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Nutritional Assessment of Preschoolers in Rural Ohio: Biological Investigations into Dietary Implications of Economically Disadvantaged Children

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Plate after lunch in the preschool 2 room on July 18, 2007 at NHEEC

Nutritional Assessment of Preschoolers in Rural Ohio: Biological Investigations into Dietary Implications of Economically Disadvantaged Children

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Plates after lunch in the kindergarten readiness room July 9, 2007

Introduction

Child growth has proven to be a reputable indicator of the environmental circumstances within which a child exists; providing a barometer of which the social and economic conditions of the community can be measured. From extensive studies conducted within developing countries the connections between childhood malnutrition and permanent biological effects (e.g. Chávez et al., et. al, 1995; Peltó 1987), and between poverty and malnutrition has been established. Lack of sufficient funds make people particularly vulnerable to diseases and life-long physical conditions. Further, food habits are created as young as 3 years old. It is little realized that within such a developed country as the United States malnutrition is similarly a prevalent and serious problem (Crooks 1995).

Research Question: Are the children attending a preschool in rural Ohio biologically healthy? From an overall assessment of children's growth, the study aims at determining the presence of dietary issues and then evaluating possible contributing factors. This group was chosen based socioeconomic backgrounds and age. It was expected that the children would have above average BMIs.



Plates after lunch in the preschool 2 room on July 18, 2007

Background

Recent trends of body stature and composition have been towards obesity among U.S. children. (CDC 2007)

- 17.1% of the United States children ages 2-18 were categorized as overweight in 2004
- Given today's trend children with weight problems may comprise an even higher percentage of the U.S. population.
- Current estimates indicate that 65% of adults are either overweight or obese

In Knox County (United Way of Knox County 2006)

- The 2004-2005 United Way community assessment reported that "obesity" was ranked as a "major issue" for 46% of the people surveyed
- "[N]ot having enough money for food" and "being overweight or obese" were major issues for 24% of people over the past 12 months
- 19.2% of children fall below the poverty line in Knox County, just below the state percentage of 21.0%

The Knox County Preschool (Head Start 2006)

- The majority of the children attending the Knox County Preschool are associated with the Federal Head Start Program.
- Provide support and services for economically disadvantaged children and families in the way of education, health and nutrition
- Of the 300 children enrolled about 200 meet the poverty requirements

Methods

Data was collected using standard anthropometric procedures (CDC 2007). Height, weight and age was collected using a stadiometer from Children aged 3 – 5 in three classrooms (the kindergarten readiness room, preschool 1 and preschool 2).

Data was analyzed with Microsoft Excel and the Epi Info Nutrition. The indexes were compared with the national standards of the Center for Disease Control. Children are categorized as "normal" when their BMI is between the 5th and the 85th percentiles and "at risk for being overweight" when their BMI is in between the 85th to 95th percentile. They are "overweight" if their BMI is beyond the 95th percentile (CDC 2007).

In the complementary study, behavioral data about food choices and knowledge was collected from these same children through lunch-time observations and focus groups (Sanders 2007). Data was analyzed using SPSS.



Standard posture for measuring height <http://spixpert.com/technical10.htm>

Results

- The data was skewed towards the heavy end of the spectrum
- Of the 13 males measured only 3 were below the 50th percentile (figure 1)
- There were only 2 girls who fell below the 50th percentile (figure 2, n = 12)
- All of the 4 and 5 year old girls were above the 50th percentile (figure 2)
- The pattern of heaviness increased in severity with age (figure 3)
- 44% of children were either at risk for being overweight or overweight (n = 27)

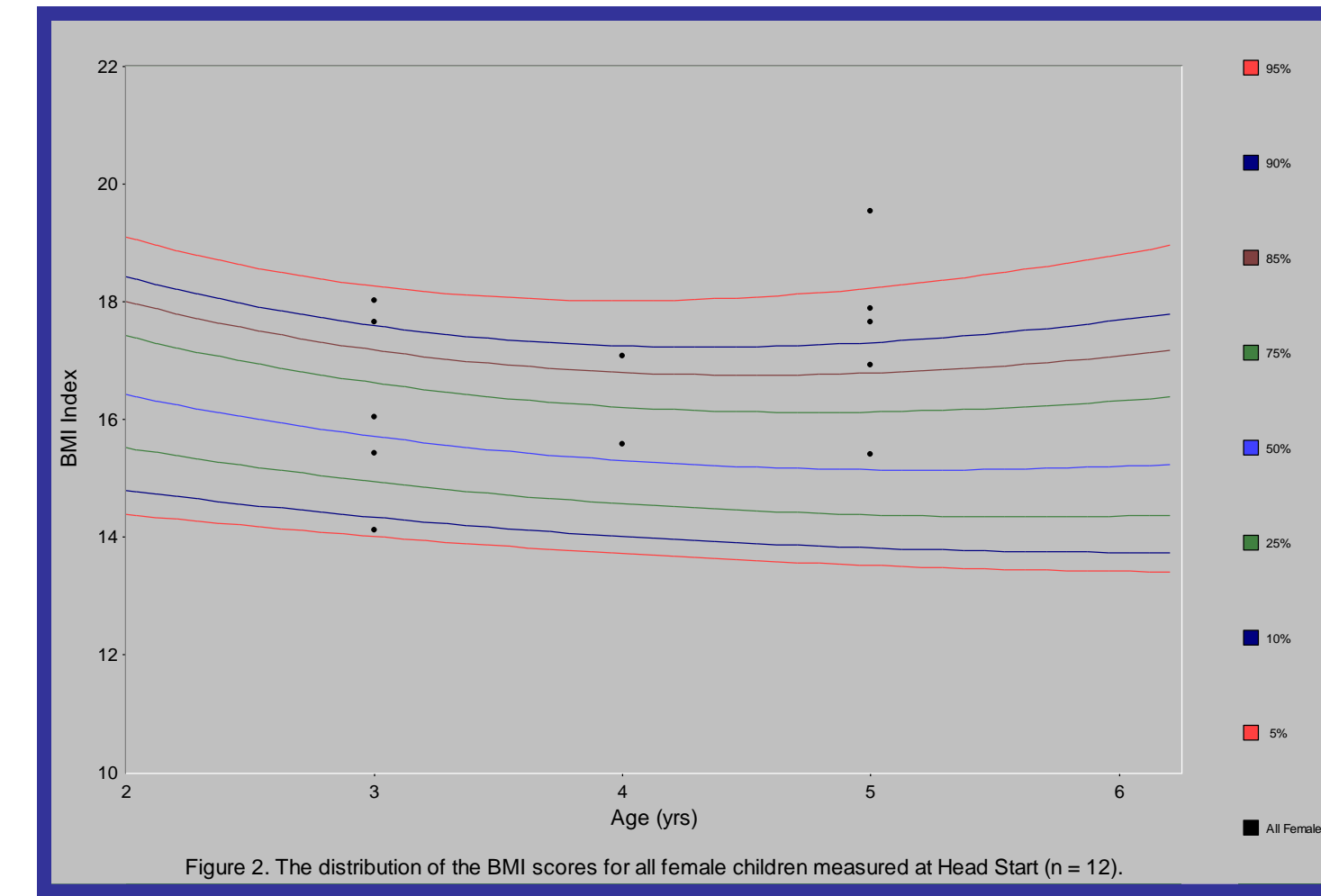


Figure 2. The distribution of the BMI scores for all female children measured at Head Start (n = 12).

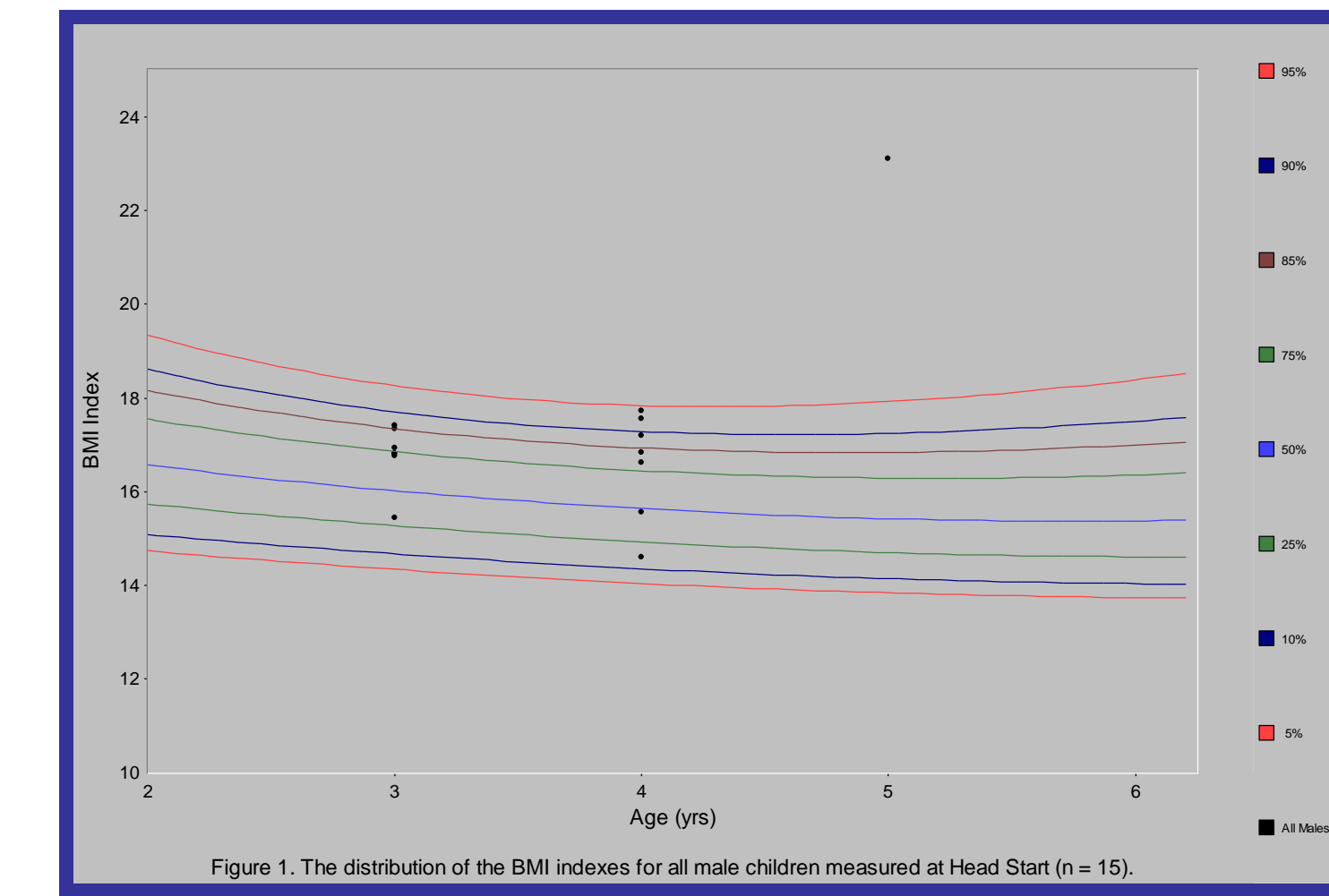


Figure 1. The distribution of the BMI indexes for all male children measured at Head Start (n = 15).

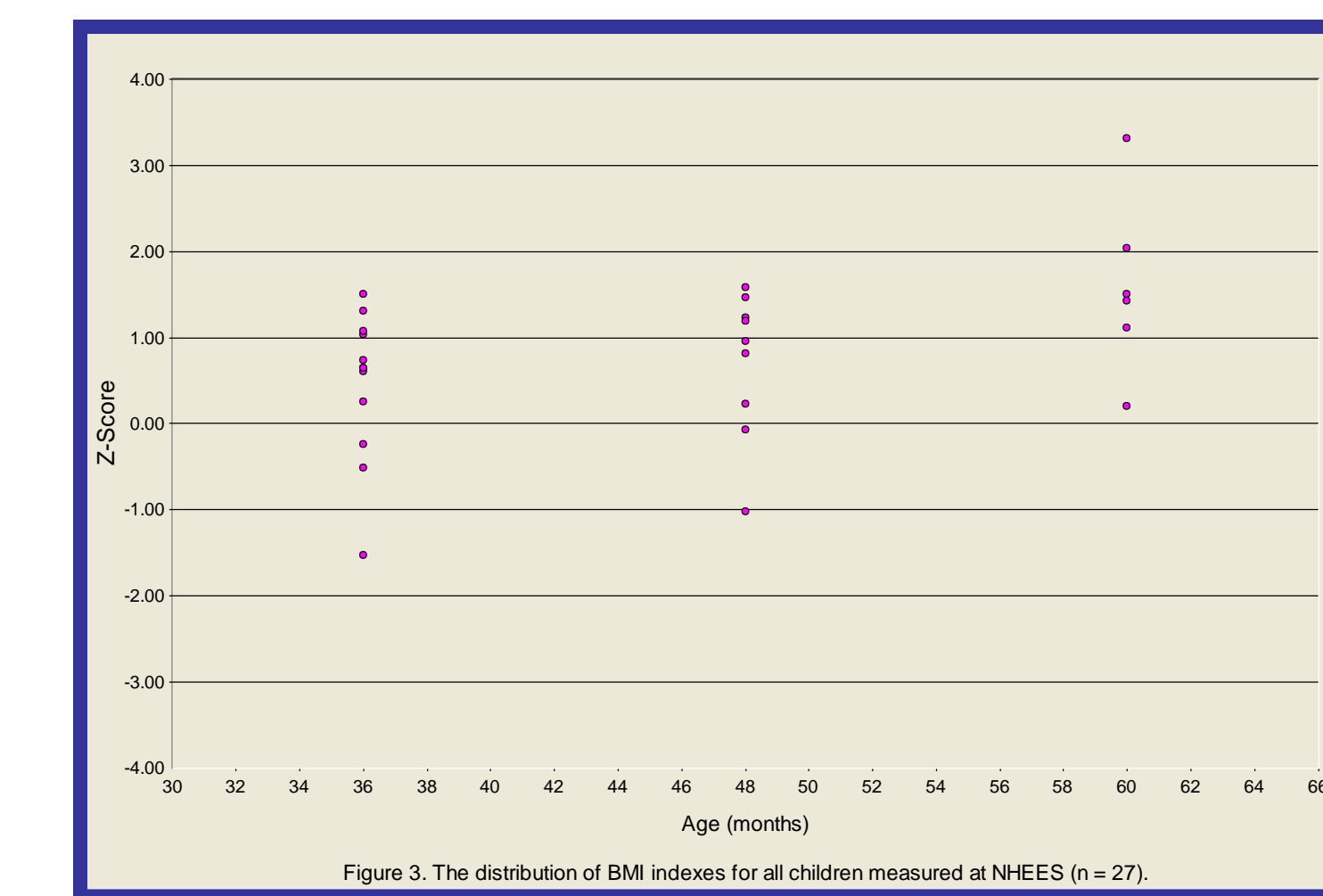


Figure 3. The distribution of BMI indexes for all children measured at NHEES (n = 27).

From the behavioral data

- "ideal" versus "realized" behaviors (figure 4)
- 47.7% of children who took a serving of the main course took 2 or more servings
- 25%, 33.9% and 36.7% children took 2 or more servings of bread, fruit and vegetable
- only 77.6% of the children took any serving of the vegetable and 79.8% took of the fruit

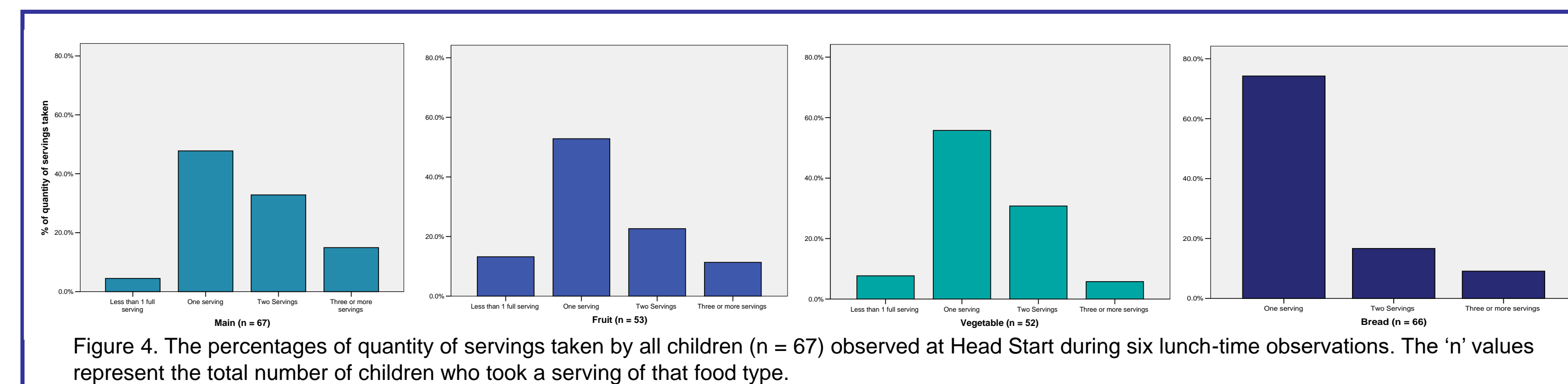


Figure 4. The percentages of quantity of servings taken by all children (n = 67) observed at Head Start during six lunch-time observations. The 'n' values represent the total number of children who took a serving of that food type.

Discussion

- Results aligned with the study's hypothesis, however the predictions greatly underestimated the severity and immediacy of malnutrition.
- The risk for being overweight increases with age, aligning with the previous research (Crooks 1998)
- Given the percentages of children falling below the poverty line, it would be expected in other areas of Ohio malnutrition is even stronger.
 - Other states have greater numbers of children below the poverty line, and lack access to locally grown foods possible in rural Ohio.
- The development of healthy eating habits during childhood could be particularly important in the prevention of cardiovascular disease as an adult (Singer et al 1995).
- Children who are overweight have diets that are too low in fruits, vegetables and grains and too high in fats and sugars (Birch 1998).
 - Established eating habits are hard to break
- In young children preferences are based on two dimensions, familiarity and sweetness (Birch 1979a, 1979b).
 - If children are only exposed to highly modified and artificial foods that is what they will like
 - Children who are exposed to whole fresh foods do like these "healthy" foods
- Children are highly influenced by advertisements: carrots taste "better" by just being in McDonald's wrappers (Robinson et al 2007)

Influences acting upon children's food choices (Birch 1980, 1998)

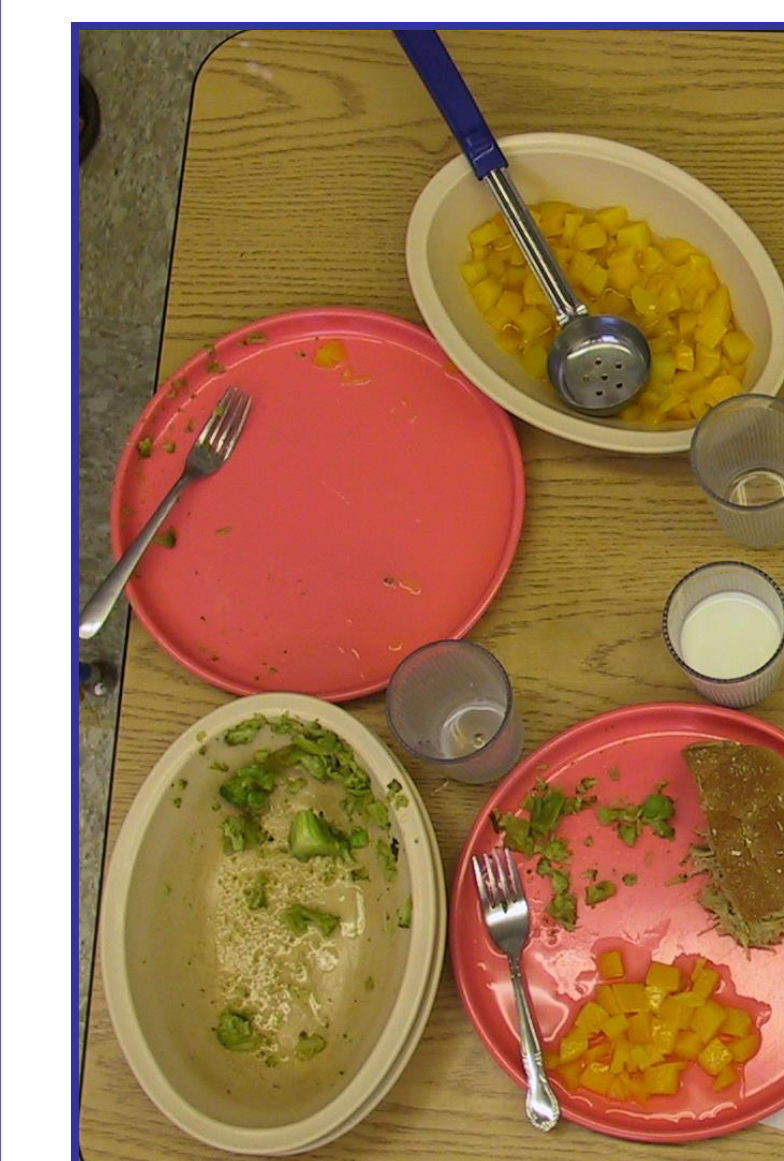
- **Neophobia**
 - need repeated exposures before possible acceptance
- **Context**
 - reaction of peers (e.g. "That's yucky- oo- yuck")
 - situation (special occasions, location)
- **Modeling**
 - copy what people around them are doing (especially teachers and parents)
 - informants (e.g. older sister told child that spinach was gross)
- **Past experiences**
 - allergies ("When they go down my throat they make me feel sick")
- **Knowledge of healthy foods**
 - few children were able to think in the abstract
 - able to recite reasons for "healthy"/"unhealthy" foods
- **Creative reasoning**
 - "Broccoli makes babies"
 - "Funny word" (macaroni)

Further Research and Questions

- Collection of more in depth information on children in this age group
 - Expand size of the study groups and meal-time observations to breakfast and snack time
 - Collect information about foods eaten at home
 - More extensive demographic data
 - Quantify activity levels and energy output
 - Social awareness
 - Are girls more prone to sedentary behaviors?
- The physical environment within which the children live
 - Proximity to fast food restaurants, parks, convenience stores
 - How strong of a factor is location and convenience
- Apply research findings
 - Work with the tendencies of childhood eating behaviors to establish healthy eating habits in child of this malleable age

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Plates after lunch in the kindergarten readiness room July 16, 2007

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