

Can environmental dietary factors make regulating energy intake difficult?

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The role of the environment in eating behavior

- The environment is believed to play a large role in the current obesity epidemic
 - Basic eating research has shown that dietary environmental variables, such as amount of food and variety, influence eating behavior
 - Data from food manufacturers show that as portion sizes and the number of different foods in the market place has increased, so has the prevalence of obesity



Amount of food and energy intake

- Experimental studies show that when a larger amount of food is given to adults and children in a meal, a greater amount of food and energy is consumed (Diliberti, Bordi, Conklin, Roe, & Rolls, 2004; Levitsky & Youn, 2004; Fisher, Rolls, & Birch, 2003)
- Hypothesized this effect is due to:
 - Stimulus control
 - Suggestion of an appropriate amount to eat
 - Reducing accuracy of self-monitoring intake



Amount of food and energy intake

- Can an environmental cue of an appropriate serving size (package unit size) help reduce intake in eating situations?
 - Providing food in single-serving package sizes versus larger package sizes
 - 1 oz bag of potato chips vs. 5 oz bag of potato chips



Study design

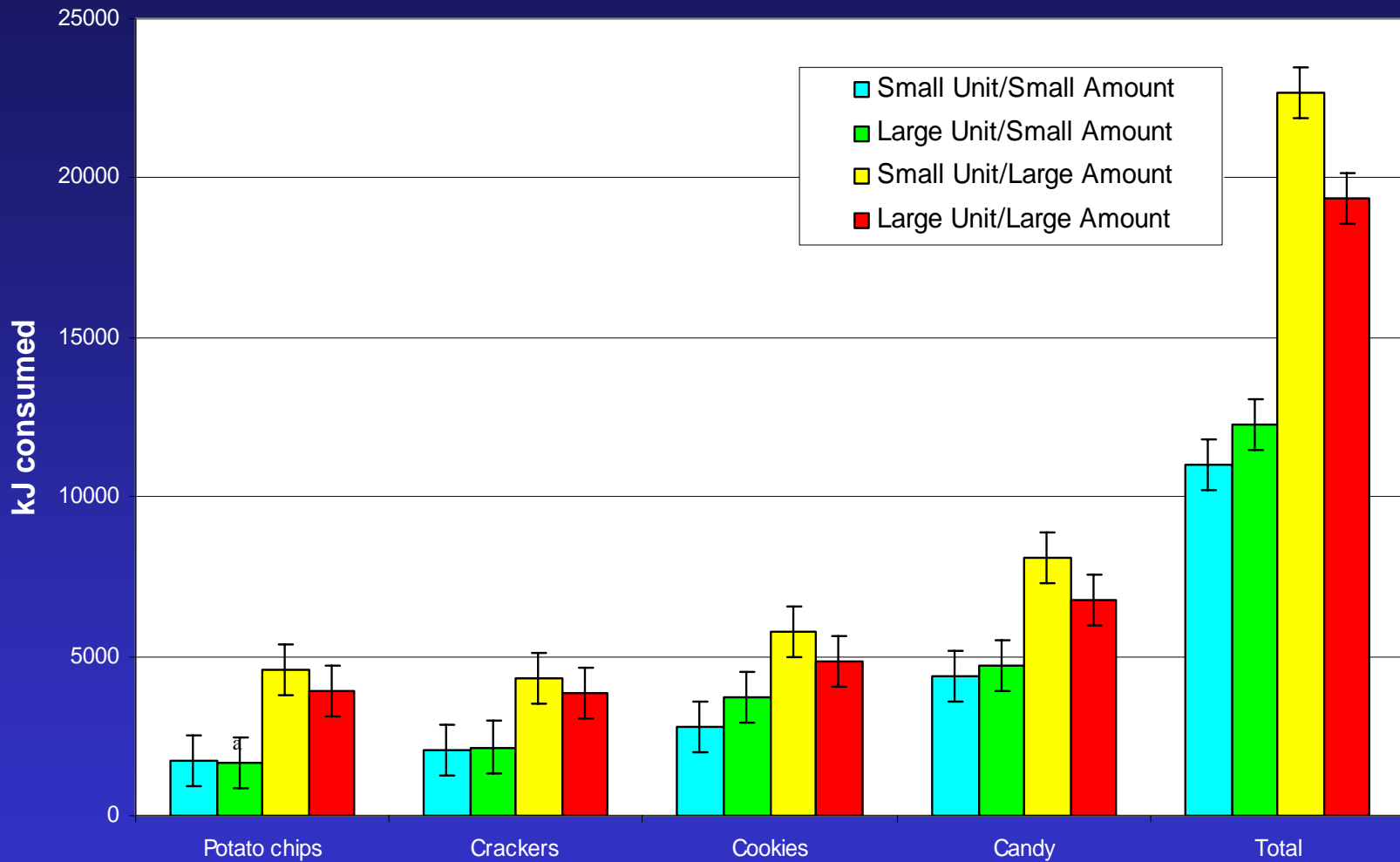
		Amount	
		S (≈ 4350 kcals)	L (≈ 8750 kcals)
Package Unit Size	S	5, 1 oz bags chips 5, 1.5 oz bags crackers 6, 1.25 oz bags cookies 5, 1.7 oz candies	10, 1 oz bags chips 9, 1.5 oz bags crackers 12, 1.25 oz bags cookies 11, 1.7 oz candies
	L	1, 5 oz bag chips 1, 7.2 oz bag crackers 1, 8 oz bag cookies 1, 9.4 oz bag candies	2, 5 oz bag chips 2, 7.2 oz bag crackers 2, 8 oz bag cookies 2, 9.4 oz bag candies



Participants

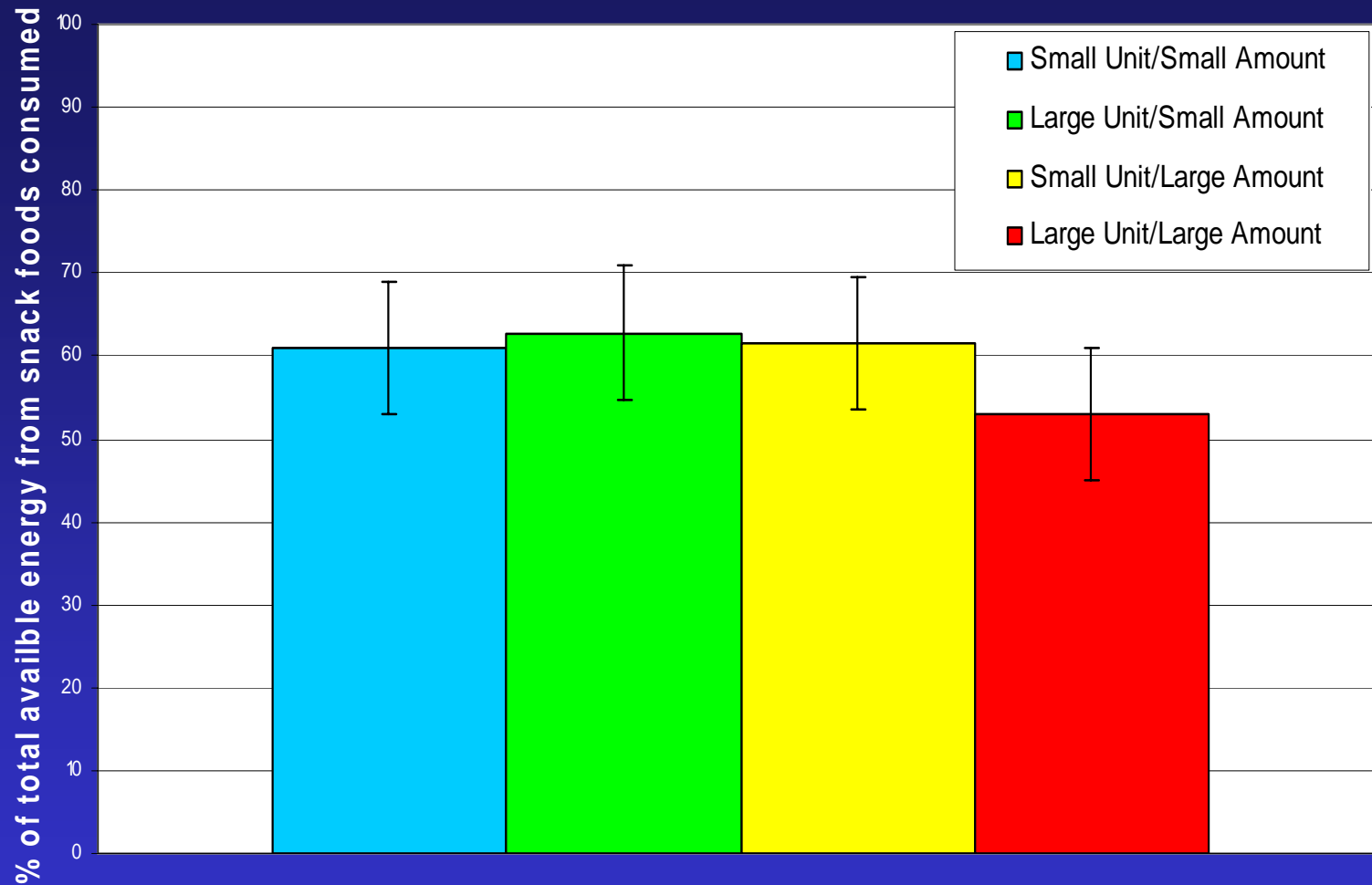
- N = 28
- Young adults
- Non-obese
- Unrestrained eaters
- Regularly consumed snack foods
- Not trying to lose weight



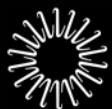


Raynor, H. A., & Wing, R. R. (In press). Package unit size and amount of food: Do both influence intake? *Obesity*.





Raynor, H. A., & Wing, R. R.. (In press). Package unit size and amount of food: Do both influence intake? *Obesity*.



Amount of food and intake

- Amount of food in the environment may influence eating by stimulus control (cue eating) or by suggesting an appropriate amount to eat
- Large amounts of available food in a meal or in the home environment appears to increase intake



Package size and intake

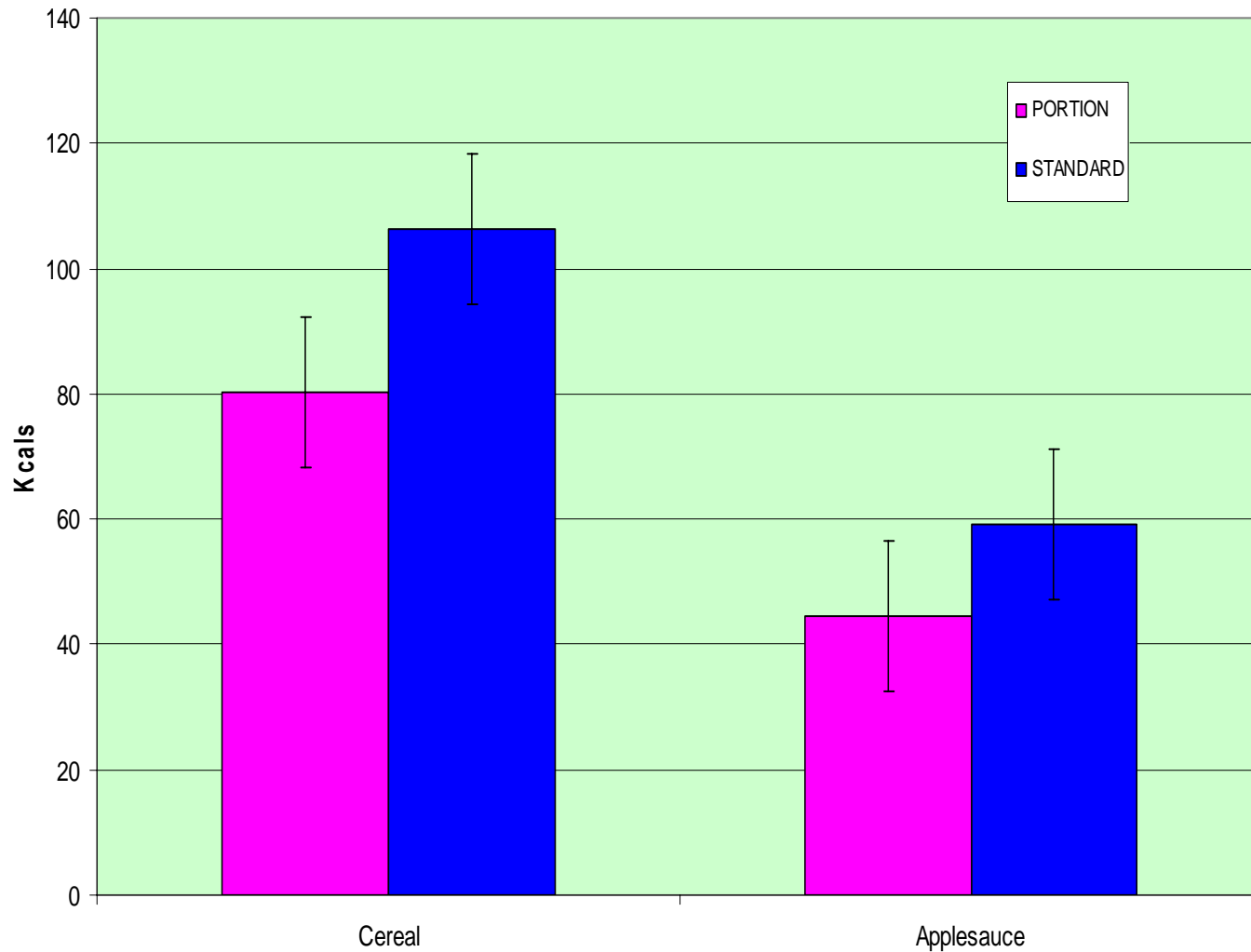
- Single-serving packaged foods may only reduce intake in situations in which conscious attempts at reducing intake are occurring
- Single-serving packaged foods may help decrease intake of food by helping to reduce amount of food available in an eating bout and/or with improving accuracy of monitoring intake



Single-serving foods and intake during a behavioral weight loss program

- Can food packaging influence energy intake during an 8-week behavioral weight loss program?
- It was hypothesized that breakfast foods packaged in single servings would help reduce intake of energy consumed at breakfast, as compared to breakfast foods packaged in standard non-portioned packages





Raynor, H. A., Niemeier, H., Butryn, M., & Wing, R. R. (2006). Using foods packaged in single servings may help with reducing intake during a weight loss intervention. *Obesity, 14*, A97.



Single-serving foods and intake during a behavioral weight loss program

- These results suggest that foods packaged in single-serving packages may help to reduce intake when a low-calorie diet for weight loss is prescribed



Amount of food and intake

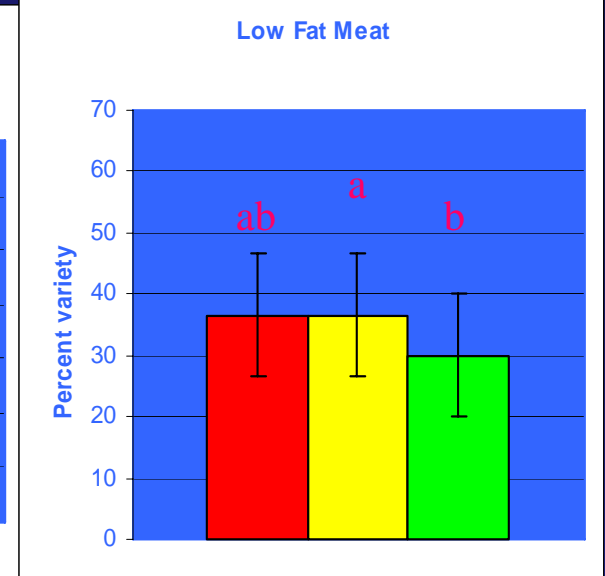
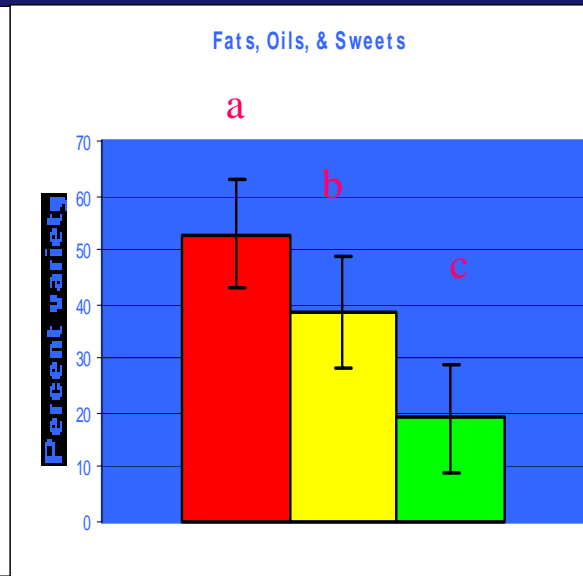
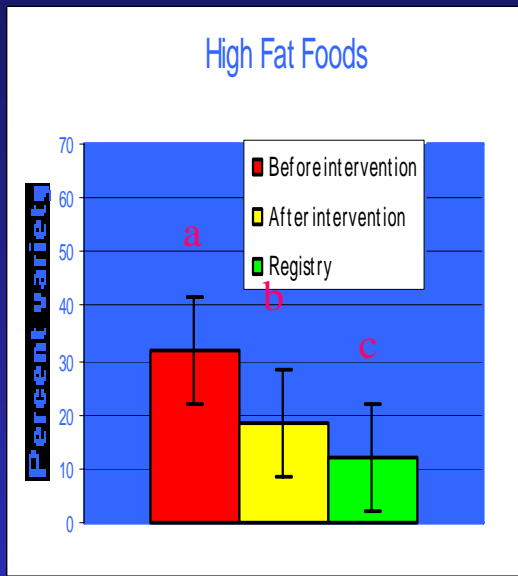
- These studies suggest that amount of food greatly influences intake
- Package size may influence intake:
 - When conscious efforts for reducing intake are in place
 - When non-snack foods are being consumed



Variety and food consumption

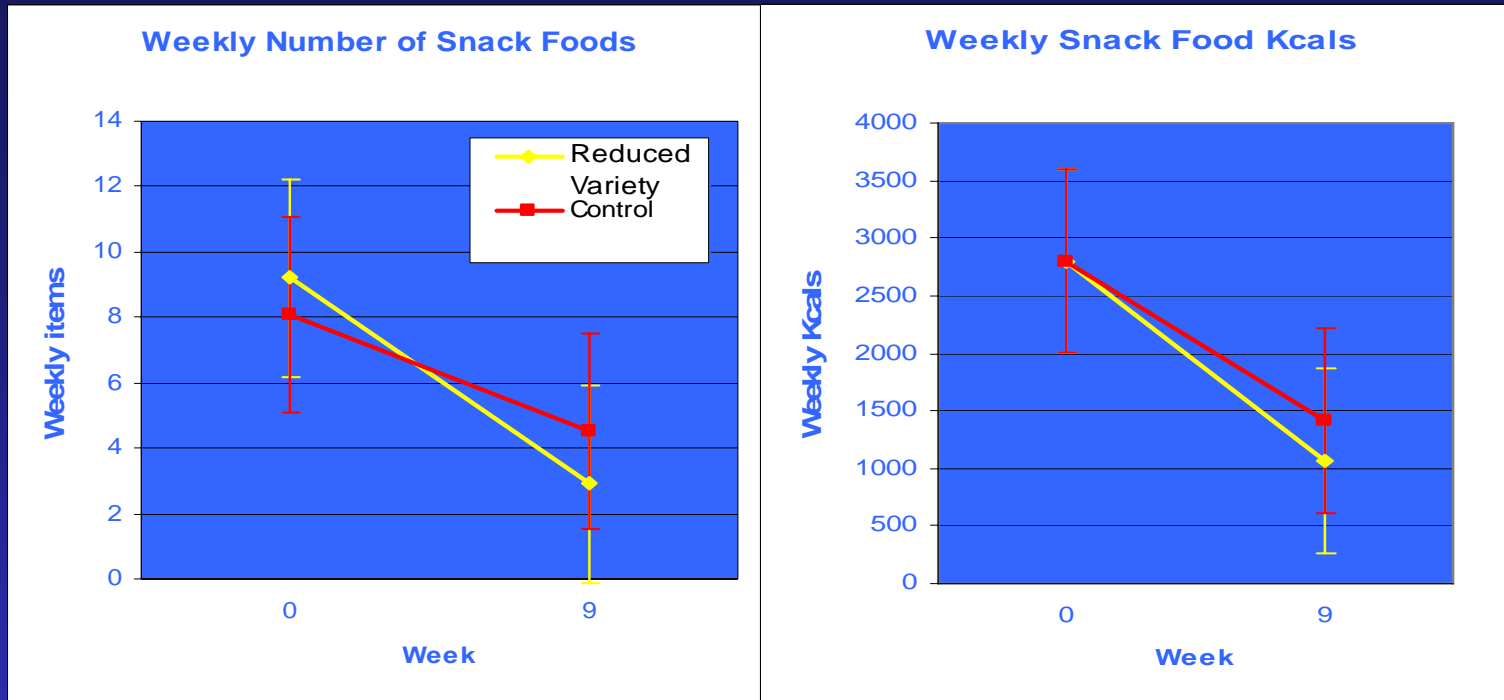
- Increased dietary variety is associated with increased intake, weight, and body fat in animals (for a review Raynor & Epstein, 2001, Psychological Bulletin)
- Increased variety within a meal is associated with increased consumption in humans
- The effect of variety on food consumption is believed to be due to the differential experience with sensory properties of foods – sensory-specific satiety (SSS)





Mean percent variety in 5 food groups for recent successful weight losers before and after a standard weight loss intervention (n= 96), and registry participants (n = 2237) (M \pm SEM).

Raynor, H. A., Jeffery, R. W., Phelan, S., Hill, J. O., & Wing, R.R. (2005). Amount of food group variety consumed in the diet and long-term weight loss maintenance. *Obesity Research*, 13, 883-890.



Number of different and kcals from snack foods consumed per week prior to and after 8 weeks of treatment in the Reduced Variety and Control conditions ($M \pm SEM$).

Raynor, H. A., Neimeier, H. M., & Wing, R. R. (2006). Effect of limiting variety on long-term sensory-specific satiety and monotony during obesity treatment. *Eating Behaviors*, 7, 1-14.



Conclusion

- Dietary environmental variables, amount of food and variety, influence intake and appear to be able to override physiological feedback
- These factors may need to be addressed when assisting in regulating intake



Conclusion

- Preliminary findings suggest that directly manipulating amount of food and variety in behavioral weight control programs may enhance the ability of the standard hypocaloric, low-fat diet that is usually prescribed in these interventions to reduce intake

