Developmentally Appropriate Nutrition Education for Elementary School Aged Children (Raleigh, North Carolina)

By:

Ashley Perrone

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ABSTRACT

With increasing childhood obesity, a growing number of interventions target young children with a goal of impacting their food choices and physical activity\textsuperscript{10}. However, messages being sent to young children are often translated incorrectly based on the child’s developmental stage\textsuperscript{14}, and may do more harm than good. In particular, the rise in obesity prevention approaches has coincided with a rise in disordered eating behavior\textsuperscript{2,5}. In this paper, I will focus on how nutrition messages in the education setting should be appropriately tailored based on the child’s developmental stage to simultaneously decrease the risks of both obesity and disordered eating.

INTRODUCTION

There has been growing concern about the rise in childhood obesity over the past few decades\textsuperscript{1}. With the new labeling of obesity as a “disease”, there is even more of an outcry for solutions, both in treatment and prevention. Interventions have been designed to help children “lose weight” or “eat healthy”\textsuperscript{6}. The one component of these interventions that has seemed to slide under the radar is the resulting harm that the idea of “obesity as a disease” is causing for those who are overweight\textsuperscript{10,23}. The restrictions we are placing on food choices, the morality associated with eating “good” vs. “bad” foods, the over-emphasis of weight being the sole indication of health, and the stigma that we place on those who are of a curvy figure, can potentially lead to more serious consequences such as chronic dieting, low self-esteem, and disordered eating that often leads to a DSM-V diagnosable eating disorder\textsuperscript{2}. 
The mental and emotional damage that is being done by some of these interventions is often disregarded, but can be very serious. In fact, “eating disorders have the highest mortality rate of any mental illness”\textsuperscript{4}. In the implementation of a solution for one deadly “illness” we are creating others. The scary fact is that, because we are increasingly targeting childhood obesity, the rise in eating disorders is not only seen in the adolescent population, but is now evident in very young children\textsuperscript{9}. One study found that girls are expressing concerns about their weight and body size as early as age 6 and 50-60\% of elementary-aged girls are afraid of becoming “too fat”\textsuperscript{4}. At this point in their lives, children are learning about themselves and the world around them\textsuperscript{25}. The last thing they should be preoccupied with is their weight.

The issue is that obesity prevention strategies often necessitate symptoms of common eating disorders – food restriction, obsession with weight, body shaming, size stigma, and perpetuation of the “thin ideology”\textsuperscript{5}. When dealing with our most vulnerable population, we have to be aware of some of the messages they are receiving when it comes to their growing bodies and the food they enjoy. Nutrition messages, especially in the school setting, should be designed around addressing current issues without doing harm\textsuperscript{18}. The purpose of this paper is to draw attention to the aspects of nutrition messages that cause harm, principally those geared towards children, and what the current recommendations are in the literature. Then, I will discuss how the recommendations apply to the school setting, in particular, the NC school curriculum. Lastly, I will suggest implications for further research on this topic.
APPROPRIATE NUTRITION MESSAGES TO CHILDREN: THE RECOMMENDATIONS

For decades, there has been an immense amount of science surrounding the idea of developmentally appropriate messages and their protective benefits\textsuperscript{14}. There has also been a surfeit of studies showing the harmful, life-long effects of the current nutrition practices put in place for children. More recently, specific recommendations are coming out regarding nutrition education tailored primarily towards parents and healthcare providers\textsuperscript{12}. The critical gap in the current literature is the translation of appropriate messages to the health curricula in the schools. Children of elementary school age spend most of their time at school. Therefore, those who are in authority at school (teachers, principals, etc.) can have a larger influence on how children receive nutrition messages, more so than health care providers and potentially even parents.

Something that has been identified as the “Gold Standard” in the literature surrounding public health interventions is the idea that the shared risk factors of eating disorders and obesity should be identified and intervened in such a way that prevents one without triggering the other\textsuperscript{1}. There have been many new effective recommendations in the literature surrounding obesity prevention with respect of eating disorder prevention. These recommendations even touch on what is appropriate for children to learn in regards to nutrition and health\textsuperscript{6}. I will summarize the top five current recommendations for best practice in the school setting when it comes to nutrition education so it can be made clear where there is a deficit in our current practices.
**RECOMMENDATION #1:** Remove the Focus on Weight

An individual’s weight is only one aspect of overall health and oftentimes it cannot be controlled. Children will experience many changes in growth and body shapes throughout their first two decades of life. To expect them to fit into a “normal” weight category is impractical, and instead brings shame to those who have larger body types. Targeted interventions should focus on modifiable behaviors, and weight is not a behavior. Children are meant to eat enough to support their growing body, and this growth looks different for everyone. Being overly focused on weight has the potential to cause unhealthy social comparisons, weight-based stigmatization, and weight-based victimization in such a susceptible population. Characterizing someone using terms such as “obese” or “overweight” actually promotes weight-based stigma in schools and the misconception that the size of one’s body can be easily manipulated.

Weight control behaviors have been found to be part of the problem, putting children at risk of the development of unhealthy eating behaviors and feelings of unworthiness or incompetence. A recent statement released by the American Academy of Pediatrics emphasizes the harm caused by “weight talk”, whether it be geared towards themselves or their children. The realization that weight is a biologically diverse measure is the key to avoiding harm.

**RECOMMENDATION #2:** Avoid Moralization of Food

With the prevalence of weight loss schemes in our diet-obsessed culture, there has been the creation of a black-and-white schematic of “good” vs. “bad” foods. Either the food is a “bad
food” – ridden with guilt, temptation or shame\textsuperscript{13}, or a “good food” – one that you can feel good about eating. Many of these assumptions of foods being “good” or “bad” are based on erroneous beliefs (e.g. carbohydrates are “fattening”)\textsuperscript{14}. When these messages get to children, the implications are even worse. Children, up until ages 11 or 12, are concrete thinkers, meaning that they think in terms of facts and literality\textsuperscript{25}. At even earlier ages, children do not even consider cause and effect and have difficulty categorizing items\textsuperscript{15}. If they are told that cupcakes are “unhealthy”, it is hard for them to conceptualize that one cupcake every now-and-then is not going to hurt them or that other foods similar to cupcakes (e.g. cookies) fall into the same category\textsuperscript{14}. One of the most important experiences for growing a healthy child is a positive experience surrounding food\textsuperscript{17}. Creating fear or guilt around foods that a child likes creates a negative atmosphere around eating and can lead to a battlefield at mealtimes\textsuperscript{16}.

RECOMMENDATION #3: Consider Learning Development

Throughout elementary school, children can only comprehend concrete messages, or those that are easy to understand with consistent meanings that can be measured, defined or experienced by the senses\textsuperscript{25}. No matter how well constructed, children cannot understand abstract concepts until they are developmentally ready. Ideas such as “eat a variety of foods” or “maintain a healthy weight” are not well understood by children of elementary school age\textsuperscript{15}. Studies have shown that they can easily repeat the phrases they have heard, but that does not mean they understand it\textsuperscript{14}. One study in particular looked at how children interpreted common nutrition messages, such as “vegetables are healthy”, and found that children, up until about 11
or 12 years old, will not understand how or why vegetables are healthy\textsuperscript{15}. Even though they may know vegetables are healthy they will not be able to reason what makes them healthier than any other food item. Another study showed that elementary school children had difficulty understanding abstract terms such as “moderation” or foods that are appropriate “once in a while”\textsuperscript{14}. Table 1 shows you the varied responses children had to “what is a serving size”. In Table 2, you can see that children of elementary school age also had difficulty labeling foods until grades 5-6. If we want our interventions to impact the knowledge of the participants, we must meet them where they are at developmentally.

### Table 1. Selected Responses to the Question “What is a Serving”?

<table>
<thead>
<tr>
<th></th>
<th>Grades 3-4</th>
<th>Grades 5-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A dish</td>
<td>A glass of milk</td>
<td></td>
</tr>
<tr>
<td>A plate</td>
<td>A cup of milk</td>
<td></td>
</tr>
<tr>
<td>Bucket or teaspoon</td>
<td>A couple of ounces of milk</td>
<td></td>
</tr>
<tr>
<td>What is served to you</td>
<td>A little container of yogurt</td>
<td></td>
</tr>
<tr>
<td>2-3 apples is at least 3 servings</td>
<td>One banana equals a serving of fruit</td>
<td></td>
</tr>
<tr>
<td>14 potato chips would be 14-16 servings</td>
<td>A bowlful of cereal</td>
<td></td>
</tr>
<tr>
<td>Rice and meat is one serving; pasta for lunch is one serving; pancakes for breakfast is one serving</td>
<td>One piece of bread</td>
<td></td>
</tr>
<tr>
<td>Two slices of breads is one serving from the grain group</td>
<td>How much you eat</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>How much it takes to make you full</td>
</tr>
</tbody>
</table>

Children were shown the Food Guide Pyramid and asked what they think a serving size should be.\textsuperscript{14}

### Table 2. Average number of foods correctly associated with food categories: Results of Food Identification Task.

<table>
<thead>
<tr>
<th>Food Category</th>
<th>Grade Level</th>
<th>K-2</th>
<th>3-4</th>
<th>5-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Fat</td>
<td>1.5</td>
<td>1.8</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Low Fat</td>
<td>2.1</td>
<td>1.7</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>2.3</td>
<td>2.6</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>2.6</td>
<td>2.8</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Grain Products</td>
<td>1.3</td>
<td>2.1</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>High in Sugar</td>
<td>1.4</td>
<td>2.0</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>High in Salt</td>
<td>0.5</td>
<td>1.3</td>
<td>1.9</td>
<td></td>
</tr>
</tbody>
</table>

Children were asked to name three foods in each of the food categories.\textsuperscript{14}
**RECOMMENDATION #4: Ellyn Satter’s Division of Responsibility**

In the Division of Responsibility (DOR), Ellyn Satter, MS, RD. proposes that parents (or adults) decide the *what, when and where* of meals and snacks\(^{16}\). This provides children with the structure with which they get to decide the *how much* and *whether*\(^ {16}\). How this is different from commonly used models is that we are allowing the adult to do the providing and trusting the child to listen to their bodies to eat what they need. Children are the ultimate intuitive eaters, starting from birth\(^ {17}\). They listen to their internal hunger and satiety cues because, quite simply, they do not know anything else\(^ {16}\). They have not been bombarded with expectations or fear of certain foods. The DOR model only asks that the parents provide the structure\(^ {16}\). Children need structure as their habits are still forming\(^ {18}\). Parents are asked to rid their weight stigma and fear of “overweight” in order to allow their children to grow the way they are supposed to. The key is to provide structure not control (figure 1)\(^ {19}\).

![Figure 1. Structure vs. Control in Parenting](image)

Based on Grolnick and Pomerantz’s models of parental control, depicting that parents’ use of structure and control in parenting may have differing effects on the development of self-regulation in childhood. On the left are structure-based parenting practices hypothesized to facilitate the development of children’s self-regulation. On the right are types of controlling parenting practices on hypothesized to have negative effects on children’s self-regulation development\(^ {19}\).
RECOMMENDATION #5: Avoid Restriction and Coercion

There have been numerous studies that show restriction only leads to feelings of deprivation and increased craving for the food you are restricting\(^\text{20}\). This is a direct result of ignoring internal hunger signals, which are our innate ability to ensure survival as a species. This is no different for children, except they do not yet understand what they are doing wrong or why they are doing it\(^\text{16}\). Restricting a child to eat more or less to fit the “guidelines” can create fear and obstinacy when it comes to eating\(^\text{10}\). The American Academy of Pediatrics recognized dieting as a formal method of caloric restriction in an attempt to control weight that could lead to disordered eating behaviors\(^\text{12}\). The consensus is that the benefits of dieting are too small to outweigh the potential dangers in order for it to be considered as a safe and effective strategy for weight control\(^\text{20}\). Research has shown that restricting certain foods actually increases their appeal to children\(^\text{7}\) and that diet restriction is a major contributor to eating in the absence of hunger\(^\text{10}\) – traits that stay with you into adulthood\(^\text{9}\). On the other hand, coercion to eat more healthy foods or scolding for eating too much will actually lead children to feel shame for not being obedient to these food “rules”\(^\text{16}\). Actively encouraging or rewarding children to eat certain food will make it less likely that they will eat them\(^\text{18}\). Just like with restriction, coercion is forcing a reliance on externally prescribed hunger rather than internal hunger regulation.

TRANSLATING CURRENT RECOMMENDATIONS INTO THE SCHOOL SETTING

Current criteria for health evaluation in schools rely on things such as banning junk food, calorie labeling on menus, BMI screenings\(^\text{23}\) and promotional campaigns emphasizing the
dangers of excess weight. There has been growing proof that these new standards could actually lead to disordered eating behaviors such as preoccupation with dietary restraint and weight stigma. BMI screening, for example, has shown to encourage parental promotion of dieting, increased stigmatization of obesity, lowered self-esteem, increased body dissatisfaction, and disordered eating. It does not, however, address the underlying issues that lead to obesity or determine all aspects of health. It is essentially a method that shames both parents and children for being of a higher weight than the norm.

Although the DOR applies mainly to parents, teachers could also use a similar set of guidelines for providing structure around eating for children. Teachers are just as responsible for being good role models, sending positive messages and allowing children to discover their own likes and dislikes as parents are. Children in elementary school are still forming their food habits and need adults to manage structure around feeding. This can be provided within the classroom by allowing for a planned snack time and not allowing eating during times outside meals and snacks. Children still need to be trusted to make their own food choices among what is provided. Studies have shown that children eat better when they can choose the foods that they want. It is important to remember what a child eats from day to day greatly varies in how much they eat or what types of foods they choose. It is best to offer a variety of familiar and unfamiliar foods and support children’s abilities to eat based on hunger, appetite, and satiety. Their food intake will even out over the course of time so that they are getting enough to ensure proper growth.
What teachers say and how they act can impact a child’s eating just as much as their parents. They should avoid coercion to eat healthy foods or scolding if a child goes back for seconds. The focus should be on keeping the food environment a positive experience for everyone by refraining from derogatory comments (e.g. weight talk) or displaying negative attitudes (e.g. “good” vs. “bad” foods). Teachers should provide emotional and social support by reassuring children that they do not have to eat everything they have taken; they will be more daring with food choices if they do not feel like they have to eat it all. Include teaching them manners at the dinner table (e.g. refusing a food politely) and not allowing children to mock other kids’ eating habits or food preferences.

Lastly, and potentially the most important application to the school setting, is to make sure that health and nutrition lessons are developmentally appropriate. For elementary school kids who have not developed abstract reasoning or critical thinking skills, activities that expose them to different types of foods and their sensory components are most appropriate. Activities like drawing, growing or preparing different types of foods help to familiarize children with healthy foods in a way that they understand and relate to. Lessons can be things such as learning where foods come from, how they are grown or harvested, how it gets to us and exposure to different cultural foods. It is actually not until about the age of 12 that children can be able to think abstractly and actually apply nutrition principles. Until that time, it is important to focus on simple, positive and behaviorally-oriented nutrition lessons.
EVALUATING THE NORTH CAROLINA HEALTH AND NUTRITION CURRICULUM

It is wonderful that schools are taking it upon themselves to incorporate nutrition education within their health lessons. Children need to be exposed to a variety of foods and discover foods that they like and dislike. This will help reinforce feeding skills at home. The problem is that, in being so concerned about the “obesity epidemic”, we have been bombarding our children with information that they are not cognitively developed enough to understand. As it turns out, children are interpreting these messages the best way they can, and for some, this means turning their eating behaviors into rigid and fearful practices. I evaluated the North Carolina Health and Nutrition Curricula with respect to the recommendations (Table 3).

Table 3. Appropriate Nutrition Education in the School Setting: Current Recommendations vs. NC School Health Curriculum

<table>
<thead>
<tr>
<th>Current Recommendations(^{14,15,25})</th>
<th>NC School Health Curriculum Objectives(^{26})</th>
<th>Evaluation</th>
</tr>
</thead>
</table>
| Kindergarten – 2\(^{nd}\) Grade: preoperational stage | Kindergarten:  
- Recall foods and beverages beneficial to teeth and bones  
- Recognize nutrient-dense foods in a list of foods that are culturally diverse | ✓ Multiple categories are inappropriate for children of this age  
✓ Nutrient-density is an abstract concept |
| • Simple and direct concrete messages  
• Sensitive to stimuli/easily over stimulated  
• Difficulty classifying and categorizing items  
• Understanding cause and effect  
• Attending to more than one message at a time  
• Understanding abstract concepts like “variety” or “healthy” | 1\(^{st}\) Grade:  
- Select a variety of foods based on MyPlate  
- Select healthy alternatives to foods and beverages that are high in sugar | ✓ MyPlate categorization will be difficult  
✓ Healthy is an abstract term  
✓ Multiple categories are inappropriate for children of this age |
| 1\(^{st}\) Grade:  
- Select a variety of foods based on MyPlate  
- Select healthy alternatives to foods and beverages that are high in sugar | 2\(^{nd}\) Grade:  
- Summarize motivations for eating food, including hunger and satiety  
- Plan meals that are chosen for energy and health | ✓ Motivations for eating are innate (i.e. hunger/satiety) not learned  
✓ It is the adults’ job to plan the meals |
<table>
<thead>
<tr>
<th>Grade</th>
<th>Key Points</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Grade – 4th Grade: Concrete Operational Stage</td>
<td>Achieving the age of reason</td>
<td>Logically think about concrete ideas</td>
</tr>
<tr>
<td>2nd Grade:</td>
<td>Recognize the interrelationship of parts of MyPlate</td>
<td>Explain the importance of a healthy breakfast and lunch</td>
</tr>
<tr>
<td>3rd Grade:</td>
<td>Check the Food Facts Label to determine foods that are low in sugar and high in Calcium</td>
<td>Recognize appropriate portion sizes of foods for most Americans</td>
</tr>
<tr>
<td>4th Grade:</td>
<td>Use the Food Facts Label to plan meals and avoid food allergies</td>
<td>Compare unhealthy and healthy eating patterns, including eating in moderation</td>
</tr>
<tr>
<td>5th Grade and Beyond (end of elementary school): Formative Operational Stage</td>
<td>Develop critical thinking skills</td>
<td>Have not yet develop abstract reasoning</td>
</tr>
<tr>
<td>4th Grade:</td>
<td>Explain how nutrition and fitness affect cardiovascular health</td>
<td>Summarize the association between caloric intake and expenditure to prevent obesity</td>
</tr>
<tr>
<td>5th Grade:</td>
<td>Contrast dieting and healthy weight management, including limiting high-fat and high-sugar foods</td>
<td>Infer the benefits of limiting the consumption of foods and beverages high in fat and added sugar</td>
</tr>
</tbody>
</table>

Evaluations are based on the research that is currently in the literature and has been discussed in this paper. Further research is required to determine what methodologies are most appropriate.

Based on this analysis, the objectives of the curriculum are too far-reaching for most children to understand, leaving it open to interpretation\(^4\). It has the potential to create guilt or
shame for having eating patterns that are different than those that are considered “healthy”, especially since we know children naturally eat unpredictably from day to day. It is also important to take note that children are developing at different rates, meaning that not all children will understand the same principles at the same time.

FUTURE RESEARCH

As this is a new topic gaining traction in the literature, there are many gaps that should be acknowledged. For one, these recommendations need to be studied in the school setting to provide proof of beneficial outcomes. Second, for further evidence of potential harm, the current nutrition objectives need to be studied as far as how children are receiving these messages. The last study done on this was 20 years ago. Lastly, more focus needs to be placed on the complexity of these concepts and how they can be better understood for more lay audiences or those with less food and nutrition knowledge.

CONCLUSION

School curricula in all areas of study (math, science, etc.) are tailored towards children’s developmental learning stage, there is no reason why nutrition should be any different. Placing the responsibility on children to make “healthy” food choices and teaching weight control to such a vulnerable population will unquestionably do more harm than good. Weight or body size is not something that children need to be concerned with at this point in their lives for the reasons we have discussed in this paper, nor is it something that they feel like they should “manage” as their bodies are growing and changing. This could lead to unhealthy weight
control methods and disordered eating that could stunt their natural growth. Attention needs to be called to these “obesity prevention” tactics throughout the school system in order to relinquish the idea that our children need to understand complex nutrition principles in order to be healthy. We need to leave the challenging concepts of structure and supply to adults, and trust kids do what they do best – learn, grow and develop.
REFERENCES