-1140)



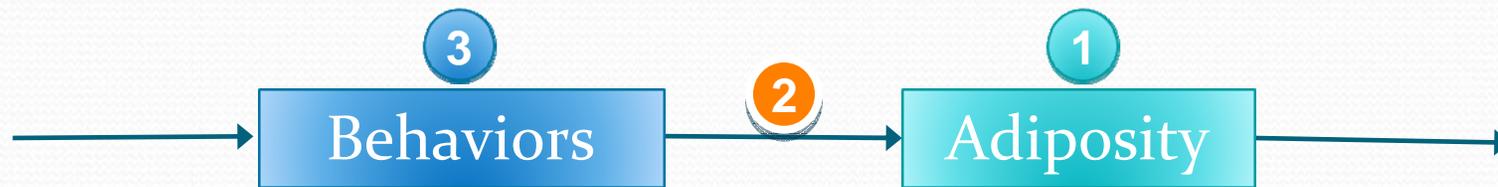
- Walter Willett questions:
  - Do FV protect against adiposity?
  - Should we encourage FV intake?
  - FJ promotes obesity?
  - Baked potatoes promote obesity?
- Russ Pate says we've never really studied "inactivity"
  - (ESSR 2008, 36:173-178)



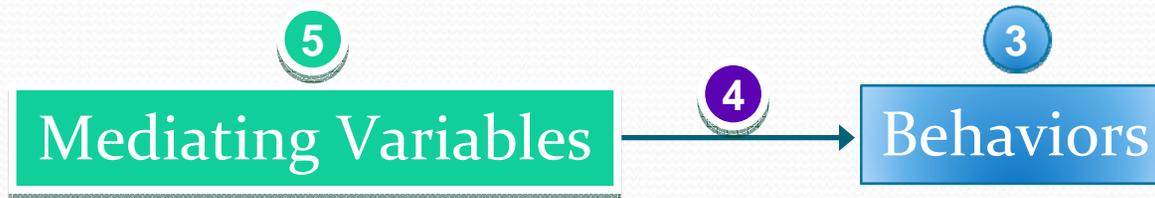
- 2b. How complex are these relationships?
  - Perhaps intakes of foods or food groups are parts of larger patterns, i.e. dietary intake patterns, e.g. Mediterranean diet
    - (J Woo, et al, Euro J Clin Nutr, 2008;62:480-487)
  - Do these complex eating patterns better predispose to change?



- 2c. What is the level of caloric intake excess that is predisposing to obesity? Is this level the same in all sub-groups?
  - 100 calories/day?
    - (J Hill, Science, 2003;299:853-855)
  - 110-1017 calories/day?
    - (YC Wang, et al, Pediatrics, 2006;118:e1721-e1733)
  - 329-2013 calories/day?
    - (C Bouchard, Int J Obes, 2008;32:879-880)
  - 350 calories/day of NEAT?
    - (JA Levine, et al, Science, 2005, 307:584-586)



- 3a. Are we using measures of these behaviors with acceptable metrics (validity, reliability, sensitivity to meaningful change)?
  - Metrics often not reported in articles
    - (T Baranowski, et al, Am J Prev Med, 1998;15(4):266-297)
  - Validity of 0.9 necessary to minimize misclassification error
    - (C de Moore, et al, Pub Health Nutr, 2003;6:393-399)
    - We don't usually get close
  - PA → adiposity?
    - (O Bar-Or, T Baranowski, Ped Exercise Sci, 1994;(6):348-360)
  - Severe under-reporting by the obese
    - How to correct? Huang method?



- 4a. What mediating variable or combinations of mediating variables are necessary to change behavior?
  - What are the best mediating variables?
    - Hypothesized mediating variables not related + suppressors
    - (L Haerens, et al, Int J Behav Nutr Phys Act, 2007;4:55)
  - How do mediating variables change (process)?
    - Tailoring: (R Hawkins, et al, Health Ed Res, 2008;23:454-466)
  - What strength of relationship is minimally necessary
    - E. Cerin graphs

**Figure b.10. Bio-behavioral Model of Likely Influences on Diet, Physical Activity and Adiposity**

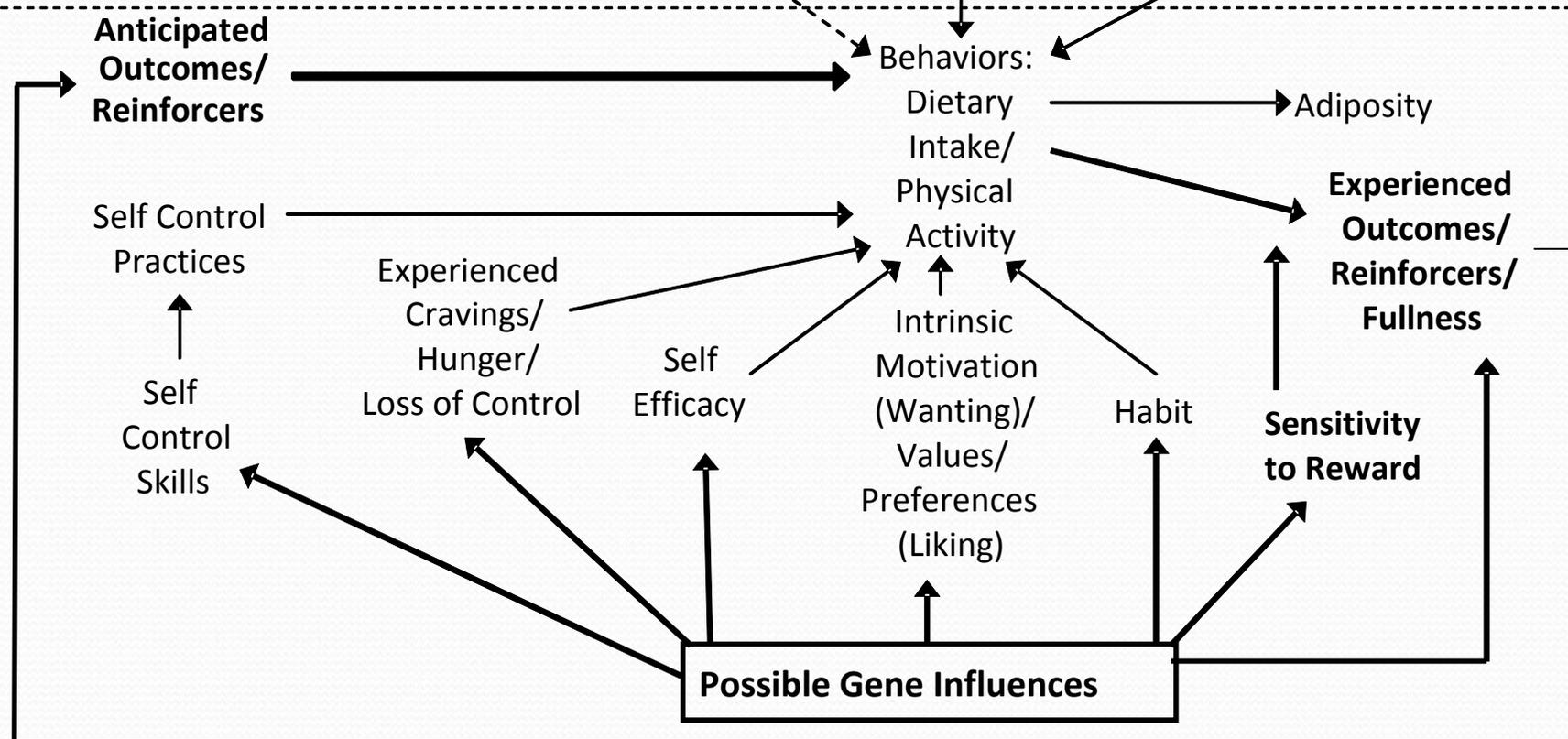
**Contextual Factors:**

Socioeconomic Status (income, education)  
 Gender  
 Ethnic Group  
 Region

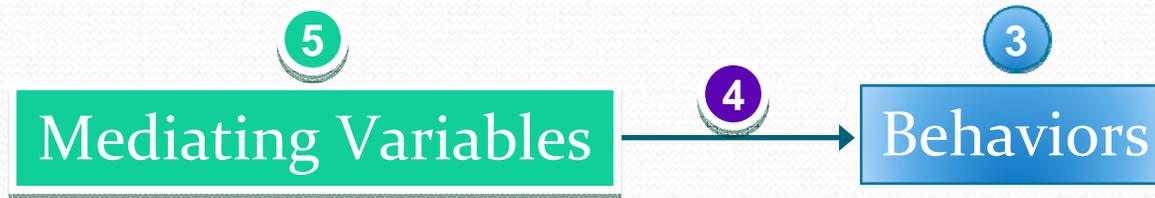
Home Environment (Food, PA, Media) (Choices)

Parenting (Food, PA, Media)

Environmental Influences



**Bolded lines and words are hypothesized gene related influences; environmental influences; Non bolded items below dotted line are psychosocial influences.**



- 5a. Are we using measures of these mediating variables with acceptable metrics (validity, reliability, range, sensitivity to meaningful change?)
  - Self efficacy
    - (K Watson, et al, Health Educ Res, 2006;21 Suppl:i47-57)
  - “Validated measure”
    - (C deMoor, T Baranowski, Pub Health Nutr, 2003;6:393-399)

## What Should We Be Doing? (1)

- Obesity prevention intentions need to target the interventions at the most influential causal behavior and psychosocial variables among the children at the highest risk for obesity

## What Should We Be Doing? (2)

To get that information we need:

- A longitudinal study
  - Wrap around design
- Using the best measures of adiposity, behaviors and psychosocial variables
- Among ethnic minority children
  - (where obesity is most common)
- With a large enough sample to enable complex analyses

# Wrap Around Design:

Grades	Year 1	Year 2	Year 3	Year 4
3 <sup>rd</sup>	3 <sup>rd</sup>			
4 <sup>th</sup>		4 <sup>th</sup>		
5 <sup>th</sup>			5 <sup>th</sup>	
6 <sup>th</sup>	6 <sup>th</sup>			6 <sup>th</sup>
7 <sup>th</sup>		7 <sup>th</sup>		
8 <sup>th</sup>			8 <sup>th</sup>	
9 <sup>th</sup>	9 <sup>th</sup>			9 <sup>th</sup>
10 <sup>th</sup>		10 <sup>th</sup>		
11 <sup>th</sup>			11 <sup>th</sup>	
12 <sup>th</sup>				12 <sup>th</sup>
In 4 years – cover 10 years of development with overlap				

**We Have A Lot Of Work To Do  
Before We Solve the Obesity  
Reduction Problem!**

# Thank You!

ARIGATŌ!

DANKE!

EFHARISTÓ!

MERCI BEAUCOUP!

MGÒI!

MUCHAS GRACIAS!

MUITO OBRIGADO!

SERDECZNIE DZIĘKUJĘ!

SHUKRAN!

TACK SÅMYCKET!

TAKK!

XIE XIE!