

**Prevention of Eating Habits Associated with Obesity in Adolescents through a Wise  
Intervention**

**Project**

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## **Justification for the Project**

Obesity in adolescence is associated with physical and mental health problems and predicts obesity in adulthood. Adolescence may be an ideal time to target interventions, as this is when numerous health-related habits are consolidated (Bryan et al., 2019). Several universal preventive interventions have been carried out in educational centers for the promotion of healthy eating habits. However, the results of reviews and meta-analyses have concluded that most are not cost-effective for producing long-term changes in the dietary preferences of young people (Ashton et al., 2019; Kobes et al., 2018).

## **Why Do Traditional Interventions with Adolescents Fail?**

Traditional interventions typically include nutrition education strategies and tell adolescents what behaviors they should and should not engage in (Steinberg, 2015). However, some characteristics of adolescence can cause these approaches to fail. If adolescents perceive that adults are trying to manipulate them or introduce behavioral patterns such that their autonomy is threatened, they will often resist (Yeager et al., 2018).

The so-called wise interventions paradigm is an innovative approach to interventions that involve a set of rigorous techniques grounded in research to help people improve in a variety of life settings (Walton & Wilson, 2018). In recent years, a proliferation of wise interventions has achieved significant results in addressing social and personal problems, such as depression, stress, and other health problems. Furthermore, this type of intervention is of great interest to adolescents as it is designed in a way that is perceived as respectful of adolescents' autonomy and status (Yeager et al., 2018).

Recently, Bryan et al. (2016, 2019) developed a wise intervention aimed at improving adolescents' daily dietary choices. Their intervention, called the values alignment intervention, focused on the role of marketing on the behavior of children and adolescents who are exposed to a relentless barrage of marketing from the food industry. This marketing strategy is designed to reinforce the positive value of junk food and increase its consumption. Therefore, many experts have pointed to marketing as a key risk factor for unhealthy eating in the general population (Harris et al., 2009).

The values alignment intervention seeks to neutralize the positive emotional associations with junk food that marketing generates and presents the rejection of unhealthy foods in favor of healthy alternatives as a way to live up to two values that are important to adolescents: (1) the desire to be autonomous from adult control, and (2) the desire for social justice (Bryan et al., 2019). In two randomized controlled trials, this team demonstrated that the intervention reduced implicit positive associations with junk food and substantially improved dietary choices, especially in boys (Bryan et al., 2016, 2019). In addition, there were significant differences in attitudinal variables related to healthy eating. These promising results suggest that reframing unhealthy eating as incompatible with important youth values could be a low-cost solution to produce changes in adolescent attitudes and dietary choices.

## **Project Objectives**

The general objective of this project is to adapt the values alignment intervention to improve obesity-related eating habits in Spanish adolescents. It is therefore a highly innovative project with great potential for social impact in the field of health promotion. The specific objectives

are: (1) to adapt the values alignment intervention to the Spanish culture and context, (2) to evaluate the effects of the intervention in reducing unhealthy food intake and increasing healthy food intake in adolescents, (3) to evaluate differences between adolescents receiving the intervention and those in the control group regarding attitudinal variables related to healthy eating (alignment of healthy eating habits with adolescents' values and social attractiveness of healthy eating), (4) to evaluate potential moderators of the effect of the intervention, specifically socioeconomic status, given that more disadvantaged socioeconomic levels are associated with worse eating habits and greater obesity, gender, given that in the study by Bryan et al. (2019) the effect was more beneficial in boys, and body mass index (BMI), given that those adolescents with a higher BMI may present more consolidated habits of unhealthy food consumption, and (6) to evaluate whether the effect of the intervention on eating behavior is mediated by attitudinal variables.

## **Methodology**

**Sample:** The study will be carried out with adolescents in the second and third years of high school in Bizkaia (Spain). The necessary estimated sample size is 500, under a small, anticipated effect size (0.2), a statistical power of 0.8, and a probability level of 0.05. In anticipation of a loss of participants during the follow-ups, the sample size will be increased to 600. Inclusion criteria include adequate reading comprehension and parental and self-informed consent.

**Design and Procedure:** A randomized controlled trial with two groups will be used. Randomization will be done by clusters, using the classroom as the unit. First, the schools will be selected according to their characteristics. Then, for each school and grade, half of the classrooms will be randomly assigned to the experimental condition (values alignment) and the other half to the control condition (traditional educational intervention). Participants will complete an online assessment protocol using Qualtrics, which will be composed of different questionnaires at three time points: (1) pretest (immediately before the intervention), (2) posttest (one week after the intervention), and (3) a three-month follow-up. The study has the approval of the Ethics Committee of the University of Deusto. The trial will be registered on ClinicalTrials.gov.

**Interventions:** The experimental group will receive the values alignment intervention (Bryan et al., 2016). This includes: (1) reading materials, such as recent journalistic works that expose the deceptive and manipulative marketing practices of food companies and the harmful effects of these practices on society, with particular emphasis on harm to young children and the economically disadvantaged. Stories from other young people will also be included in order to contribute to the perception of widespread outrage and to suggest how that outrage can be channeled into taking a stand against the injustice perpetrated by food companies by eating less unhealthy or healthier food, (2) writing exercises, such as a story with a brief statement of what the participants would tell a younger child about the ads, and (3) an interactive activity, called "Make It Real" in which they are shown pictures of food ads and allowed to write and draw about them, making whatever changes (e.g., crossing out and substituting words) they feel necessary to make the ad "real" (i.e., no longer misleading). The control group will receive a traditional educational intervention on nutrition and physical exercise. This will be of the same duration and will also include reading and writing exercises.

**Measurements:** Healthy and unhealthy food intake will be measured at pretest, posttest, and three-month follow-up using the questionnaire developed by Stok et al. (2015). It consists of

four items that provide an index of unhealthy eating. In addition, according to the content addressed in the intervention sessions in the posttest and three-month follow-up, two attitudinal variables will be evaluated: (1) the alignment of healthy eating habits with the values of adolescents using seven items from Bryan et al. (2019), and (2) the social attractiveness of healthy eating using three items from Bryan et al. (2019), and answered on a five-point scale. Finally, some individual characteristics will be measured through an ad hoc questionnaire: gender, age, socioeconomic status (education and parental profession), height, and weight (to determine BMI).

**Statistical Analysis:** To evaluate the effect of the intervention on the repeated measures of the dependent variables, a multilevel analysis with MPLUS-8.8 will be used. This will include repeated measures at level one (e.g., healthy and unhealthy food intake), adolescent variables at level two (assigned intervention and potential moderators), and the classroom at level three. It will be determined whether the intervention explains the slope of change of the dependent variables (intervention  $\times$  time interaction). For moderation effects, triple interaction terms will be created using dummy variables or z variables, depending on the nature of the variables. To assess whether the effect of the intervention on healthy and unhealthy food intake is mediated by the attitudinal variables, a structural equation model with a bootstrapping procedure will be estimated (N = 10,000 samples). For the handling of missing values, the full information maximum likelihood method will be used as a general approach, although, depending on the nature of the missing value patterns, other techniques (e.g., multiple imputations or use of auxiliary variables) may be used.

#### BUDGET

Concept	Amount			
Contract for a research assistant with a degree in psychology on a part-time basis (25 hours per week).	20,000			
Travel and per diem expenses for researchers Christopher Bryan and David Yeager for coordination and adaptation of the intervention materials for Spanish adolescents.	6,100			
Incentive vouchers for participants. Vouchers will be raffled among the participants in each classroom to encourage participation. These will have a value of 20 euros and can be exchanged in shopping centers. Two vouchers will be raffled in each of the approximately 30 classrooms.	1,200			
Trips to schools.	1,100			
Expendable materials, such as markers and paints for intervention activities, which will be given to the adolescents.	1,600			
Total	30,000			
<b>QUARTERLY WORK PLAN</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1. Adaptation of the materials for Spanish adolescents	x			
2. Acquisition of materials	x			
3. Training the research staff on the procedures	x			
4. Contacting schools and obtaining permissions	x			
5. Application of pretest and intervention measures	x	x	x	
6. One-week and three-month follow-ups		x	x	
7. Merging and cleaning of databases			x	
8. Statistical analysis of data			x	x
9. Writing the final report and scientific manuscripts				x
10. Dissemination and transference in conferences, participating schools, and society in general				x

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