

# Emotional Symptoms and Dietary Patterns in Early Adolescence: A School-Based Follow-up Study

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## ABSTRACT

**Objective:** To examine the relationship between early emotional symptoms and dietary patterns over 3 years in a school-based sample.

**Design:** Three-year longitudinal prospective study.

**Setting:** Thirteen schools in Reus, Spain.

**Participants:** From a sample of 562 preadolescents with and without emotional symptoms, 165 were observed and were classified as either showing ( $n = 100$ ) or not showing emotional symptoms ( $n = 65$ ).

**Main Outcome Measure:** Emotional symptoms were assessed at baseline and after 1 and 3 years. In the third year, data were collected on food consumption, adherence to the Mediterranean diet (MD), and physical activity.

**Analysis:** Dietary patterns were created by principal component analysis. Multivariate logistic regression was conducted with  $P < .05$  considered significant.

**Results:** Girls with emotional symptoms scored significantly lower in assessments for MD (score of  $5.41 \pm 2.19$ ) and physical activity (score of  $4.97 \pm 2.05$ ) than did girls who had no emotional symptoms (scores: MD,  $6.19 \pm 1.67$ ; physical activity:  $5.86 \pm 1.94$ ). Approximately 39.68% of girls with emotional symptoms showed high adherence to a sweet and fatty food pattern. After adjusted logistic regression, girls with emotional symptoms were 4 times as likely to have high adherence to a sweet and fatty food pattern (odds ratio, 4.79; 95% confidence interval, 1.55–15.10). No differences were observed among boys.

**Conclusions and Implications:** Girls with emotional symptoms during early adolescence have high adherence to a pattern rich in sweet and fat foods and low adherence to MD, and engage in low levels of physical activity. These findings highlight the importance of managing emotional distress to prevent it from having a negative effect on eating behavior.

**Key Words:** emotional symptoms, dietary pattern, adolescent, longitudinal study, school (*J Nutr Educ Behav.* 2017;49:405-414.)

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## INTRODUCTION

Adolescence is a critical period of biological, psychological, and social changes.

These changes may make adolescents more vulnerable to experiencing mental health problems. Around 47% of children and adolescents have emotional

problems<sup>1</sup>; anxiety disorders are the most prevalent condition (31.4%) followed by mood disorders (14.3%).<sup>2</sup> These emotional problems may be accompanied by predictors for overweight or obesity,<sup>3</sup> which sharply increased in prevalence around the world in recent decades.<sup>4</sup>

Cross-sectional studies in children and adolescents mainly showed stress to be associated with high levels of sweet and fatty food<sup>5,6</sup> as well as lower intakes of healthy food.<sup>7,8</sup> However, although emotional symptoms were considered a chronic stressor, epidemiological studies assessing the relationship between emotional symptoms and food consumption in children and adolescents showed inconsistent results.<sup>5,6,9,10</sup> This relationship was confirmed in adults and some studies demonstrated differences between genders.<sup>11,12</sup>

Children and adolescents may learn to deal with emotional problems by eating unhealthy food.<sup>13-15</sup> Over

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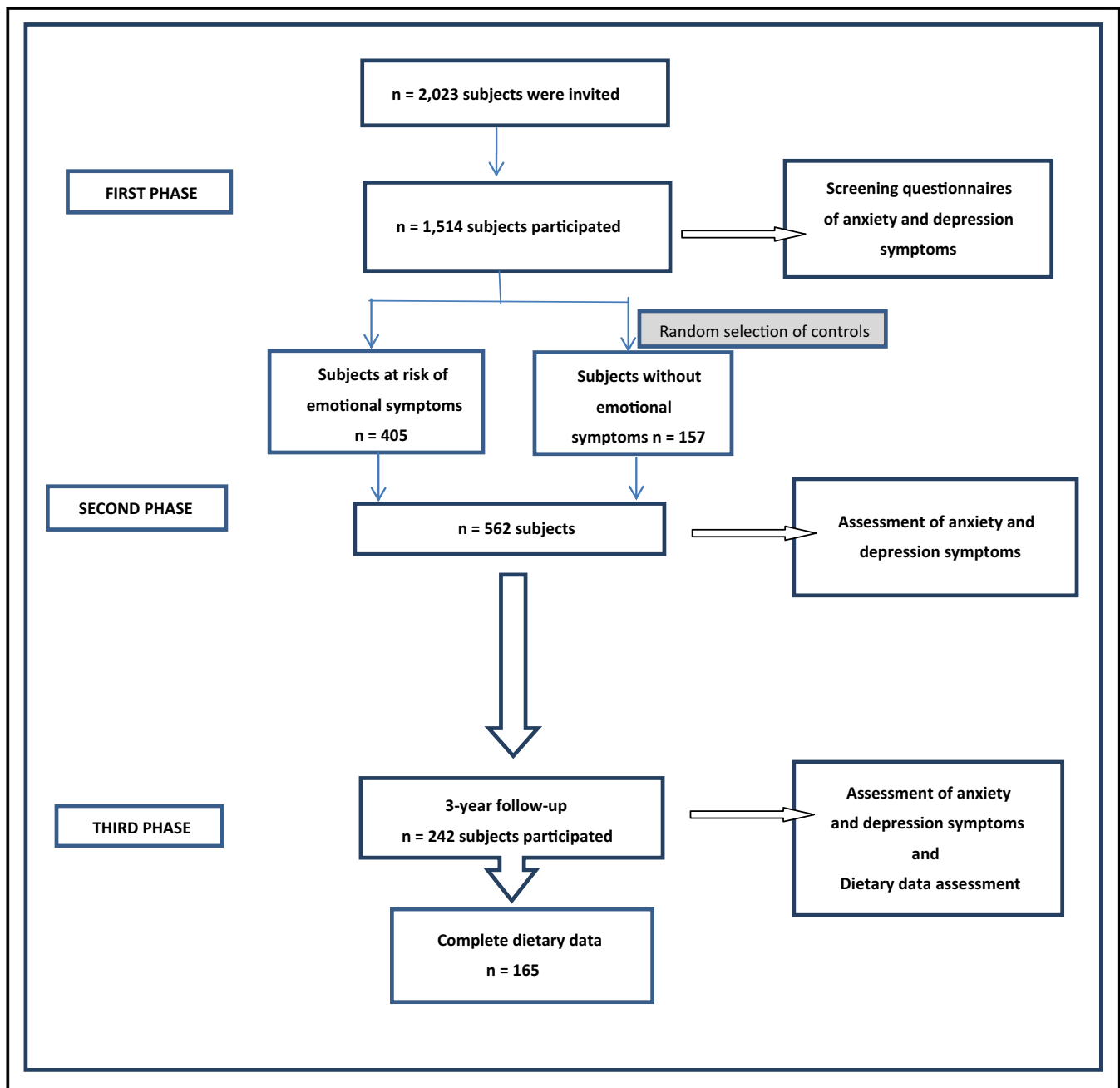
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**Figure 1.** Sample of school children, study design, and emotional symptom variables.

time, this behavior may establish a habitual dietary pattern that could increase the consumption of unhealthy food. Dietary patterns have important public health implications because they provide an overall overview of diet and are modifiable. Therefore, research on the relationship between emotions and dietary patterns from a longitudinal perspective could be useful for designing alternative, non-diet, preventive and treatment obesity programs.<sup>16</sup> To the authors' best knowledge, no similar prospective population-based studies on the rela-

tionship between emotional disorders and overall dietary patterns were conducted on adolescents similar eating habits and lifestyle from southern European countries.

The current study thus aimed to fill this research gap by investigating the prospective relationship, according to gender, between emotional symptoms and dietary patterns in a sample of schoolchildren in early adolescence who were observed for 3 years. According to the hypothesis, adolescents with emotional symptoms would have an

unhealthy dietary pattern based on sweets and fat, and this relationship would be stronger among girls than boys.

## METHODS

### Study Design and Participants

A total of 165 subjects (106 girls and 59 boys; mean age, 13.46 [SD, 0.92] years) participated in the 3-year follow-up study and provided completed data on their food consumption. Subjects were recruited from a 3-phase

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