FOOD LITERACY AND PREVENTION OF EATING DISORDERS: A QUASI-EXPERIMENTAL STUDY IN PRIMARY SCHOOL

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ABSTRACT
Eating disorders (EDs) are among the major public health emergencies in childhood (Smink, van Hoeken & Hoek, 2012). Studies such as those by Dalle Grave (2013) and Cuzzolaro (2014) highlight how primary school represents a privileged context for implementing early and preventive interventions related to EDs. This study aims to evaluate the effectiveness of a structured nutrition education program on a sample of fifth-grade primary school students, taking into consideration the construct of Food Literacy (FL), understood as an integrated set of knowledge, attitudes, and skills oriented towards informed and critical food choices, in order to implement preventive educational interventions (Vidgen & Gallegos, 2014; Truman, Lane & Elliott, 2017; Slater, Falkenberg, Rutherford & Colatruglio, 2018). This study was conducted in a primary school and lasted ten weeks (eight two-hour modules). The experimental group followed activities in critical food literacy, body image education, and food media literacy. The results of this study show that food education interventions in primary schools generate positive effects on knowledge, but have limitations in producing changes in body image and eating behaviours. This gap suggests an increase in FL, which would represent a dimension indirectly associated with the promotion of more conscious eating behaviours and potentially relevant for prevention.

KEYWORDS
Eating disorders; Food literacy; Body image.

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1. Introduction

Eating disorders (EDs) are complex psychopathological conditions that increasingly affect young people. In Italy, the Bambino Gesù Children's Hospital (2025) reports that EDs affect approximately 3.5 million people. Following the Covid-19 pandemic, this figure has seen a steady increase of 30-35%, with a progressive reduction in the age of onset, even to 8-9 years of age. These findings require reflection on the role that educational institutions can play, particularly primary schools, which, given the age of onset of EDs, have the delicate task of promoting nutritional well-being from a preventative perspective. Food literacy (FL), understood as a set of knowledge, attitudes, skills, and behaviours that enable individuals to plan, select, prepare, and consume food in a conscious, critical, and sustainable manner (Vidgen & Gallegos, 2014; Truman et al., 2017; Hernandez et al., 2021), represents, from an operational perspective, a preventative and protective factor against dysfunctional relationships with food and the body.

This paper aims to evaluate, empirically and critically, the extent to which a structured food education program produces measurable effects, taking into account the findings in the scientific literature: a) the causal relationship between food literacy and the prevention of eating disorders has not yet been unequivocally demonstrated (Vidgen & Gallegos, 2014; Cooke, 2007; Stice et al., 2007); b) most of the available effectiveness studies focus on adolescents or university settings; c) the hypothesis that increased nutritional knowledge automatically translates into attitudinal and behavioral changes has been repeatedly challenged by applied research (Wardle & Cooke, 2008; Neumark-Sztainer et al., 2006; Smolak & Levine, 2015).

The choice to conduct the study in southern Italy, specifically in the Campania region in the province of Naples, was deliberate because it addresses the need to evaluate contexts characterized by specific social, territorial, and cultural inequalities that national and international literature tends to overlook. In this context, characterized by Mediterranean food traditions, the growing prevalence of ultra-processed foods, pressure from digital media, and food insecurity dynamics, specific questions arise that an approach based solely on cognitive food literacy cannot address.

2. Theoretical framework

Eating Disorders: Epidemiology and Etiological Complexity

Eating disorders are clinical conditions classified in the DSM-5-TR, whose etiology is multifactorial: biological and genetic factors (Bulik et al., 2019); psychological factors (Jacobi et al., 2004); social and environmental factors (Levine & Smolak, 2016; Tiggemann, 2011).

According to Solmi et al. (2022), in Europe, early adolescence and childhood (8-11 years) represent the most critical time period for the onset of prodromal signs. In Italy, data from the Istituto Superiore di Sanità (2022) and Bambino Gesù Children's Hospital (2025) rported approximately 4,000 deaths attributable to eating disorders each year.

Jacobi et al. (2004) proposed a taxonomy of risk factors, distinguishing between fixed factors (demographic characteristics, family history) and variable factors (body dissatisfaction, dieting, internalization of the ideal of thinness), with the latter constituting the primary target of preventive interventions.

Considering the above, it is clear that implementing a form of primary prevention in the school context that includes the following points: a) early identification of at-risk individuals; b) normalization the dialogue on psychological and nutritional well-being; c) reduction of stigma associated with seeking help.

3. Food Literacy: Definition, Dimensions, and Debates

Vidgen and Gallegos (2014), in their work, identify four macro-domains of food literacy: 1. food planning and management; 2. food selection; 3. food preparation; 4. nutrition. This highlights the practical and contextual dimension of food literacy, distinguishing it from traditional nutrition education focused solely on the transmission of information.

Truman et al. (2017), in their systematic review, identify a set of core skills that characterize the construct of food literacy: a) knowledge related to the composition and nutritional value of foods; b) practical skills related to food preparation and management; c) critical skills for evaluating food information from different sources; d) the ability to connect one's food choices with broader dimensions of health, environmental sustainability, and social justice.

Silva et al. (2023), in a more recent review, point out a significant methodological limitation regarding the measurement of FL: most existing instruments were developed for adult populations and have not been adequately validated for school-age children (Krause et al., 2018; Ronto et al., 2018). This aspect is of great importance because it poses problems for research in contexts such as primary school.

Hernandez et al. (2021) state that educational interventions need to go beyond an exclusively cognitive approach to FL and integrate affective, identity, and social dimensions.

This approach is shared and acknowledged in this paper, but a question needs to be asked: is it possible to develop these complex dimensions in 9- to 11-year-old children through structured, time-limited school interventions?

To attempt to answer the question posed above, it is important to consider that primary school represents a privileged setting for health promotion interventions, as it engages the entire population of that specific age group, regardless of socioeconomic background. The period between the ages of 8 and 11 is the time when children consolidate eating habits, develop body image, and develop early forms of critical thinking (Piaget, 1970; Vygotsky, 1978). Implementing awareness-oriented educational interventions during this stage therefore means capitalizing on children's moment of greatest receptiveness.

In Italy, the National Curriculum Guidelines (MIUR, 2012) and subsequent guidelines for preschool and primary school (MIUR, 2018) include the promotion of health and well-being as a cross-curricular objective, but structured pathways for preventive nutrition education are not defined. The New National Curriculum Guidelines (Decree No. 221 of 9 December 2025), the PNRR (National Recovery and Resilience Plan), and the 2030 Agenda for Sustainable Development offer additional frameworks that legitimize food sustainability education interventions.

Bronfenbrenner's socio-ecological theory (1979, 1986) is used as the primary theoretical framework for designing the intervention. This framework has been useful for understanding how child development is embedded in concentric systems of influence: microsystem, mesosystem, exosystem, and macrosystem. The application of this theory to nutrition education suggests that, to be considered effective, an intervention cannot be limited to acting on the child individually, but must necessarily involve the family, peer group, school, and community in which they live. This perspective is particularly relevant in the primary prevention of eating disorders, as it allows us to interpret the relationship with food and the body as a multidimensional, contextually situated phenomenon. It is according to this ideology that food literacy is understood not only as the acquisition of nutritional information, but as a set of critical, practical, and reflective skills mediated by the social and cultural environment (Vidgen & Gallegos, 2014; Truman et al., 2017).

4. Methodology

This study mploys a quasi-experimental, mixed-methods design incorporating a pretest–posttest structure with non-equivalent groups, comprising an experimental group (EG) and a control group (CG). Two fifth-grade classes from a primary school in the province of Naples were involved. Specifically, one class assumed the role of EG and participated in the intervention program for ten weeks (January-March 2026), while the other class assumed the role of CG and continued with normal teaching activities. Both groups completed the pretest measures in the week preceding the start of the program and the post-test measures in the week following its conclusion.

Quantitative data analysis was conducted using single-factor ANCOVA and SPSS software (v. 28.0) according to methodological recommendations for pre-post designs with non-equivalent groups (Tabachnick & Fidell, 2019; Field, 2018). The following are reported: a) independent variable: group membership; covariate: pretest score; b) Dependent variables: post-test scores on the various scales.

For each analysis, the effect size was calculated using partial η^2, with the following interpretative guidelines: $\eta^2p < .06$ = small effect; $.06 \leq \eta^2p < .14$ = medium effect; $\eta^2p \geq .14$ = large effect (Cohen, 1988).

Number of students		average age	DS	range
CG	26 (13 females, 13 males)	10,3 years	0,52	9-11 years
EG	28 (15 females, 13 males)			
Total	54			

Tab. 1. Overall sample involved in the work

The socioeconomic profile of families, assessed through an anonymous survey administered to parents, was predominantly lower-middle in both groups (median ISEE < €15,000/year - the Italian means-tested household income indicator), with no statistically significant differences between the two groups (Mann-Whitney U, p = .67). It should be noted that students who did not have any confirmed clinical diagnosis of eating disorders or other conditions that could interfere with the measurements (e.g., celiac disease, diabetes mellitus) participated in this study. Students with special educational needs who would have required adaptations not covered by the research protocol were excluded, as were students who attended less than 80% of the program sessions. In this regard, one student in the CG was excluded from the analyses due to repeated absences in the post-test phase. The families of the EG participants were informed of the program through a preliminary

meeting in which the educational intervention to be implemented and the privacy protection measures were explained. Written informed consent was provided by the parents of students regularly enrolled in the fifth grade. Structured parental involvement in the program was not planned.

Measurement Tools

Cognitive FL was measured with an adapted version of the Children's Food Literacy Questionnaire (CFLQ). This adapted version was developed from the instrument by Krause et al. (2018) and revised to adapt its language and content to the age group considered. This instrument consists of 20 items distributed across four subscales: nutritional knowledge (8 items), food planning and selection (5 items), practical skills (4 items), and critical understanding of food messages (3 items). The adapted version was pilot-validated on an independent sample of 30 fifth-grade children (Cronbach's α = .74; 2-week test-retest ICC = .81). Psychometric values were acceptable but not optimal, requiring caution in interpreting the results. Therefore, this version should be considered an exploratory instrument and not a fully validated measure for the Italian primary school context.

Body image was assessed with the Children's Body Image Scale (CBIS; Truby & Paxton, 2002), a validated instrument for children aged 7–12 years that uses stylized body figures to measure the discrepancy between perceived and ideal body size. The scale offers separate measures for males and females. Concurrent validity with anthropometric measures and the Contour Drawing Rating Scale (Thompson & Gray, 1995) was satisfactory in the original populations (r = .62–.71).

Eating behavior was assessed with the Children's Eating Behavior Questionnaire (CEBQ; Wardle et al., 2001), a parent-report instrument composed of 35 items distributed across eight subscales that measure different styles of responding to food: responsiveness to food, enjoyment of food, emotional over-eating, emotional under-eating, food fussiness, desire to drink, satiety responsiveness, and slowness in eating. The Cronbach's α of the subscales in the Italian version ranges between .67 and .87, with some subscales exhibiting borderline psychometric values.

Qualitative data were collected through three sources: a) a structured diary completed by the researcher after each program session, with notes on group dynamics, participation, student reactions, and critical incidents; b) two focus groups with teachers (one midway through the program and one at the end), each lasting 60–90 minutes, audio-recorded and transcribed; c) an analysis of the school food context conducted through participant observation (school lunch, snacks, physical education). Thematic analysis of the qualitative data followed the Braun and Clarke (2006) protocol.

Intervention Program

The program, called "I Eat, Therefore I Think: A Critical Food Literacy Program," consisted of eight weekly modules of two hours each, for a total of 16 hours of direct intervention. The modules were led by the class teacher, who received advance training through four eight-hour meetings, with the support of the researcher, who served as an observer during the first four sessions. The module structure followed a recurring cycle inspired by Kolb's (1984) model: 1. concrete experience; 2. reflective observation; 3. abstract conceptualization; 4. active experimentation. Each session began with a playful activity, continued with a guided in-depth study, and concluded with a practical or reflective activity. The activity content followed the organization shown in Table 2 and integrated elements of cognitive food literacy, food media literacy, body image education, and Critical Food Systems Pedagogy, according to a multidimensional perspective (Hernandez et al., 2021; Classens & Sytsma, 2020; Medeiros et al., 2005).

Module 1	What is food? Identity, culture, and food memory
Module 2	What's in what we eat? A critical reading of nutrition labels
Module 3	How we were persuaded to eat: food advertising and its mechanisms
Module 4	The changing body: puberty, body image, and social comparison
Module 5	Social media and food: algorithms, influencers, and digital traps
Module 6	Where does the food we eat come from? Supply chain, sustainability, and food justice
Module 7	Let's cook together: practical skills and rediscovering flavors
Module 8	My food manifesto: summary, reflection, and future projection

Table 2: Contents of the activities proposed to the EG

5. Results

Before proceeding, group equivalence was verified at pretest using independent-samples t-tests and Mann-Whitney tests for ordinal variables. No significant differences emerged between EG and CG in any of the outcome variables ($p > .05$ for all comparisons), confirming the comparability of the two groups at baseline. Descriptive statistics at pretest showed, for the overall sample, a relatively low level of cognitive FL ($M = 10.8$, $SD = 2.9$, theoretical range: 0-20), with the "critical understanding of food messages" subscale presenting the lowest values ($M = 0.9$, $SD = 0.7$, theoretical range: 0-3). CBIS scores indicated a moderate perceived-ideal body discrepancy, greater in females ($M = 1.8$ points towards thinness) than in males ($M = 0.6$ points towards muscularity). On the CEBQ, the subscales with the highest scores were food fussiness ($M = 3.8$, $SD = 0.9$) and emotional under-eating

(M = 2.9, SD = 0.8), suggesting patterns of food selectivity and emotional restriction already present in the sample.

Regarding the effects of the program on cognitive food literacy, the ANCOVA for total CFLQ scores revealed a significant effect of group membership after controlling for the pretest: $F(1,51) = 11.42$, $p < .001$, $\eta^2p = .18$. Children in the EG showed a mean increase in total FL scores of 3.2 points (from M = 10.6 to M = 13.8), compared to an increase of 0.8 points in the CG (from M = 11.0 to M = 11.8). The effect size ($\eta^2p = .18$) is, with due caution, on the high side for an educational intervention of this type. Analyzing the subscales in detail, we observe that the most significant effect concerns nutritional knowledge ($\eta^2p = .22$), followed by food planning and selection ($\eta^2p = .14$). The effect on practical skills is modest ($\eta^2p = .09$), and almost negligible on critical comprehension of food messages ($\eta^2p = .04$, $p = .142$, n.s.). In this regard, it is worth noting that although Module 3 (food advertising) and Module 5 (social media) were explicitly dedicated to food media literacy, no significant improvement was recorded in this dimension. This aspect could indicate that critical literacy is not easily acquired through brief educational exposures in this age group.

Regarding the effects on attitudes towards food and health, the ANCOVA on the CEBQ subscales relating to attitudes towards food shows that the program produced a modest increase in perceived pleasure towards food, $F(1,51) = 5.43$, $p = .024$, $\eta^2p = .096$, and in responsiveness to internal food stimuli, $F(1,51) = 4.87$, $p = .032$, $\eta^2p = .087$, consistent with the aim of developing a more positive relationship with food. The subscales relating to problematic eating behaviours (emotional over-eating, food fussiness) did not show significant variations between pretest and post-test, in particular, food fussiness, which is the indicator of selectivity and food neophobia, remained substantially stable in the EG (M pre = 3.7, M post = 3.6). This finding suggests that the program did not produce appreciable effects on food selectivity, which appears to be a relatively stable trait already in this age group (Dovey et al., 2008).

Regarding the effects on body image, the ANCOVA on the CBIS showed no significant effect on body dissatisfaction: $F(1,51) = 1.62$, $p = .209$, $\eta^2p = .031$. This result was also confirmed by an exploratory analysis stratified by gender (females $\eta^2p = .028$, n.s.; males $\eta^2p = .019$, n.s.). Module 4 explicitly addressed the topic of body image and body diversity, yet no measurable change in the discrepancy between perceived and ideal body size was found. These data reflects what has been established in the literature, particularly on brief interventions in body image education at school age (Dohnt & Tiggemann, 2005; Richardson & Paxton, 2010).

Regarding the effects on self-reported eating behavior, measured using the CEBQ, no particularly significant effects were found on any of the remaining subscales: emotional under-eating ($\eta^2p = .038$, n.s.), satiety responsiveness ($\eta^2p = .024$, n.s.), and slowness in eating ($\eta^2p = .016$, n.s.). The only subscale that showed a slight increase in the EG was desire to drink (from M = 2.4 to M = 2.7 $\eta^2p = .052$, $p = .097$), consistent with the content of Module 2 on mindful hydration. The lack of significant effects on eating behavior in 9- to 11-year-old children could be due to their limited autonomy in food choices, the strength of established habits, and the influence of their peer group.

Thematic analysis of the qualitative data allowed us to identify four main themes. The first theme is the inconsistency between program content and the school food environment. Observations conducted in the cafeteria and during snack times documented a gap between the messages conveyed by the program and the actual food offerings at the school. In this regard, a teacher in the focus group reported: "The students showed us how to read labels, and then in the cafeteria they were given things they had been told to avoid." This finding suggests that increased critical skills, if not accompanied by structural changes in the environment, can generate frustration and a sense of powerlessness, rather than food agency.

The second theme concerns the ambiguous relationship between media influence and critical awareness. Although Module 5, dedicated to social media, saw high student engagement, the observed reactions were not homogeneous. Some children demonstrated the ability to recognize persuasive strategies present in digital food content, while others continued to attribute greater credibility to influencers than to the information discussed during the program. In some cases, students even critically reinterpreted content that they normally consume passively. One child, for example, observed that "videos seem to be designed to make you hungry even when you're not actually hungry." These reflections did not translate into shared critical attitudes across the class. Furthermore, numerous students defended their preferred online influencers, perceiving certain program activities as excessively normative or distant from their daily experience. In particular, the researcher's diary records a student who stated, "But he's been working out and eating like this for years and he's fine, so it's fine this way." These elements suggest that the relationship between food media literacy and critical behaviours is not linear, but is influenced by identity, affective, and relational dynamics that make it difficult to change established representations.

The third theme is the family dimension as an unreached variable. Teachers in both focus groups reported that families' eating habits are the main factor resisting change. In a socioeconomic context characterized by low-to-average income and a deeply rooted traditional food culture, the critical skills acquired in school are not

practiced at home. A teacher reported this: "Mothers told us that their children refuse certain foods at home after the program, but then buy them the same things anyway because they don't know how to do otherwise." This aspect could be considered a limitation of this work, as it would have been necessary to include a dedicated module for families.

The fourth theme is the emotional complexity of the body. This aspect can be considered the most sensitive; in fact, the teacher reported encountering unexpected resistance from some children in participating in activities that focused on their bodies: "As soon as we brought out the images of different bodies, one child started laughing and teasing a classmate. I had to stop the activity." These incidents suggest that simply including a module on body image in a nutrition education program is insufficient without specific teacher training in managing group dynamics.

6. Discussion

The results of this study highlight that school-based nutrition education interventions have produced improvements in cognitive EG, but, as confirmed by several authors such as Wardle & Cooke (2008), Meiklejohn et al. (2012), and Peralta et al. (2016), there are limitations that prevent this new knowledge from being transformed into attitudinal changes and, subsequently, into stable behavioral modifications. This discrepancy can be explained by various theories, such as the theory of planned behavior (Ajzen, 1991), which posits that the transition from knowledge to behavior is mediated by attitudes and intentions, but also by perceived subjective norms and the perception of behavioral control. In the specific case of 9- to 11-year-old children, behavioral control over food choices is objectively limited, as most decisions are made by parents, which makes the transition from new knowledge to new behaviours impossible. Bandura's (1986) social cognitive theory offers a further perspective: perceived dietary self-efficacy, or confidence in one's ability to make informed food choices, requires mastery experiences. In an eight-module program where practical activities are limited to a single session, opportunities for mastery experiences are insufficient to build significant dietary self-efficacy.

Finally, the results regarding the "critical understanding of food messages" subscale ($\eta^2p = .04$, n.s.) and the qualitative data on the persistent perceived authority of digital influencers suggest that this skill requires a longitudinal, systemic approach rooted in children's daily experience.

The management of critical incidents that emerged in Module 4 documents the risk, highlighted by Neumark-Sztainer et al. (2006), that addressing body image issues in inadequately prepared group settings may produce effects opposite to those desired. These incidents confirm the need for specific and in-depth teacher training, not only on content, but above all on interpersonal and group management skills, which are necessary to safely address emotionally charged issues such as body image.

The results from the analysis of qualitative data show that the effectiveness of school interventions is compromised by multiple factors: the school's food environment (cafeteria inconsistent with program messages), the family microsystem (not reached by the intervention), the family-school mesosystem (not activated), and the media and cultural macrosystem (which operates daily and extensively in opposition to the program's content) (Bronfenbrenner, 1979). Schools, therefore, must play a key role, understood as one element of a multilevel intervention system that certainly includes the family, the community food environment, public policies on food advertising, and the regulation of online content (Story et al., 2008; Swinburn et al., 2011; Pérez-Rodrigo & Aranceta, 2003).

An aspect that should not be underestimated is the socioeconomic inequality of the sample: an ISEE < €15,000/year compromises the ability to make informed and critical food choices, limiting families' capacity for informed food choices and pushing them towards ultra-processed options. A nutrition education program must necessarily consider this aspect, as otherwise it risks inducing feelings of inadequacy and guilt in low-income families, and fails to enhance preventive action.

7. Study Limitations

The study has several limitations that must be explicitly stated and that call for caution in interpreting and generalizing the results.

The first limitation concerns the sample size: the sample is small, and the groups belong to the same school, which may have increased the risk of intergroup contamination. Furthermore, although, as previously stated, the sample was intentionally geographically limited to a specific urban area in Southern Italy, it must be considered that the generalizability of the results to other sociocultural, geographical, and institutional contexts is limited.

The second limitation concerns the duration of the program: eight 2-hour modules over 10 weeks represent a limited exposure, likely insufficient to produce robust effects on complex dimensions such as body image and eating behavior. The lack

of follow-up does not allow us to assess the stability of the cognitive effects detected in the immediate post-test.

The third limitation concerns the measurement instruments: the adapted version of the CFLQ has not yet undergone a complete psychometric validation process, and the psychometric properties of some CEBQ subscales in the Italian version are suboptimal. The use of self-reported measures of eating behavior introduces risks of social desirability, particularly significant after participation in an educational program that explicitly addressed healthy food choices.

The fourth limitation concerns the absence of blinding among the teaching staff to the experimental conditions: the EG teachers were aware of the program's rationale and research hypotheses, which introduces a potential Hawthorne bias in the measurements. An experimental design with independent raters blinded to the condition would be methodologically more robust.

The fifth limitation concerns the failure to include a structured module for families, which emerges from qualitative evidence as one of the most significant design shortcomings. The literature indicates family involvement as one of the most important moderators of the effectiveness of nutrition education interventions in school-age children (Story et al., 2008; Dietz & Gortmaker, 2001), and its absence in the present protocol structurally limits its potential impact on daily eating behavior.

8. Concluding Reflections

This study examined the effectiveness of a structured nutrition education program on a sample of fifth-grade elementary school students in the province of Naples. The results confirm that primary school can play a role in increasing cognitive food literacy in 9- to 11-year-old children. However, this effect alone does not prevent eating disorders, as the relationship between nutrition knowledge and the prevention of eating disorders is mediated by multiple factors (contextual, relational, and systemic) that a single school-based intervention cannot modify.

The operational implications emerging from the study require that programs be explicitly designed as components of multilevel interventions, including the family, the school cafeteria, the community environment, and public policies on food advertising. Single-level interventions focused exclusively on the classroom, however well-designed, are unlikely to produce measurable effects on eating behavior and body image. Another aspect that emerged from the work is the need for teacher training in both the content of nutrition education and relational,

pedagogical, and group management skills. These skills are essential to safely and effectively address emotionally charged issues such as body image and the relationship with food.

A further implication concerns environmental coherence, since a program that teaches critical reading of nutrition labels must not be contradicted by school cafeterias serving ultra-processed foods. Schools must be willing to both invest in educational programs and primarily evaluate the coherence of their food environment and the related messages conveyed. Finally, future research should systematically include medium-term follow-up measures (3-6 months), larger and geographically diverse samples, measurement tools validated specifically for the Italian school population, and research designs that allow for the isolation of the specific contributions of different program components.

In conclusion, primary schools can and must contribute to promoting nutritional well-being and preventing eating disorders, but this will only happen through systemic, longitudinal interventions that are consistent with the context, supported by adequate resources, grounded in rigorous empirical evidence, and evaluated using methods commensurate with the complexity of the problem.

References

Ajzen, I. (1991). *The theory of planned behavior.* Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). American Psychiatric Association Publishing.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Braun, V., & Clarke, V. (2006). *Using thematic analysis in psychology.* Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

Bronfenbrenner, U. (1986). *Ecology of the family as a context for human development: Research perspectives*. Developmental Psychology, 22(6), 723–742. https://doi.org/10.1037/0012-1649.22.6.723

Bulik, C. M., Blake, L., & Austin, J. (2019). *Genetics of eating disorders: What the clinician needs to know*. Psychiatric Clinics of North America, 42(1), 59–73. https://doi.org/10.1016/j.psc.2018.10.007

Cena, H., Barthels, F., Cuzzolaro, M., Bratman, S., Brytek-Matera, A., Dunn, T., Varga, M., Missbach, B., & Donini, L. M. (2019). *Definition and diagnostic criteria for orthorexia nervosa: A narrative review of the literature.* Eating and Weight Disorders, 24(4), 209–246. https://doi.org/10.1007/s40519-018-0606-y

Classens, M., & Sytsma, T. (2020). *Critical food systems education (FoodSystems Ed): Making the case for critical approaches to food systems education.* Agroecology and Sustainable Food Systems, 44(6), 772–800. https://doi.org/10.1080/21683565.2019.1700313

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Cooke, L. (2007). *The importance of exposure for healthy eating in childhood: A review.* Journal of Human Nutrition and Dietetics, 20(4), 294–301. https://doi.org/10.1111/j.1365-277X.2007.00804.x

Cuzzolaro, M. (2014). *Anoressie e bulimie.* Bologna: Il Mulino.

Dalle Grave, R. (2013). *Alle mie pazienti dico*. Verona: Positive Press.

Dietz, W. H., & Gortmaker, S. L. (2001). *Preventing obesity in children and adolescents.* Annual Review of Public Health, 22, 337–353. https://doi.org/10.1146/annurev.publhealth.22.1.337

Dohnt, H. K., & Tiggemann, M. (2005). *Peer influences on body dissatisfaction and dieting awareness in young girls*. British Journal of Developmental Psychology, 23(1), 103–116. https://doi.org/10.1348/026151004X20658

Dovey, T. M., Staples, P. A., Gibson, E. L., & Halford, J. C. G. (2008). *Food neophobia and 'picky/fussy' eating in children: A review*. Appetite, 50(2–3), 181–193. https://doi.org/10.1016/j.appet.2007.09.009

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

Hernandez, M., Whittemore, R., Blankenship, J., & Sylvetsky, A. C. (2021). *Food literacy: A systematic review of the literature*. Journal of Nutrition Education and Behavior, 53(5), 399–414. https://doi.org/10.1016/j.jneb.2021.01.011

Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). *Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy.* Psychological Bulletin, 130(1), 19–65. https://doi.org/10.1037/0033-2909.130.1.19

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Prentice-Hall.

Krause, C., Sommerhalder, K., Beer-Borst, S., & Abel, T. (2018). *Just a subtle difference? Findings from a systematic review on definitions of nutrition literacy and food literacy.* Health Promotion International, 33(3), 378–389. https://doi.org/10.1093/heapro/daw084

Levine, M. P., & Smolak, L. (2016). *The role of protective factors in the prevention of negative body image and disordered eating*. Eating Disorders, 24(1), 39–46. https://doi.org/10.1080/10640266.2015.1113826

Medeiros, L. C., Butkus, S. N., Chipman, H., Cox, R. H., Jones, L., & Little, D. (2005). *A logic model framework for community nutrition education.* Journal of Nutrition Education and Behavior, 37(4), 197–202. https://doi.org/10.1016/j.jneb.2005.03.007

Meiklejohn, S., Ryan, L., & Palermo, C. (2012). *A systematic review of the impact of multi-strategy nutrition education programs on health and nutrition of adolescents*. Journal of Nutrition Education and Behavior, 44(3), 206–217. https://doi.org/10.1016/j.jneb.2011.09.011

Neumark-Sztainer, D., Wall, M., Guo, J., Story, M., Haines, J., & Eisenberg, M. (2006). *Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later?* Journal of the American Dietetic Association, 106(4), 559–568. https://doi.org/10.1016/j.jada.2006.01.003

Ospedale Pediatrico Bambino Gesù. (2025). *Settimana del Fiocchetto Lilla: Dati sui disturbi del comportamento alimentare.* https://img.ospedalebambinogesu.it/images/2025/03/10/113147825.pdf

Peralta, L. R., Dudley, D. A., & Cotton, W. G. (2016). *Teachinghealthy eating to school children: A systematic review and meta-analysis.* Journal of School Health, 86(9), 677–690. https://doi.org/10.1111/josh.12418

Pérez-Rodrigo, C., & Aranceta, J. (2003). *Nutrition education in schools: Experiences and challenges.* European Journal of Clinical Nutrition, 57(Suppl. 1), S82–S85. https://doi.org/10.1038/sj.ejcn.1601824

Piaget, J. (1970). *Science of education and the psychology of the child.* Orion Press.

Richardson, S. M., & Paxton, S. J. (2010). *An evaluation of a body image intervention based on risk factors for body dissatisfaction: A controlled study with adolescent girls.* International Journal of Eating Disorders, 43(2), 112–122. https://doi.org/10.1002/eat.20682

Ronto, R., Ball, L., Pendergast, D., & Harris, N. D. (2018). *Food literacy at secondary schools in Australia.* Journal of School Health, 86(11), 823–831. https://doi.org/10.1111/josh.12440

Silva, P., Araújo, R., & Lopes, F. (2023). *Food literacy: A systematic scoping review of its definitions, dimensions, assessment tools and implementation programmes.* Nutrients, 15(5), 1238. https://doi.org/10.3390/nu15051238

Slater, J., Falkenberg, T., Rutherford, J., & Colatruglio, S. (2018). *Food literacy competencies: A conceptual framework for youth transitioning to adulthood*. International Journal of Consumer Studies, 42(5), 547–556.

Smink, F. R. E., van Hoeken, D., & Hoek, H. W. (2012). *Epidemiology of eating disorders: Incidence, prevalence and mortality rates*. Current Psychiatry Reports, 14(4), 406–414. https://doi.org/10.1007/s11920-012-0282-y

Smolak, L., & Levine, M. P. (2015). *The Wiley handbook of eating disorders.* Wiley-Blackwell.

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V.,

Correll, C. U., & Fusar-Poli, P. (2022). *Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies*. Molecular Psychiatry, 27(1), 281–295. https://doi.org/10.1038/s41380-021-01161-7

Stice, E., Shaw, H., & Marti, C. N. (2007). *A meta-analytic review of eating disorder prevention programs: Encouraging findings*. Annual Review of Clinical Psychology, 3, 207–231. https://doi.org/10.1146/annurev.clinpsy.3.022806.091447

Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). *Creating healthy food and eating environments: Policy and environmental approaches.* Annual Review of Public Health, 29, 253–272. https://doi.org/10.1146/annurev.publhealth.29.020907.090926

Swinburn, B. A., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011*). The global obesity pandemic: Shaped by global drivers and local environments.* The Lancet, 378(9793), 804–814. https://doi.org/10.1016/S0140-6736(11)60813-1

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

Thompson, M. A., & Gray, J. J. (1995). *Development and validation of a new body-image assessment scale.* Journal of Personality Assessment, 64(2), 258–269. https://doi.org/10.1207/s15327752jpa6402_6

Truby, H., & Paxton, S. J. (2002). *Development of the Children's Body Image Scale.* British Journal of Clinical Psychology, 41(2), 185–203. https://doi.org/10.1348/014466502163967

Truman, E., Lane, D., & Elliott, C. (2017). *Defining food literacy: A scoping review.* Appetite, 116, 365–371. https://doi.org/10.1016/j.appet.2017.05.007

Vidgen, H. A., & Gallegos, D. (2014). *Defining food literacy and its components.* Appetite, 76, 50–59. https://doi.org/10.1016/j.appet.2014.01.010

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wardle, J., & Cooke, L. (2008). *Genetic and environmental determinants of children's food preferences*. British Journal of Nutrition, 99(Suppl. 1), S15–S21. https://doi.org/10.1017/S000711450889246X

Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). *Development of the Children's Eating Behaviour Questionnaire.* Journal of Child Psychology and Psychiatry, 42(7), 963–970. https://doi.org/10.1111/1469-7610.00792

Regulatory References

Istituto Superiore di Sanità. (2022). *Disturbi alimentari: La prima mappatura dei centri del Servizio Sanitario Nazionale*. https://www.iss.it/comunicati-stampa/-/asset_publisher/disturbi-alimentari-mappatura-ssn

Ministero della Salute. (2023). *Disturbi della Nutrizione e dell'Alimentazione. Documento istituzionale utile per contestualizzare il DCA come problema di salute pubblica e per l'affermazione sull'esordio precoce in età preadolescenziale*.

MIUR. (2012). *Indicazioni nazionali per il curricolo della scuola dell'infanzia e del primo ciclo di istruzione.* Ministero dell'Istruzione, dell'Università e della Ricerca.

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