

# Relationship between Eating Behavior, Breakfast Consumption, and Obesity Among Finnish and Greek Adolescents

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## ABSTRACT

**Objective:** To investigate the relationship between eating-related behaviors, particularly breakfast consumption, and weight status in Finnish and Greek adolescents.

**Methods:** A total of 6,468 16-year-old Finnish adolescents and 2,842 17- and 18-year-old Greek adolescents, based on the latest follow-up of 2 population-based cohorts, were studied. Univariate analysis examined the associations between breakfast consumption, family meals, emotional eating, bingeing, and weight status in both populations. Multiple logistic regression models focused on the relationship between breakfast consumption and overweight/obesity taking potential confounders into account.

**Results:** Daily breakfast consumption was associated with lower levels of overweight/obesity among Finnish and Greek boys, but not among girls. Adjusting for confounders did not change the result among Greek boys, but adjustment for father's body mass index, weight control, and fear of getting fat attenuated the association among Finnish boys.

**Conclusions and Implications:** This study highlights the importance of breakfast consumption, particularly among male adolescents, in obesity prevention programs.

**Key Words:** obesity, eating behavior, breakfast, cohort studies, adolescent (*J Nutr Educ Behav.* 2010;42:417-421.)

## INTRODUCTION

The prevalence of childhood and adolescent obesity is increasing rapidly throughout the world, but great regional differences exist.<sup>1</sup> In Europe, there is a tendency for a higher prevalence of overweight youth (up to 23%) in southwestern countries, including Greece, whereas in the Nordic countries, including Finland, the corresponding prevalence is less than 15%.<sup>1</sup> To clarify why regional differences exist, cross-national comparisons using nationally representative samples and the same procedures are required.<sup>1</sup>

This survey, based on the European Birth and Lifecourse Study (EURO-BLCS), was specifically designed for comparisons, using the same methodology and classification procedures.<sup>2</sup>

In epidemiologic research, the recent increase in childhood obesity worldwide is mostly attributed to environmental, rather than genetic factors.<sup>3-5</sup> Numerous studies indicate positive associations between body weight and eating-related behaviors, including skipping breakfast,<sup>6,7</sup> emotional eating,<sup>8</sup> binge eating,<sup>9,10</sup> and family meals.<sup>11,12</sup> Culture and socioeconomic status play an

important role in the development of eating behaviors.<sup>13-15</sup>

This cross-national comparison aimed to reveal similarities and differences in weight status and eating-related habits among adolescents of a northern (Finland) and a southern (Greece) European country with distinct cultural, habitual, social, and geographical characteristics. Relationships between eating-related habits and weight status were examined, focusing on the association between daily breakfast consumption and levels of overweight and obesity in each country.

## METHODS

This cross-national study is based on the most recent follow-up of 2 birth cohorts, namely, the Northern Finland 1985/86 birth cohort and the Greek 1983 birth cohort, conducted in 2001. The latest follow-up was part of the EURO-BLCS project.<sup>2</sup> One of the main undertakings of this project was to harmonize methods of data collection between the countries involved.<sup>2</sup>

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The Greek population consisted of 17- to 18- year-old adolescents born throughout Greece in April 1983. Participants initially represented 8% of the country's annual births and constituted a representative, population-based sample. In 2001, attempts were made to locate the participants through the country's high schools. Participants and their parents were sent anonymous questionnaires, as required by the Ministry of Education, which issues the permission for conducting research in schools. A total of 4,675 adolescent and parental questionnaires were administered, of which 3,500 were returned (74.8%), and 3,452 (73.8%) gave permission to use their data. Details of the study design, methodology, and data collection have been given elsewhere.<sup>16,17</sup> The procedures for the Greek data collection were approved by the National Hellenic Research Foundation, the Institute of Biological Research and Biotechnology, and the National Privacy Principles Board.

Sensitivity analysis showed that the data collected in 2001 was fairly well representative of the initial birth cohort.<sup>17</sup> Furthermore, participants recruited in 2001 were representative of adolescents living throughout Greece based on the gender, urban living, and socioeconomic distribution of the same year's census.

The Finnish cohort comprised 9,432 live-born children in the 2 northernmost provinces of Finland born between July 1, 1985 and June 30, 1986. A more detailed description of the cohort and early data collection has been given.<sup>17,18</sup> A total of 9,215 adolescents of the original study were still alive and living in Finland with a known address in 2001. Questionnaires were distributed by mail to traced adolescent cohort members and their parents. Data collection was started at the end of May 2001 and continued until spring 2002. Therefore, the average age of the participants was very close to 16 years. In all, 7,344 (80%) adolescents originally returned the questionnaire, of whom 7,128 (77.4%) allowed their data to be used in epidemiological studies. The Finnish study was approved by the Ethical Committee of the University of Oulu, Finland.

When the authors compared the background factors of the Finnish par-

ticipants in 2001 to the children of the initial birth cohort, they detected the data collected in 2001 was fairly representative of the initial Northern Finland birth cohort.<sup>17</sup> In addition, the sample size was large, and the response rates were high. Therefore, the sample could be considered representative of adolescents living in northern Finland.

### Variables and Statistical Analyses

Body mass index (BMI) was calculated from self-reported weight and height obtained from the questionnaires. Overweight and obesity were defined by using the age- and sex-specific BMI cutoff points proposed by the International Obesity Task Force.<sup>19</sup> Breakfast consumption was derived from a question assessing the "frequency of eating breakfast during the previous year," with 4 possible answers: "daily," "1-3 times per week," "1-3 times per month," and "never/rarely." The last 3 responses were grouped together. The frequency of having family meals was requested, and the answers "a few times per week," "1-2 times per week," "occasionally," and "hardly ever" were grouped together, leaving "daily/almost daily" as a single group. The use of weight control methods was assessed through a question with 4 options: "dieting/fasting," "heavy exercise," "vomiting," or "use of medication" and their frequency ("never," "occasionally," or "often"). The use of at least 1 of the above methods, either "occasionally" or "often," formed the "extreme weight control practices" group. Emotional eating was studied by asking participants whether they tried to make themselves feel better by eating when facing a stressful situation. The possible answers were "never," "sometimes," "quite often," and "very often." The last 2 responses were grouped together.<sup>8</sup> The authors asked about the frequency of bingeing on large amounts of food and grouped together the following answers: (1) "never" and "hardly ever"; (2) "occasionally" and "once per month"; (3) "once per week", "2-3 times per week," and "daily." The question: "Are you afraid of the idea of getting

fat?" was asked, with 2 possible answers, "yes" and "no." Parental BMIs were determined from self-reported weight and height measurements in the parental questionnaire, whereas socioeconomic status (SES) was based on the father's occupation.

Analysis was restricted to those who had valid self-reported weight and height measurements (6,468 Finns and 2,842 Greeks). The authors calculated the prevalence of eating-related behaviors, weight status, and other study items separately for Finnish and Greek boys and girls. The authors then compared Greeks and Finns by gender by calculating prevalence ratios and their 95% confidence intervals.

To focus on the relationship between breakfast consumption and weight status, the authors used univariate logistic regression to examine the odds for boys and girls separately in both populations. The authors then examined the association of potential confounders with breakfast consumption and weight status, and adjusted the multivariate logistic regression analysis only for the confounders significantly associated with both outcome (ie, overweight/obesity) and independent variable (ie, breakfast consumption). From the potential confounders examined (afraid of getting fat, weight control, emotional eating, bingeing, parents' BMI, and SES), the following were controlled for in multivariate analysis: weight control, fear of getting fat, parents' BMI, and SES. Odds ratios with 95% confidence intervals were reported for unadjusted and adjusted models.

## RESULTS

Comparison of the prevalence of overweight and obesity, eating-related behaviors, and psychosocial factors between Greeks and Finns by sex is presented in Table 1. Greek boys showed a higher prevalence of overweight compared to Finns, but they had very similar levels of obesity. In girls, overweight was similar in both cohorts, but obesity was significantly lower in Greek girls. Nearly 75% of Finnish boys and 61.6% of Finnish girls had breakfast daily, but the

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