1-2010

The Healthy Food Slide Rule (HFSR): A Nutrition Education Tool for Children

Elaine M. Long
Boise State University

Uwe Reischl
Boise State University

Barbara B. Abo
University of Idaho, Cooperative Extension

The Healthy Food Slide Rule (HFSR): A Nutrition Education Tool for Children

Elaine M. Long, PhD, RD, LD
Department of Community and Environmental Health
Boise State University
Boise, ID 83725

Uwe Reischl, PhD, MD
Department of Community and Environmental Health
Boise State University
Boise, ID 83725

Barbara B. Abo, MS
University of Idaho, Cooperative Extension
Boise, ID 83714

INTRODUCTION

The Healthy Food Slide Rule (HFSR) is a new educational tool designed specifically for use by school children in grades 4-6. The HFSR teaches the importance of including the 5 food groups and the importance of complying with appropriate portion sizes as presented in *MyPyramid*.[1, 2] The portion size information included in the HFSR combines the healthy eating and physical activity messages offered by *MyPyramid for Kids.*[3, 4] The new tool can be easily incorporated into existing math lessons (weights, measures, and fractions), into language arts lessons, or into science lessons.[5]

DESCRIPTION OF HFSR AND LESSON

Food intake patterns from *MyPyramid*[1] and Estimated Energy Requirements by age, gender, and activity levels outlined in the *Dietary Guidelines for Americans* were used to construct the HFSR (Figure 1). [6] The slide rule consists of a front panel, a back panel, and middle slider panel. While age groups, gender groups and measures are listed on the front panel, activity levels and portions are found on the slider panel. Directions for use are printed on the HFSR front panel. The back panel provides information on food groups, portion sizes, and physical activity levels from *MyPyramid*.[1] Visual examples of portion sizes include cupped hands (for cups), a thumb (for an ounce), and a slice of bread. As the user moves the slider to a self-selected physical activity level (light, moderate, or vigorous), recommended portions from each food group appear in the windows of the front panel.

A lesson plan on portion sizes, healthy food choices and menu planning was written to accompany the HFSR. During the lesson, children manipulate the slide rule and write down the amounts they need to eat next to each food group on a worksheet ("*Amounts for Me*"); measures for portion sizes are pre-printed on this sheet as a prompt. At the end of the lesson, children plan a one-day menu on a worksheet ("*What I Plan to Eat*") using amounts from the HFSR. Children are reminded by the instructor to include foods from all food groups in their menus along with both amounts and portion sizes (e.g.1 cup, 2 ounces) from the HFSR appropriate for their age, gender and activity level.

Prior to using the HFSR with the target age-group, a convenience sample of 128 health science students was given the HFSR, lesson plan and worksheets. Boise State University's IRB reviewed and approved our survey. The health science students described the slide rule as "kid-friendly," "easy to use," "colorful," "interactive," "hands-on," and "fun." After this review, a measuring activity with dried beans, group menu planning activity, discussion of physical activity, and age-appropriate wording were incorporated into the final lesson plan and worksheets.

CLASSROOM IMPLEMENTATION AND EVALUATION

Four elementary school classes (grades 4, 5, and 6) were recruited from the local school district. A 45-minute lesson using the HFSR was presented by a Cooperative Extension faculty member. The lesson was repeated 1 month later to provide a review of portion sizes and to provide for additional menu planning practice. Boise State University's IRB reviewed and approved the classroom implementation and evaluation. The HFSR, food models, pieces of fruit and vegetables, measuring cups, plates, and drinking glasses were included each time the lesson was taught. Children always used the HFSR to find their individual amounts and then planned a menu (breakfast, lunch, dinner and snacks; Figure 2). Eighty-nine students (53 males and 36 females) (mean age 10.3 years, SD 0.86) were taught both lessons and completed a "*What I Plan to Eat*" worksheet each time. We found that the transfer of foods and portions from the HFSR to the "*What I Plan to Eat*" worksheet was difficult for the children. The menus were evaluated using 3 questions for each food group: 1) Was a food from the food group included (yes/no)? 2) Was a portion size used with the food (yes/no)? 3) If a portion size was included, was it appropriate (yes/no)? The average number of food groups included on menus developed by the children was 4.38 after the first lesson and 4.55 for the second menu (no significant difference). Children were more likely to include foods from the grains and meat & beans groups and less likely to include vegetables. Cereal, chicken, milk, apples, and carrots were included most often. Some children named ingredients in combination foods, such as sandwiches and tacos. After the second session, children included more vegetables on their menus (74% to 81%). Portion sizes were infrequently used by students after the first session. Students included portion sizes 15-16% of the time for grains, fruits, vegetables and meat & beans. Portion sizes (cups) were used 25% of the time for milk. After the second session that included a group menu planning activity, students used portion sizes 85-88% of the time for all food groups; the frequency of portion size use after the second session was statistically different for all food groups (Chi square, $p < .001$). Children used portions that were more appropriate after the second session (3 ounces of chicken vs. 10 ounces).

SUMMARY AND LESSONS LEARNED

The HFSR tool presents *MyPyramid* messages in a novel interactive format. After 2 classroom sessions, it was seen that children in the target age group used portion sizes more frequently when planning foods to eat than before being introduced to the HFSR. Children enjoyed using the HFSR and asked questions during the lesson such as: What if I am more active? How does my food intake measure up? How much is 1 cup of fruit or 1 ounce of cereal? Additional HFSR math lessons include: Estimating physical activity levels, label reading, and purchasing food.

FUTURE PLANS

We envision that teachers attending in-service workshops will prepare lesson plans across the curriculum[5] and post on a course web-site. Aides in Idaho's EFNEP will use the HFSR in a series of lessons for low income mothers and their children; food intake records will be compared to previously collected data. Participants in America's largest women's 5 K run and walk[7] will receive the HFSR in their participant bag. The HFSR, lesson and worksheets may be obtained from the corresponding author.

ACKNOWLEDGEMENT

This project was supported in part by grants from the Idaho Dairy Council and Idaho Beef Council. The authors wish to thank the students and school personnel for their cooperation in this project. We acknowledge the contributions of Johanna Kratt, Aledia Mermerian, Chalese Riley and the design team at American Slide Chart/Perrygraf.

REFERENCES

1. U.S. Department of Agriculture, *MyPyramid*. Available at http://www.mypyramid.gov/ Accessed June 10, 2008.

2. Britten P, Haven J, Davis C. Consumer Research for Development of Educational Messages for the MyPyramid Food Guidance System. *J Nutr Educ Behav* 06:38:S108-S123.

3. U.S. Department of Agriculture, *MyPyramid for Kids.* Available at: http://www.mypyramid.gov/kids/index.html Accessed June 10, 2008.

4. French, L Howell G, Haven J. Designing *MyPyramid for Kids* Materials to Help Children Eat Right, Exercise, Have Fun. *J Nutr Educ Behav* 06:38:S158-159.

5. U.S. Department of Agriculture, Food and Nutrition Service, Team Nutrition resources, *Team Nutrition: Getting It Started and Keeping It Going.* Available at http://teamnutrition.usda.gov/Resources/gettingitstarted.html. Accessed October 18, 2008.

6. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *Dietary Guidelines for Americans, 2005*. 6th Edition, Washington, DC: U.S. Government Printing Office, January 2005.

7. St Luke's Women's Fitness Celebration. Available at http://www.celebrateall.org/ Accessed July 9, 2009.

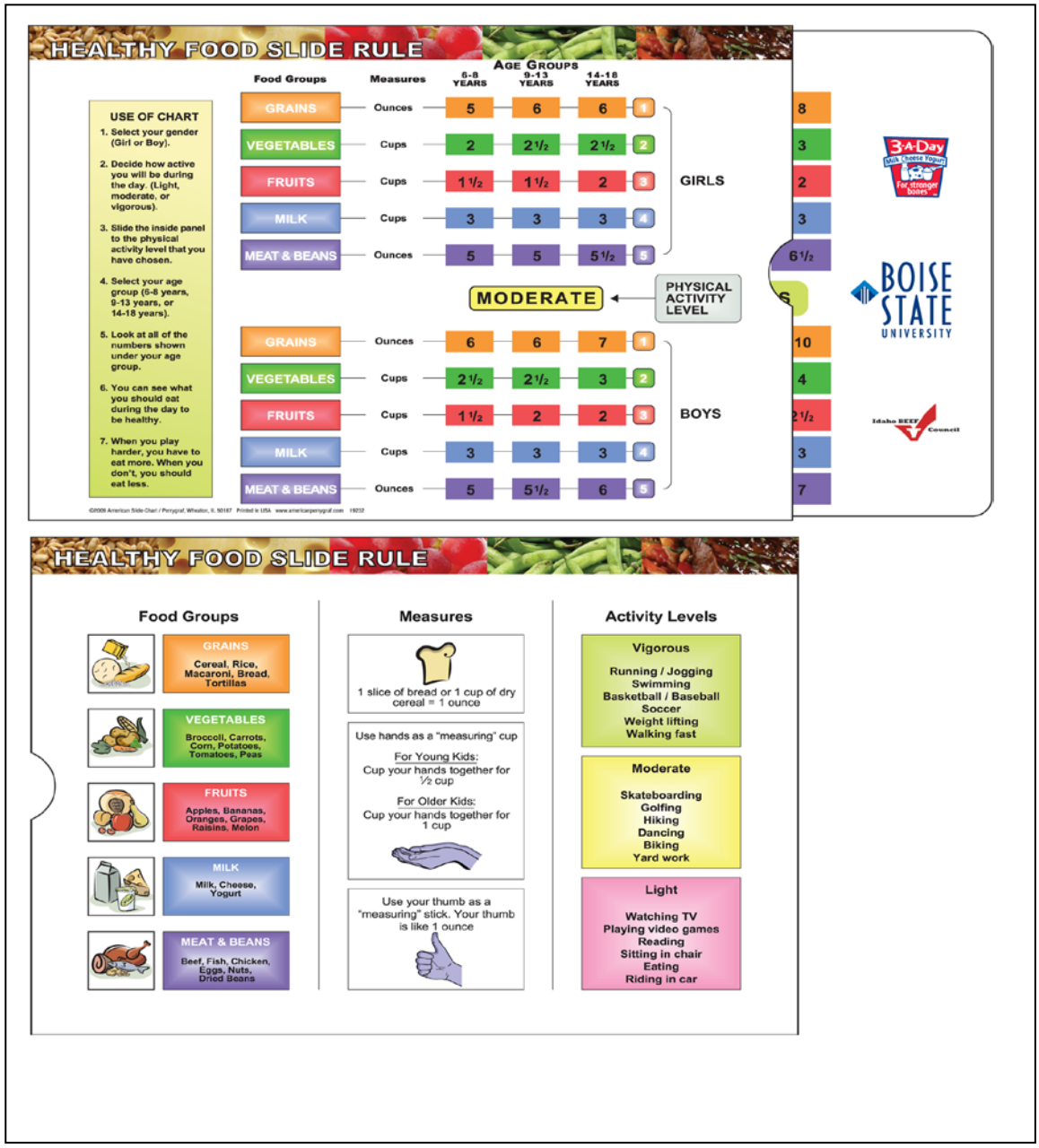

Figure 1.

Healthy Food Slide Rule front panel and slider in action and back panel.

Figure 2.

Elementary school children working with the Healthy Food Slide Rule and associated worksheets