From Family to Peer Setting: Food Choices of College Freshmen

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Introduction

Prevalence of obesity in the US:
- ≈15% (in the 1970's) → 32.9% (in the 2000's)
- Ranks 6th in the world for number of overweight and obese adults

Hypotheses in the literature:
- ○Prices of healthy foods like fruits and vegetables are too high
- ○Prices of calorie dense 'junk' food is cheap and easier to prepare
- ○Farm policy/welfare policy is to blame for this

Suggested/Current Food Policy Interventions:
- Taxes on 'Junk' foods
- Subsidies on fruits and vegetables
- Banning of 'trans-fats' in New York City
- Removal of vending machines from schools
- Coming soon: FDA regulations on sodium

Findings in the Literature:
- Drewnowski & Darmon (2005)
  - ▪Inverse relationship between diet cost & energy density of diet
  - ▪Sometimes the energy dense diet is selected willfully
- Miljkovic, Nganje & Chastenet (2008)
  - ▪Rational addiction model
  - ▪Price hikes deterred normal weight people from consuming but not overweight & obese people
- Beghin & Jensen (2008)
  - ▪Found countries with very dissimilar food & farm policies have experienced obesity increases as well

If altering food price is a relatively ineffective means of getting the result that society desires (i.e., lower body mass index (BMI) of the overall population), then where should we go from here? If foods are addictive like some researchers suggest, the issue becomes one of either, a) altering external factors, like food environment or b) altering internal factors, like food choice.

An Alternative direction for policy: *Food Environment & Choice*

Group Choice

Some theories suggest that peoples' choices are partly due to their preferences & the preferences of some group or some social influence. Most commonly, we think of households, work groups or couples as entities in which preferences become interdependent on each other (Yang and Allenby, 2003).

We might expect for parents to exert high influence over decisions made in the family setting, but some studies have shown that children will actually exert more influence, especially when it comes to purchase decisions (Caruana and Vassallo, 2003).

Peer Influence

College freshmen present a unique opportunity
- ▪Changing their peer group
  - •From living with parents to being autonomous
  - •New friends & situations
- ▪Under studied when it comes to obesity
- ▪Candidate for effective prevention before poor habits are formed for adulthood

Objectives

Examine food consumption behaviors of college freshmen; specifically,
- ▪Test whether the peer effect dominated the parental effect in shaping their current behavior
- ▪Determine the impacts of changes in food consumption on changes in weight

Previous Literature

Other studies on college weight gain have shown an average gain of 1.5 to 3 kilograms or 3.3 to 6.6 pounds. Also, it was a common occurrence to find an increase in late night snacking and eating 'junk food' as well as a decrease in fruit and vegetable consumption. Living quarters also seemed to play and important role. Pliner and Saunders (2008) found that students living on-campus gained more weight than those living off-campus.

Studies on peer influence and weight have followed Burke and Heiland's (2007) model that suggests a penalty for weighing more than the group average weight. Two studies, Trogdon, Nonemaker and Pais (2008) and Halliday and Kwak (2009) both found a 0.3 and 0.19 marginal effect of peers' BMI on the participating adolescent's BMI. Both studies also found that adolescents with higher BMI tended to 'cluster' together in each other's peer groups, however it is unclear if this is because the students are selecting themselves into groups of similar weights or if their weights are impacting each other.

Conceptual Model

$$U_{ik}[F_{ik},C_i \mid Pf_{qk}]=G_i[F_{ik},C_i]-J(F_{ik}[F_{i,j\text{-}k},Z_{ik}]\text{-}Pf_{qk})$$

where:
U_{ik} = utility function for individual *i* derived from food group *k*,
F_{ik} = food consumption from group *k*,
C_i = non food consumption,
G_i = utility that is independent of peer influence,
J = social interaction component of the utility,
Pf_{qk} = food consumption of peer *q* (either parents or friends) of food group *k*,
$F_{i,j\text{-}k}$ = food consumption of individual *i* from all other food groups but *k*
Z_{ik} = the individual heterogeneity in consumption of the food group

Solving the utility maximization yields the optimal food consumption demand equations:

$$F^*_{ik} = F^*_{ik}(F_{i,j\text{-}k}, Pf_{qk}, Z_{ik})$$

Now the optimal consumption of food groups can be subtituted into an equation that determines weight:

$$W_i=f(\Sigma F^*_{ik}, H_i, Q_i)$$

where:
W_i = individual's BMI,
H_i = measure of the individual's physical activity
Q_i = function of the individual's demographics

Data & Empirical Analysis

College freshman recruited at Kansas State University
Two data collection periods
- ○September
  - •Measure weight & height
  - •Complete food frequency questionnaire (FFQ) about eating behavior before coming to campus
  - •Sent home parents survey to be completed
- ○November
  - •Recruit a friend to complete a 3-day food diary
  - •Submit food diaries
  - •Measure weight & height

The food consumption observations were converted to calories by food groups: Beverages, Dairy, Meats/Main Dishes, Breads/Grains, Fruits/Vegetables and Snacks/Desserts. The consumption of each food group was specified as consumptions of other food groups and the peer effect variable. The equations were estimated as a system. Then, the predicted values were used in the equation with the change in the student's weight from September to November as the dependent variable. Demographics and other factors such as having a meal plan through the college and depression were included as well.

Descriptive Statistics (n = 45)

Weight Stats	September	November	Difference
Average BMI	23.46	23.47	0.01
St.Dev	2.76	2.8	0.8
#Overweight	11	9	
#Obese	1	1	

Food Consumption	September		November		
(Average calories per day)	Mean	St. Dev.	Mean	St. Dev.	t-value of difference
Total Calories	3737.70	2865.67	2516.66	866.98	-2.74**
Beverages	124.09	145.75	182.80	207.23	1.56
Dairy	421.54	229.44	215.46	181.25	-4.73***
Meats/Main Dishes	1302.23	1378.11	991.15	507.68	-1.42
Breads & Grains	672.43	490.47	423.72	260.21	-3.01***
Fruits & Veggies	454.01	404.34	127.81	113.26	-5.21***
Snacks & Desserts	839.63	684.62	611.67	558.76	-1.73*

* Indicates significance at the 10% level, ** at the 5% level and *** at the 1% level

Insight?!

When asked: "How have your eating habits changed during your first year of college?"

"It is harder to restrict my diet when the meal plan at the dining center is already paid for."

"I can eat as much as I want because there's no limit or extra pay. This makes me eat like a cow!"

Results

Food Consumption

The food consumption equations showed a significant impact of the peer effect for their change in beverage consumption. The result is negative, contrary to our expectations, indicating when the friend consumed more as compared to the parents, the individual would consume less.

The Change in Weight Equation

Variable		Estimate	St. Err.	P-Value
Intercept		-2.7353	0.6638	0.0002
Meal Plan? (1=yes, 0=no)		0.7283	0.2602	0.0086
Time per week family ate together		0.3483	0.1321	0.0128
Female (1=yes, 0=no)		0.4018	0.2225	0.0803
Pregnant (1=yes, 0=no)		0.5229	0.5420	0.3419
Depressed		0.4421	0.2275	0.0608
Predicted changes in average daily consumption of food groups:				
	Beverages	0.0005	0.0012	0.6744
	Dairy	-0.0007	0.0005	0.1887
	Meats/Main dishes	0.0005	0.0004	0.2002
	Breads/Grains	0.0009	0.0006	0.1124
	Fruits/Veggies	-0.0017	0.0013	0.2184
	Snacks/Desserts	-0.0010	0.0004	0.0162

- •Being on a meal plan increased a student's BMI by about 0.73 kg/m^2.
- •The more a family ate together, the more likely the student was to gain weight in college. Perhaps an indicator of the peer effect?
- •Consistent with previous studies, females were more likely to gain weight.
- •Also, experiencing more 3 or more depression symptoms increased the student's BMI.
- •Interestingly, eating fewer snacks increased their BMI… are fewer snacks being converted to larger meal portions?

Literature cited

•Beghin, J.C., & Jensen, H.H. 2008. Farm Policies and Added Sugars in US Diets.
•Burke, M. & Heiland, F. 2007. Social Dynamics of Obesity.
•Caruana, A., & Vassallo, R. 2003. Children's Perception of their Influence over Purchases.
•Drewnowski, A., & N. Darmon. 2005. The Economics of Obesity: Dietary Energy Density and Energy Cost.
•Halliday, T. J. & Kwak, S. 2009. Weight gain in adolescents and their peers.
•Miljkovic, D., Nganje, W.E., & de Chastenet, H. 2008. Economic Factors Affecting the Increase in Obesity in the United States: Differential Response to Price.
•Pliner, P. & Saunders, T. 2008. "Vulnerability to freshman weight gain as a function of dietary restraint and residence."
•Trogdon, J.G., Nonnemaker, J. & Pais, J. 2008. "Peer effects in adolescent overweight"
•Yang, S. & Allenby, G.M. 2003. Modeling Interdependent Consumer Preferences.