



ACTION PLANS IN VIDEO GAMES HELP INCREASE AND MAINTAIN FRUIT AND VEGETABLE CONSUMPTION

Increasing fruit and vegetable consumption is an important goal not only in adults, but also in children.

Researchers at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine recently tested how implementation intentions, or creating plans to achieve a goal, while playing a health-promoting video game affected fruit and vegetable consumption in fourth and fifth grade children. Their report appeared in the *International Journal of Behavioral Nutrition and Physical Activity*.

There are two types of implementation intentions - action plans and coping plans. Action plans are those that involve the who, what, when and where of accomplishing a specific goal. Coping plans are essentially problem solving in advance - predicting what will keep the individual from meeting goals and deciding a plan in advance to help one overcome the barrier when faced with this type of situation.

Children in the study were asked to play *Squire's Quest! II - Saving the Kingdom of Fivealot*, a 10-episode videogame that encouraged children between the ages of 9 and 11 years to consume at least five servings of fruits and vegetables each day. During the game they learned important tips about fruits and vegetables and serving sizes.

Study participants were divided into four groups before they played the video game. Each group set a fruit and vegetable consumption goal in each episode, but the groups varied on the plan they created to meet the goal - one group created an action plan, one created a coping plan, another created both action and coping plans and one group did not create a plan.

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STUDY SHOWS MOTHERS' WEIGHT BEFORE PREGNANCY IMPACTS CHILDREN

Children of mothers who were overweight or obese at the time of conception have a greater chance of being overweight or obese themselves during childhood, according to a recent study by a researcher at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine and her colleagues.

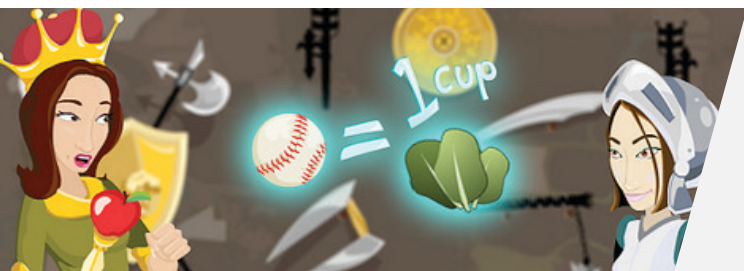
The study appeared in the journal *Pediatric Diabetes*. Participants underwent measurement of height and weight, and evaluation of body composition, abdominal fat distribution, blood pressure, fasting lipids and an oral glucose tolerance test.

"Our study aimed to evaluate the relationship of maternal pre-pregnancy body mass index (BMI) to the BMI, body composition and cardiometabolic characteristics of the offspring in childhood," said Dr. Fida Bacha, associate professor of pediatrics at the CNRC.

The study showed that children of mothers who were overweight or obese at the time of conception have a greater tendency to be overweight/obese with increased total body fat and abdominal fat compared to children born to normal weight mothers.

The children of overweight/obese mothers also showed evidence of insulin resistance - a risk factor for diabetes and cardiovascular disease - and an adverse lipid and inflammation profile, which increases the risk for cardiovascular disease.

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A SURPRISING ROLE FOR ESTROGEN IN MALE BODY WEIGHT REGULATION



Hormones are molecules that travel through the bloodstream to relay signals from one part of the body to another, by binding to ‘receptors’ in target tissues. Although estrogen is the definitive ‘female hormone’, it is also found in men. The estrogen receptor plays a role in preventing weight gain in females, but there is also strong evidence that the same receptor is important for body weight control in males.

In a report published recently in the *Journal of Clinical Investigation*, researchers at the USDA/ARS Children’s Nutrition Research Center at Baylor College of Medicine have found that the site of action is the amygdala, an almond-shaped region located deep in the brain’s medial temporal lobe that is linked to fear and pleasure responses.

Dr. Yong Xu, assistant professor of pediatrics at Baylor and lead author of the paper found that when they eliminated the function of the estrogen receptor specifically in this part of the brain in male mice, the animals became obese. When they did the opposite – overexpressed the receptor in the same region of the male brain – it prevented the development of obesity in the male mice, even when they were on a high-fat diet.

The research team demonstrated that a pharmacological agent (or drug) that delivers estrogen into this region of the brain could effectively decrease body weight in male mice.

They also found that a specific estrogen receptor regulates body weight in this region primarily through stimulating physical activity, not by affecting appetite.

He and his colleagues concluded that the cells in this almond-shaped brain structure stimulate physical activity, which in turn prevents weight gain.

Xu said the next steps in the research will be to look into these cells to study where this estrogen comes from in male brains and how these male cells are regulated by the “female hormone”.

Others who took part in the study include Pingwen Xu, Xuehong Cao, Yanlin He, Yongjie Yang, Kenji Saito, Chunmei Wang, Xiaofeng Yan, Antentor Othrell Hinton Jr., Fang Zou, Hongfang Ding, Yan Xia, Chunling Yan, Gang Shu, San-Pin Wu, Sophia Y. Tsai, Francesco J. DeMayo and Qi Wu of Baylor; Liangru Zhu of Baylor and Huazhong University of Science and Technology; Bin Yang and Richard DeMarchi of Indiana University; Yuxin Feng of Cincinnati Children’s Hospital Medical Center; Deborah J. Clegg of Cedars-Sinai Medical Center; Sohaib A. Khan of the University of Cincinnati College of Medicine; and Qingchun Tong of the University of Texas Health Science Center at Houston.

This work was supported by grants from the NIH, Marcadia Biotech, the American Diabetes Association, and American Heart Association awards.

Join a CNRC Nutrition Study!

Houston-area residents are invited to participate in the following nutrition research projects designed to help CNRC scientists learn more about the nutritional needs of children. Free parking is provided. For most studies, financial compensation is provided and transportation may be available.

FOR MORE INFORMATION ON ANY OF THE FOLLOWING CNRC NUTRITION STUDIES, contact Marilyn Navarrete at 713.798.7002 or rilynn@bcm.edu.

VOLUNTEERS

Adult Volunteers Needed H-34291

Healthy, overweight volunteers aged 18 to 65 and volunteers diagnosed with type 2 diabetes within the last three years, also aged 18 to 65, are needed for a metabolic study. The study will investigate whether healthy volunteers, type 2 diabetics and ketosis-prone diabetics make an important compound called arginine in different amounts. Healthy, overweight volunteers should have no chronic medical conditions and all should consume a diet adequate in calories and protein. Women must not be pregnant.

Baylor Infant Twin Study (BITS) H-36097

Do you expect twins or have twins less than 4 months of age? We are seeking twin infants for a research study on twins from four months through 3 years of age. The research is to learn more about infant and child feeding and behavior. Two visits are in the Children’s Nutrition Research Center and other visits are conducted by mailed questionnaires.

Children’s Physical Activity in the Neighborhood H-34292

Researchers at Baylor College of Medicine want to study how neighborhoods influence young children’s physical activity. Children enrolled in the study will be asked to wear activity monitors and a location monitor for three hours (one time only). Your child will be asked to perform a series of tasks at your home and neighborhood with the assistance of a research staff member. The child’s parent has to be with him/her at all times. Study requirements: Healthy child age 3 to 5 years old, family owns a car with child car seat, parent has a valid driver’s license.

Fatty Liver H-31469

11- to 21-year-old overweight adolescents and young adults with and without liver disease are needed for a research study investigating risk for early heart disease in youth. Study involves body composition, liver scan and blood tests.

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APPLES AND COOKED OATMEAL LINKED TO BETTER DIET QUALITY

Perhaps the old adage “An apple a day keeps the doctor away” should be updated to also include oatmeal. Recent studies show that consumption of apple products and cooked oatmeal are associated with better overall diet quality.

The studies were led by Dr. Theresa Nicklas, professor of pediatrics at the USDA/ARS Children’s Nutrition Research Center at Baylor College of Medicine.

A study published in *Nutrition Journal* included whole apples and apple products, such as applesauce and 100 percent apple juice. It involved children ages 2 to 18 years who participated in the National Health and Nutrition Examination Survey (NHANES) from 2003 to 2010.

NHANES is a series of studies combining interviews and physical examinations designed to assess the health and nutritional status of adults and children in the U.S.

Those who ate apples or apple products had higher scores than those who did not on the Healthy Eating Index, which is a measure of diet quality.

In addition, the apple consumers had lower body mass index (BMI) scores than non-apple consumers, and they were less likely to be obese than non-consumers.

A second study published in *Food & Nutrition Research* also showed that consumption of whole apples and apple products was associated with improved nutrient adequacy in the diets of children.

The study on cooked oatmeal, published in *Food & Nutrition Research*, showed similar results when comparing individuals who consumed oatmeal to those who did not. This study was also based on NHANES data (2001 to 2010) and included children ages 2 to 18 years.

Cooked oatmeal consumers had higher dietary quality scores due to a higher intake of whole grains and lower intakes of refined grains and empty calories. Children who ate oatmeal were at lower risk for having central adiposity and being obese.

Oatmeal consumers also were more likely to be younger and less likely to smoke when compared to their counterparts. They had higher intakes of dietary fiber, vitamin A, thiamin, riboflavin, calcium, phosphorus, magnesium, iron and potassium and lower intake of fatty acids, cholesterol and sodium.

Others involved in the apple research were Carol O’Neil, Louisiana State University, and Victor Fulgoni, Nutrition Impact LLC. Funding support was provided by the USDA/ARS (3092-51000-058-02S) and by Dr. Pepper/ Snapple.

Others involved in the oatmeal research were Carol O’Neil, Victor Fulgoni and Maureen DiRenzo, Quadrant Nutrition LLC. The study was supported by the USDA/ARS (3092-51000-058-02S) and Pepsico.



VIDEO GAMES

CONTINUED FROM THE COVER

Of the 400 families that were recruited for the study, 91 percent played all 10 episodes of the video game.

Researchers found that the group that created action plans as a part of goal setting not only increased fruit and vegetable consumption, but also maintained this increase three months after the game ended.

“This showed us that we had a maintenance effect, which is what you want to see after the intervention ends,” said lead author Dr. Debbie Thompson, USDA/ARS research nutritionist and associate professor of pediatrics at Baylor and the CNRC. “Creating an action plan, a specific plan of how you are going to achieve your goal, appears to be an important part of dietary behavior change for children.”

Researchers found that the group that created a coping plan did increase fruit and vegetable consumption after playing the game, but did not show a maintenance effect three months after the game ended.

Thompson and colleagues now hope to disseminate the game to families. She also notes that the fact that the video game was created with input from children help make it a more appealing and enjoyable game.

Others who took part in the study include Riddhi Bhatt, Isabel Vazquez, Karen W. Cullen, Janice Baranowski, Tom Baranowski and Yan Liu, all with Baylor and the CNRC.

Funding for the study came from the National Institutes of Health, the National Institute of Child Health & Human Development and the USDA/ARS.

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MOTHER'S WEIGHT

CONTINUED FROM THE COVER

These differences occurred despite similar birth weight and gestational age and were independent of ethnic differences of the study participants.

"These findings highlight the importance of maternal nutrition even before conception as a contributing factor for excess adiposity and cardiometabolic disease risk in the offspring during later childhood," Bacha said. "The contribution of environmental/societal factors vs. epigenetic transmission of risk factors to these findings need to be evaluated in future studies. These studies are needed to formulate effective strategies to better manage childhood obesity."

Others who were involved in the study were Hong Chang Tan and Roman Shypailo of the CNRC, James Roberts and Janet Catov of the University of Pittsburgh, and Ramkumar Krishnamurthy of Baylor and Texas Children's Hospital.

The work was supported by the National Institutes of Health, the USDA/ARS and the Children's Hospital of Pittsburgh Foundation.

VOLUNTEERS

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Games for Health (G4H) H-29172

Children ages 10 to 12 years old, are needed for 6-month study to understand how to help them eat healthier and be more physically active. Must play two "Games for Health" video games and provide three blood samples. Sign up at www.g4hstudy.org/s3/Eligibility. Watch game trailers at <https://www.youtube.com/watch?v=K89f7lqFJ-w> and https://www.youtube.com/watch?v=3e2z0L_bpZM.

Newborn Colic H-35001

Do you have a baby with fussiness, gas, tummy pain or who spits up or has trouble with bowel movements? Researchers at Texas Children's Hospital and Baylor College of Medicine are seeking infants between 14 and 28 days of age for participation in a feeding study. You must be able to read and understand English and have telephone access to be eligible.

SEEDS H-28013

Ayuda a los científicos aprender sobre las experiencias alimenticias de los niños con su participación in clases educativas y actividades alimenticias con otras familias. Todas las madres serán recompensadas por su tiempo en cada día de pruebas. Las clases se llevaran a cabo en el código postal 77061.

Teen Heart Health H-30665

13- to 18-year-old adolescents and young adults (normal weight and overweight) with and without type 2 diabetes are needed for a research study investigating risk for heart disease in youth. Study involves body composition, heart scan and blood tests.