Effect of the School Lunch Program on Children's Food Preferences and Family Grocery Shopping

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Good nutrition during childhood plays a key role in ensuring adequate growth, preventing the long-term risk of obesity and other chronic diseases, and enhancing overall health and well-being (USDA/HHS 2010). Since food habits are still developing during childhood, it is meaningful to help children adopt healthy eating habits in order to improve longer-term health outcomes. Although individual factors such as gender and age play an important role, and parental influence exists, there is an increasing understanding that children's eating habits are influenced by environmental factors, both in the home and at school.

As many children spend most of their weekdays at school, and on average obtain one-third of their daily caloric intake from food consumed at school (Briefel et al. 2009), schools are a natural place to provide nutrition education or implement policies to help children to improve healthy eating habits. Federal, state and local school nutrition programs can influence the foods provided to students in school. In this sense, the School Meal Program of U.S. Department of Agriculture (USDA), including both the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) serve a very important role in developing children's food and eating habits.

In 1946, the National School Lunch Program (NSLP) was established with the dual-goal of reducing government commodity surpluses while providing nutritious meals to low-income children (Ralston et al., 2008) to help reduce the malnutrition problem. The NSLP was designed to reduce malnutrition by providing meals whose nutritive contents met at least one-third of the child's nutritional requirements for the day to help insure a healthy and balanced diet. At the same time, through Federal, State and local support, the price of the meal was set at a low level.
Over time, the NSLP has become the second-largest government food-assistance program in the United States with the primary objective to “safeguard the health and well-being of the Nation’s children.” Over 80% of all primary and secondary schools participate in the NSLP. The current program provides free and reduced-cost lunches for income-eligible students, as well as subsidizing paid lunches for students whose families meet somewhat higher income eligibility requirements. Similar to NSLP, the SBP was designed to provide children easy access to a healthy and well-balanced breakfast on school days. Given the reach of these programs, it is an interesting question to investigate the effects of school meals on children's food preferences. Given the reach of these programs, measuring the effects of school meals on children’s food preferences is an important research question.

If the NSLP and SBP influence children’s food preference, an additional question is how this carries over to household food consumption. Children’s role in the U.S. market has increased: over a twenty year period from the 1960s to the end of 1980s, spending of children as consumers in the U.S. market increased from $2billion to $6billion and their influence extended to a staggering $132bn of household expenditure (McNeal, 1992). This trend continued through the 1980s with an increasingly affluent teenage market, despite numbers of teenagers declining by 15.5%. By the end of the 1990s, it was estimated that children in the United States accounted for $23bn in direct spending, and their indirect spending had increased to a further $188bn in family purchases (McNeal, 1999). Thus it is important to understand the power of children in the market, and the children’s direct and indirect influence on family purchases.

The goal of this research is to explore whether school meals change children's food preference, and lead to choosing healthier options outside of the school environment. In addition, considering that children have an impact on family's purchasing decisions as they directly and
indirectly influence their parent's decision-making, and that children's preference and shopping behaviors influence present and future consumption trends; a secondary goal of this study is to explore how children influence the family's grocery shopping, and whether or not participation in the NSLP influences parents' food shopping behaviors.

**Previous Research**

Previous research has identified a number of factors that influence children’s food preferences. Various studies have identified age as significantly related to children and adolescent’s food preferences (for example, Aranceta et al., 2003; Nu, Macleod, Barthelemy, 1996). Other demographics, like gender, are less clear in prior research. Some studies find similar trends in boys and girls (Lytle and Seifert 1999; Aranceta et al., 2003), while others found differences (Wardle, Sanderson and Gilbson 2001; Reynolds et al. 1999; Caine and Scheule, 2008).

Children’s level of knowledge about nutrition has been found to influence children’s food choices. For example, Morgan and Warren (2009) found that school garden-enhanced nutrition education did encourage more children to taste fruits and vegetables. Taste preferences also play a factor according to research conducted by French et al. (1998) and Barr (1994).

Parental factors are also related to children’s food choices. This includes demographics of the parents, for example, their educational and employment status (Guillaume and Lapidus, 1998; Wolfe and Campbell, 1993), and marital status (Young and Fors, 2001). In addition to demographics, factors such as food exposure and availability, parental modeling, parenting style, and food socialization practices also influence choices (Nicklas et al., 2001; Hearn et al., 1998). For example, the more fruit and vegetables available at home, the larger consumption of fresh fruit and vegetables were reported.
Peers have an important and lasting influence on the food preferences of children. Hendy and Raudenbush (2000) investigated the effect of school environment, including teachers’ modeling and peer effect on children’s willingness to taste new foods. And from this research, peer modeling has been found to be the strongest predictor of younger children to try some new foods. French et al (1998) examined 13 different motivations regarding snack selections among 419 adolescents, and they found that the influence of friends was significant.

Marketing and mass media are also considered to be an influencer on children’s food preference and food purchases. Marquis and Dagenais (2002) investigated the relationship between the frequency of consumption of specific foods and TV watching. Food advertising was found to significantly promote increased consumption of some specific food items, and this research further discussed that food or beverage commercial advertisements often contained misleading information, which might lead to confusion among children.

School environment and school policies can also influence children’s healthy eating and food selection. Hanks, Just, and Wansink (2012) argued that the consumption of “competitive foods” (food or beverage sold to students outside the School Meals Program, like vending machines, a la carte sales and school stores), decrease students’ intake of healthy foods, while increasing the intake of total fat and sugar. It was also reported by Ishdorj, Crepinsek and Jensen (2012) that the School Lunch Program and School Breakfast Program lead to increased consumption of both fruit and vegetables in schools.

**Children’s Influence on Family Decision Making**

Family decision making has an important role in consumption decision making in the market. Thus, there have been numerous research studies in the area of the process of family decision making. However, in the early years, most researchers tended to focus on the influence
of husband and wife in the family decision making, and overlooked the role of children in the decision process.

The first research trying to analyze the influences of children on family decision making dates back to Berry and Pollay (1968). They chose the independent variables as the children’s assertiveness, mother’s children-centeredness, and mother’s brand recall, and concluded that the more the mother is child-centered, the less the mother would agree to buy the foods children liked, and instead they would to buy foods that were healthy for their children. Since then, children have been researched and recognized as having an influential role on the process of family decision making.

In the 1990s, research indicated the increasingly important role of children during family decision making. According to the report of McNeal (1992), children spent more than $132 billion on 62 product categories, and approximately 17% of family purchases were influenced by the children in the United States. And in the late 1990s, McNeal (1998) indicated that the influence has increased to around $188 billion directly, and $300 billion indirectly. And the research by Laczniak and Palan (2004) on children aged from 3-11 years old and found that when shopping together with parents, children would asked for a purchase every two minutes on average.

Thus, the power of children in the process of family purchase decision-making has increasingly aroused the interests of researchers, marketers and manufacturers. And based on the previous studies, children’s influence varies based on a number of different factors, including product types, decision stage, children’s characteristics, family characteristics, and socio-economic factors

**Product Types**
One important factor is product type. According to the previous research, generally, it is indicated that children have more influence on the product for their own use than product for the whole family. (Foxman and Tansuhaj, 1988) More recently, Shoham and Dalaka (2005) claimed that children have the greatest influence on the purchase of magazines, children’s dress and records/CDs. And as for the leisure time activity, children are also influential in decision-making processes, because such activities are often child-focused (Labrecque, Ricard, 1999).

In contract, children had less influence on the products that was used by the entire family; especially the products with high price (Foxman et al, 1989b). Foxman et al., (1889b)’s research indicated that children had little involvement in the purchase of cars, furniture, televisions and life insurance. It is easy to understand that parents’ are more responsible for the purchase of household goods which involve higher financial risks (Belch et al., 1985).

**Decision Stage**

Another significant factor influencing the power of children in the family consumption is decision stage. According to various research studies, including the study conducted by Beatty and Talpade, children have larger influence in the early stage of the decision making process (Beatty and Talpade, 1994).

Yet, there is also existing contrary evidence, from the research conducted by Lee and Beatty in New Zealand (Lee and Beatty, 2002), which concluded that children were highly involved in both the earlier stages and final stages of the decision process. This may be caused by the increasing influence of children on the family purchase in recent years.

**Children’s Characteristics**

Recently, more and more researchers like Foxman (1989a), Beatty and Talpade (1994), and Belch et al, (2005) have paid attention to the relationship between children’s characteristics
and the power of children in the family decision making process. From the resource theory, developed by Blood and Wolf in 1960, which mainly explain the influence husband and wife in the family purchase, it is shown that in the decision making process, the family member who contributes more resources has larger influence on the decision making. And, grounded on this theory, many researchers indicated that children’s individual resources would influence their influence in the process of family decision-making.

Foxman et al (1989) examined the relationship between children’s resources and their power in the family decision making. In this study, they chose children’s income contribution, employment, grade and the perception of parental love and confidence as independent variables, and chose the product influence as the dependent variables. And it concluded that children’s personal resources have a positive relationship to their influence on the family decision making process. Also among all the independent variables, grade had the largest influence towards the decision process.

Secondly, considering the income contribution, Moschis and Mithchell (1986) indicated in their research that children’s earning and employment status has a positive relationship with children’s power at home. And then, Beatty and Talpade (1994) replicated Foxman et al (1989)’s study using a wider range of products both for children’s purchase and for family purchase, with the aim of generating more robust results; their results suggested that Finally, product knowledge is also considered as a resource of children which has positive influence on children’s power in the process of family purchases. According to Foxman’s research (1989), product knowledge has marginally significant effect on children’s choice of product, but only had influence on some products used by children themselves. Furthermore, research conducted by Beatyy and Talpade (1994), indicated that product knowledge did not affect children’s influence, except in the first
stage, initiating the idea to purchase the item. And for those products used by the whole family, children did not affect the decision making process. Also, Thomson (2007), found that knowledge and information were important resources that can effectively affect children’s influence over the purchase decision.

**Family Characteristics**

In addition to the various aforementioned factors, changes in family structure also can significantly impact the level of children’s influence on family decision making. Many researchers have claimed that the increasing divorce rate has dramatically altered the traditional family structure, and that single parent families or blended families, may change the dynamic of children’s influence on family decision making. Numerous researchers indicated that children in single parent families were more involved in the family purchase decision than children from ordinary families. In the study conducted by Taylor et al.,(1985) found that children from single parent families tend to have greater influence on food purchase, and had more participation on the choice of foods. One reason explaining this may be that single-parent may not have enough time to make food purchase decisions, thus children had to take more responsibility for the family decision making on food purchases.

Secondly, in the previous research, many researchers claimed that children from higher income families would have more influence on the family purchase. Jenkins (1979) found that children’s influence would increase with the income of the family. And, in the research constructed by Moschis and Mitchell (1986), they argued that children’s influence would be larger in family with higher socio-economic status. It may be because higher-income families may provide more opportunities to their children on the choice of products, and then be more likely to accept children’s input. Besides, it was also showed by the study of Breatty and Talpade
(1994) that children in the dual-income family would have greater influence on family purchase decisions.

Parents’ Characteristics

There is little research examining the relationship between parents’ characteristics with children’s influence during family shopping. Berey and Pollay (1968) found that mothers who are child-centered would be less inclined to buy the cereal that children liked, because mothers who care more about their children would pay more attention to the nutritional content of foods, thus it may lead to fewer purchases of the foods that children liked. Another study conducted by Roberts et al (1981) found that the more conservative and traditional the mother, the less children influenced family purchase decisions.

Data

A mail survey was delivered to parents of 4th and 5th graders in one county through the school system. Because the research includes two aspects (the NSLP’s effects on children’s food preference, and on parents’ grocery shopping), the survey was designed with two parts: one for parents to complete and the other for children. Children from 4th or 5th grade were chosen because they were more likely than younger children to be actively engaged in family grocery shopping, they may be better able to express their opinions regarding foods, and they had a higher ability to complete the questionnaire. Elementary school children were selected as opposed to middle or high school students due to the rates of participation in school lunch, increased food options (non-NSLP foods) at schools for older children, and because their preferences may not be as set as older children.

Surveys were sent home with approximately 1,000 4th and 5th graders across 7 schools with varying levels of participation in the school lunch program. A pre-paid envelope was
included for participants to return the survey. In total, 172 respondents returned completed surveys, for a completion rate of 15%. However, 15 returned surveys had incomplete responses and were not included in this analysis. The remaining 163 responses are both completed by parents in the first part, and children in the second part.

Demographic information was collected with the hope to determine if these factors could affect the amount of children’s influence in family purchase. For parents, females accounted for 90% of the respondents. Gender of children was more evenly spread, with 59% girls, and 41% boys. Most (93.7%) parents in the sample were more than thirty years old, with the most common age range of 36-40 years old (26.38%). Given the 4th and 5th grade target, it is not surprising that 82.21% of children were ages 10 and 11. More than 70% of the children come from a dual-parent family, while approximately 22.09% have a family with a single parent, either separated, divorced, widowed or never married (Table 1). From the education aspect, approximately 50% of the participants have a four-year college degree or higher. Very few people (10%) had a high school diploma or lower (Table 2). Most of the participants had an annual household income in the range from $50,000 to $75,000. Participants with an annual household income less than $35,000 accounted for about 26% of respondents and participants with a household income more than $149,000 made up about 6% of the total participants. Most (85%) of the participants had more than one child in their house, with 30% of families with three or more children. Only 15% of the participants had one child, 53% had two children, and the remainder (32%) reported having 3 or more children.

Table 1 Marital status of parents

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never married</td>
<td>6.75</td>
</tr>
<tr>
<td>Married</td>
<td>71.17</td>
</tr>
<tr>
<td>Divorced</td>
<td>11.66</td>
</tr>
<tr>
<td>Other</td>
<td>10.43</td>
</tr>
</tbody>
</table>
In order to understand children’s preference towards school meals, parents were at first asked to indicate the frequency of their children having school lunch and home lunch; school breakfast, and home breakfast. In the sample, approximately 36% of all the parents indicated their children had school lunch every day, while there was 24% that never had school lunch. Compared to school lunch, school breakfast is less popular. Only 12% of the respondents indicated that their child had school breakfast every day, and 64% reported never having school breakfast (Figure 1). Parents were asked to report if their child was eligible for the National School Lunch Program (they were reminded the prices of a full-price, reduced-price, and free lunch to help with the definitions). According to the respondents, 38% qualify for free or reduced fee lunches (Table 3).

Table 2 Education level of parents

<table>
<thead>
<tr>
<th>Education</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school diploma</td>
<td>3.68</td>
</tr>
<tr>
<td>High school diploma or equivalent (G.E.D.)</td>
<td>6.13</td>
</tr>
<tr>
<td>Some college (AA degree or courses without a final degree)</td>
<td>41.10</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
<td>19.02</td>
</tr>
<tr>
<td>Post-graduate or Professional Degree</td>
<td>30.06</td>
</tr>
</tbody>
</table>


Table 3 Eligibility for school meals

<table>
<thead>
<tr>
<th>Meals</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free lunch</td>
<td>30.06</td>
</tr>
<tr>
<td>Reduced-price meals</td>
<td>6.75</td>
</tr>
<tr>
<td>Regular school lunch ($2.15)</td>
<td>60.12</td>
</tr>
<tr>
<td>Do not know</td>
<td>3.07</td>
</tr>
</tbody>
</table>

Children were asked to indicate how much they liked school lunch and home lunch on a 5-point scale (indicated with smiley faces). Children indicated they preferred home lunch to school lunch, with a mean score of 1.44 for home lunch (1 being the best), and 2.97 for school lunch (3 being neutral). Only 9.8% of children indicated that they liked the school lunch very much, and another 13.5% report never having school lunch. Over half of the children (55.8%) gave lunch brought from home highest score, and 19.0% never have lunch packed from home. As for school breakfast, 10.6% of children gave the school breakfast the best rating, but 60.3% never have school breakfast. On the other hand, 70.4% like the home breakfast best, with only 3.1% never having home breakfast (Table 4).
### Table 4 Preference towards school meals and home meals

<table>
<thead>
<tr>
<th></th>
<th>😊</th>
<th>😄</th>
<th>😊</th>
<th>😞</th>
<th>😞</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Lunch</td>
<td>9.82%</td>
<td>24.54%</td>
<td>26.99%</td>
<td>10.43%</td>
<td>14.72%</td>
</tr>
<tr>
<td>Lunch you bring from home</td>
<td>55.83%</td>
<td>19.02%</td>
<td>4.91%</td>
<td>0.06%</td>
<td>0.06%</td>
</tr>
<tr>
<td>School breakfast</td>
<td>10.56%</td>
<td>10.56%</td>
<td>4.91%</td>
<td>5.59%</td>
<td>8.07%</td>
</tr>
<tr>
<td>Breakfast I have at home</td>
<td>70.37%</td>
<td>20.37%</td>
<td>4.91%</td>
<td>0.06%</td>
<td>0.06%</td>
</tr>
</tbody>
</table>

To better understand family shopping habits, parents were asked to report how often their children came to the grocery store with them. Approximately 70% reported their children came grocery shopping more than frequently (Table 5). Nearly all (96%) of the parents thought that they would agree to buy an item that their children wanted during shopping more than occasionally, and 7% would agree to buy the foods all of the time (Table 5).

### Table 5 Grocery Shopping Behaviors

<table>
<thead>
<tr>
<th></th>
<th>Percent frequency child goes with parents</th>
<th>Percent frequency of parents agreeing to buy items at the grocery store if child asks for something</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rarely</td>
<td>4</td>
<td>3.09</td>
</tr>
<tr>
<td>Occasionally</td>
<td>26</td>
<td>43.83</td>
</tr>
<tr>
<td>Frequently</td>
<td>45</td>
<td>46.91</td>
</tr>
<tr>
<td>All of the time</td>
<td>25</td>
<td>6.17</td>
</tr>
</tbody>
</table>

Finally the children were asked about their shopping habits, their contribution to housework, and their efforts related to studying, which may be important factors affecting the power of children in family shopping. Approximately 74% of children indicated they ask their parents to buy something they like during shopping.

The frequency of doing housework (including house cleaning, making bed, cleaning dishes, and doing laundry) was asked, to calculate children’s contributions towards the house. More than half (64%) of children though that they did house cleaning more than occasionally, and 22% of children indicated they made their bed every day. As for helping with the dishes,
43% of children reported that they helped at least 1-2 times each week. Nearly half (42%) indicated they did laundry more than 1-2 times a week. Almost all (86%) indicated that they did homework every day, and 11% thought they did homework about 4-5 times a week (Table 6).

Table 6 Frequency of doing housework as reported by the children

<table>
<thead>
<tr>
<th>Type of work</th>
<th>Never</th>
<th>Not much</th>
<th>About 1-2 times a week</th>
<th>About 4-5 times a week</th>
<th>Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean the house</td>
<td>6.13%</td>
<td>29.45%</td>
<td>42.33%</td>
<td>10.43%</td>
<td>11.66%</td>
</tr>
<tr>
<td>Make the bed</td>
<td>12.27%</td>
<td>26.99%</td>
<td>21.47%</td>
<td>16.56%</td>
<td>22.70%</td>
</tr>
<tr>
<td>Wash dishes</td>
<td>22.84%</td>
<td>33.95%</td>
<td>21.60%</td>
<td>12.35%</td>
<td>9.26%</td>
</tr>
<tr>
<td>Do laundry</td>
<td>26.99%</td>
<td>30.06%</td>
<td>32.20%</td>
<td>4.91%</td>
<td>5.52%</td>
</tr>
<tr>
<td>Do homework</td>
<td>0</td>
<td>1.23%</td>
<td>1.84%</td>
<td>11.04%</td>
<td>85.89%</td>
</tr>
</tbody>
</table>

In order to investigate the National School Lunch Program, perceived quality differences between School Meals and home meals is tested. To determine if children prefer home meals to school meals, mean ratings for both types of lunch were compared for respondents who reported having both school and home lunches (53 respondents who never tried School Lunch or lunch brought from home were removed from this test).

Among the participating children, 24.54% never had school lunch, and 20.37% of them never had lunch packed from home. Among those who had both, 6.36% prefer school lunch more than home lunch, 8.18% rank the lunches same and 85.46% thought home lunch was better than school lunch. For breakfast, 60.25% of responding students never had school breakfast, while 3.09% report never having breakfast at home. Among those students who both had school and home breakfast, 8.06% would prefer school breakfast over home breakfast, 67.74% had ranked the home breakfast higher, and 24.19% thought the two were the same quality.

The paired t-test indicates the mean values (3.12 for school lunch and 1.43 for home lunch) is different at the 95% confidence level (Table 7), with students preferring lunch from home to the School Lunch Program food. Similarly, deleting 101 responders who report never
having School Breakfast or home breakfast, the mean score of School Breakfast is 2.84, while the score for home breakfast is 1.30 (Table 7). This difference is also significant at the 95% confidence level, with children preferring home breakfast to school breakfast. Results from these two tests indicate the quality of school meals may be an issue as students significantly prefer home meals to school meals.

| Table 7 Children’s preference towards school meals and home meals: Matched Paired T-test |
|---------------------------------|----------------|----------------|------------------|------------------|
|                                 | t   | df  | Sig.  | Mean Difference |
| Difference between school lunch | 12.65 | 109 | <0.001 | 1.6818 |
| than home lunch                 |     |     |       | 1.4184 1.9453  |
| Difference between school      | 6.96 | 61  | <0.001 | 1.5323 |
| breakfast than home breakfast  |     |     |       | 1.0919 1.7341  |

An ordered probit model is used to estimate models whose dependent variables are ordinal, but not. The ordered probit model is based on the central idea that there is a latent underlying index that is not observable by the analyst and is a continuous descriptor of the real responses. Thresholds partition the real line into a series of regions corresponding to various ordinal categories. In addition the random error associated with this continuous descriptor is assumed to be normal distributed.

The basic probit model is shown in equation 1

\[ Y_1^* = X_i \beta + \varepsilon_i \quad \varepsilon_i \sim N(0, 1) \]  

where \( Y_1^* \) is a continuous variable which is a linear function of a set of dependent variables \( X_i \). \( \varepsilon_i \) is the disturbance term that has a normal distribution. \( \beta \) is the vector of the regression coefficient to be estimated.

The relationship between \( Y_1^* \) and \( Y_2 \) (for example \( Y_i \) can be 0,1,…,m) is shown in the following equations (Equations 2-4):

\[ Y_i = 0, \text{ if } Y_1^* \leq 0 \]  

16
\[ Y_i = \begin{cases} 1, & \text{if } 0 < Y_i^* < \mu_1 \\ m, & \text{if } \mu_{m-1} < Y_i^* < \mu_m \end{cases} \]

Where \( Y_i \) is the observed ordinal variable taking on values 0 through \( m \), and \( \mu \)s are unknown threshold parameters which are estimated with \( \beta \).

To analyze children’s influence on parents’ purchase decision, we denote \( Y \) as parents’ agreement/disagreement of statements regarding children’s impacts on parents’ purchase decision, such as

\[ Y_i = 0 \text{ if parents totally disagree with the statement that children have influence on their purchase decision.} \]

\[ Y_i = 1 \text{ if parents disagree with statement that children have influence on their purchase decision.} \]

\[ Y_i = 2 \text{ if parents neither disagree nor agree with the statement that children have influence on their purchase decision.} \]

\[ Y_i = 3 \text{ if parents agree with the statement that children have influence on their purchase decision.} \]

\[ Y_i = 4 \text{ if parents totally agree with the statement that children have influence on their purchase decision.} \]

Consider the probabilities of each ordinal outcome, the following equations can be written:

\[ P [Y_i = 0] = P [\mu_{-1} < Y_i^* < \mu_0] = \phi (-\beta X') \quad (5) \]

\[ P [Y_i = 1] = P [\mu_0 < Y_i^* < \mu_1] = \phi (\mu_1 - \beta X') - \phi (-\beta X') \quad (6) \]

\[ P [Y_i = 2] = P [\mu_1 < Y_i^* < \mu_2] = \phi (\mu_2 - X_i \beta) - \phi (\mu_1 - \beta X') \quad (7) \]

\[ P [Y_i = 3] = P [\mu_2 < Y_i^* < \mu_3] = \phi (\mu_3 - \beta X') - \phi (\mu_2 - \beta X') \quad (8) \]
The marginal effects of the independent variables on the probabilities can be derived and they vary by individuals. The marginal effects depends on the values of all independent variables and are calculated as the follows (Equation 10):

$$\frac{\partial P [Y_i = j]}{\partial x} = [\phi (\mu_j - \beta'X') - \phi (\mu_{j-1} - \beta'X')] \times \beta$$

Typical marginal effects are calculated at the mean of the variable. However, in the case of dummy variables the mean is not relevant, and the difference of two resulting probabilities when the dummy variable equals 1 and 0 is used.

In the Ordered Probit Model the dependent variable for the model is the parents’ agreement towards six statements describing children’s influence (Table 8). Independent variables used in the model include demographics, family shopping habits, and children’s characteristics.

<table>
<thead>
<tr>
<th>Label</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If my child told me that he/she needs an electronic device for reading or listening to books to help his/her with school, I would think about buying one.</td>
</tr>
<tr>
<td>2</td>
<td>The more my child studies and the better he/she does in school, the more likely I am to think about buying a new electronic device (for reading/listening to books) for him/her.</td>
</tr>
<tr>
<td>3</td>
<td>When deciding what electronic device (for reading/listening to books) to buy, if my child told me that there is a certain brand they need because it works better for school or they know how to use it because they learnt it at school, I would buy that brand.</td>
</tr>
<tr>
<td>4</td>
<td>If my child told me that she/he wants to get a certain food from the grocery store, because she/he likes it, I will be more likely to buy it for them.</td>
</tr>
<tr>
<td>5</td>
<td>If my child told me that she/he wants to get a certain food from the grocery store, because she/he learnt how healthy it is at school, I would be more likely to buy it for them.</td>
</tr>
<tr>
<td>6</td>
<td>The more my child helps around our home, the more likely I am to purchase things for him/her as a reward</td>
</tr>
</tbody>
</table>
The specification of the Ordered Probit Model is:

\[
Pa_{\text{study}} = f(\beta_0 + \beta_1 \text{Parenter} + \beta_2 \text{Parage} + \beta_3 \text{Paredu} + \beta_4 \text{Marstatus} + \beta_5 \text{Nochild} + \beta_6 \text{Income} + \beta_7 \text{Nutrigrade} + \beta_8 \text{Chigender} + \beta_9 \text{Chiage} + \beta_{10} \text{Freqhome} + \beta_{11} \text{Freqhouse} + \beta_{12} \text{Freqshopchi} + \beta_{13} \text{Freqask} + \beta_{14} \text{Freqbuy})
\]

Where \(Pa_{\text{study}}\) is the parents ranking how likely they are to purchase an electronic device to help the child study (statement 1, repeated for each statement). The independent variables in the model can be divided into several groups. The first group is family characteristics and parents’ demographics, including parents’ gender, age, education level, marital status, number of children in the family, income, and self-rated nutrition knowledge. The second group concerns children’s characteristics, which consists of children’s gender, children’s age, frequency of doing homework, and frequency of doing housework. The frequency of doing housework is the sum of the reported frequency of doing laundry, washing dishes, making their bed, and helping to clean the house. The third group consists of three variables focusing on the interaction between children and parents regarding shopping behavior such as frequency of shopping with children, frequency of children asking for a certain item, and frequency of parents agreeing to buy in general.

Results

Data from 163 surveys was used to estimate the ordered probit models. Since the six statements making the dependent variables were answered by the same person, and their answers will inevitably affected by their personality, the answers would likely be correlated. Thus the qualitative and limited dependent model (QLIM) procedure in SAS, which has the ability to analyze the models involving simultaneous association, was used. Correlation tests were run, and based on the results (Rho < 0.0011 in all cases), the variables are correlated, supporting use of the QLIM procedure. Results of the ordered probit models are shown in Table 9.
The coefficient for gender is significant in five of the six cases, with the exception being children’s preference (pa_food). The positive sign on the five significant coefficients indicates mothers (female) are more likely to be influenced by children during the shopping progress than fathers (male). In the case of whether or not a parent will purchase a food from the grocery store because the child likes it, gender was not significant. In fact, in this equation, only two factors were significant: parents’ frequency of agreeing to buy a certain food in general, which is positively related to likelihood to purchase a food because the child likes it, and their level of
nutrition knowledge, which is negatively related. This result is consistent with previous research constructed by Berry and Pollay (1968) that the more mothers cared about nutrition, the less influence the children has over food purchases.

The coefficient of parents’ education level is significant in two cases: when checking the relationship between children’s power in family purchase with children’s knowledge of certain brand/item, and children’s nutritious knowledge of certain food. In both of the two statements, the sign of the coefficients is negative, indicating that parents’ education level is reversely connected with the children’s influence, which means that the higher education parents’ received, the lower possibility that they will buy things children liked, and thus the smaller children’s influence is towards family purchase.

Parents’ self-rated grade of nutrition knowledge is only significant in one statement, the relationship between children’s amount of influence and children’s preference towards certain food. In this case, the grade of nutrition knowledge is negatively associated with children’s influence, in other words, if parents feel they have more knowledge about nutrition, they are less likely to listen to the children’s argument that they want a product because they like it.

The coefficient of family income is only significant in one case, which is examining the relationship between children’s influence and the knowledge or information of a certain brand they provided during shopping. The positive coefficient sign in this case shows that in families with higher household income, the children have larger influence over brand choices. In this way, children will play a more important role in the process of purchase. This result is consistent with numerous of research, like the one conducted by Jenkins (1979).

Parents’ age turns to be a significant factor in only one out of six cases. When exploring factors affecting the amount of children’s influence concerned about children’s contribution to
housework, the sign of the coefficient of parent’s age is negative. This may be because that older parents would be more traditional and conservative, thus they would be less influenced by their children, which is consistent with previous research constructed by Roberts et al (1981).

Marital status and number of children in the household were insignificant in all cases. It was expected that children in single family may have larger influence in family shopping (based on previous research by Taylor et. al, 1985).

Children’s characteristics are also related variables which would impact the amount of children’s influence in family shopping. The coefficient of children’s frequency of doing housework is statistically significant and positive in three out the six cases (pa_study, pa_housework, and pa_grade). According to the resource theory developed by Blood and Wolf (1960), this is consistent in that children who are seen to contribute more are more likely to have influence. In a similar finding, children’s frequency of doing homework is statistically significant and positive in three cases (pa_study, pa_grade, and pa_work).

The coefficients of both children’s age and gender are only statistically significant pa_nutri. The sign of age’ coefficient is negative, indicating that the younger the children, the more influential they are towards parents when asking for a certain food. The positive sign of gender shows that boys are more influential than girls in this case.

The group of family shopping habits is consisted of three variables: frequency of shopping with children, frequency of children asking for a certain item during shopping, and frequency of parents agreeing to buy in general. The coefficient for the frequency of children asking for a certain item is statistically significant and positive in three cases, regarding the necessity of certain items for study, children’ progress in school work and contribution to housework. This result is consistent with the Cowan and Avants (1988)’s work. “Asking a
certain item from parents need some strategies, and the use of strategies like bargaining would increase the possibility of children’s influence.”

Frequency of parents agreeing to buy items children asked in general is only affective in the one case concerned children’s preference towards a certain food. The positive coefficient sign indicating that higher frequency of parents’ agreeing to purchase what children asked in general, the larger amount of children’s influence in family purchase decision-making. The frequency of shopping with children is insignificant in all the six cases, which indicates that shopping with parents does not improve the influence of children in family shopping.

Conclusions

Data from a survey conducted with 4th and 5th graders showed that although many eat school lunch, students tend to prefer home prepared lunch (and breakfast). In theory, school lunch and breakfast are a way to introduce new nutrition information and foods to children. But whether or not this translates to changed behavior at home relies on whether children can influence their parents decision making process. In this study, we attempted to examine factors related to a parents willingness to be influenced by children for a variety of reasons.

Some findings were not surprising. For example, children who worked more on homework or housework often had more influence in parents decision making processes. Other findings were less expected. For example, most variables did not influence all six situations we examined, indicating the influence the child has is complicated (and not always consistent).

REFERENCES


