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EVIDENCE BRIEF

Food Neutrality or Food Bias and Impact in Children and Adolescents Aged 4-18 Years

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Key Messages

- This evidence synthesis is intended to inform nutrition-based school health promotion and answers the following question: how does food neutral (or non-neutral/food bias) nutrition education messaging impact behaviours, physical health, and mental health in children and adolescents aged 4-18 years?
- There is a lack of evidence on the impact of food neutral approaches in interventions with school-aged children and adolescents. There is no direct evidence that tests the impact of food neutral or food biased approaches on physical or mental health outcomes within the evidence published in the last 10 years.

- The best available evidence to inform this topic is indirect and relates to food intake outcomes only, and does not address the impacts on physical or mental health outcomes or behaviour. While it does not directly answer the question around food neutrality or food bias impacts, the indirect evidence tells us:
    - Nutrition education interventions that identifiably used a healthy/unhealthy construct (i.e., food bias constructs that aligned with how this concept was operationalized in this evidence brief) were associated with some positive dietary intake measures among school-aged children. These studies were not designed to test food neutrality or food bias, and did not consider or measure physical or mental health outcomes.
    - Rules instituted by parents that were food biased (e.g., only fruit for dessert) were associated with some positive dietary intake measures. These studies were not designed to test food neutrality or food bias, and did not consider or measure physical or mental health outcomes.
    - In addition, qualitative studies indicated that food biases may have some unintended negative impacts on conceptualizations of food and healthy eating. Specifically, food biased approaches may be moralized by children and adolescents and may be associated with negative emotions including guilt, anxiety, and belonging related to food choices. Qualitative studies described how children, adolescents, and their parents can view obesity as a negative attribute associated with personal responsibility (e.g., unhealthy food choices), and view a healthy lifestyle (e.g., healthy food choices) as a way to achieve weight loss and thinness rather than overall good health. Similar to the quantitative evidence, these studies did not directly evaluate behaviours, physical health, nor mental health outcomes.
- Of note, the term "food neutrality" was not used in any of the peer-reviewed or grey literature. If the term "food neutrality" is to be propagated via use in the field, it is important for it to be clearly defined and evaluated.

Issue and Research Question

In a recent survey of Ontario public health units, evidence syntheses on the use of a food neutral approach in health promotion practice was identified as a top priority. In line with this, a sub-group of the Ontario Dietitians in Public Health (ODPH) requested an evidence synthesis of food neutrality among school-aged children and adolescents. This evidence synthesis is intended to inform nutrition-based school health promotion and answers the following question: **how does food neutral (or non-neutral/food bias) nutrition education messaging impact behaviours, physical health, and mental health in children and adolescents aged 4-18 years?**

Definition of Food Neutrality

"Food neutrality" is a relatively new term that has been consistently defined in a variety of dietetic practice spaces, including in nutrition education resources,[1,2] on Ontario public health unit webpages,[3,4] and by private dietetic practitioners.[1,5] The definition of food neutrality in those spaces are consistent, and include:

- "Food neutrality means all foods have the same moral value. No foods are inherently 'good' or 'bad' or 'healthy' or 'unhealthy.'"[2]
- "Food neutrality is an approach to remove MORAL judgement from how we talk and think about food."[3]

- "Food neutrality essentially means that all foods, regardless of their nutritional composition, have the same moral value. So, no foods are inherently 'good', 'bad', 'healthy' or 'unhealthy'. They are just… food! Food neutrality is about detaching moral value or judgement from a food, and the person eating that food."[5]

Based on the above, the definition of food neutrality operationalized in this evidence brief focuses on morality (good vs. bad) and judgements (healthy vs. unhealthy) of foods. Within this evidence brief, a lack of food neutrality is operationalized as "food bias", otherwise stated as including morality and judgements in approaching foods.

Origins of food neutrality

Use of the term "food neutrality" stems from the area of internally regulated eating, used in approaches including Ellyn Satter's Eating Competence Model (ecSatter), and Evelyn Tribole and Elyse Resch's Intuitive Eating (IE) approach.[6] ecSatter defines competent eaters based on having:

1. positive attitudes towards food and eating,
2. food acceptance skills (ability to accept a variety of available foods),
3. internal regulation skills (intuitively consuming enough food to give energy and stamina and to support stable body weight), and
4. food management skills (skills and resources for managing the food context).

In a newsletter authored by Ellyn Satter, it is stated that internally regulated eating practices (e.g., ecSatter and IE) are "interventions that heal eating attitudes and behaviours [and] have this in common: Are food neutral – Give strong permission to eat preferred food, without in any way stipulating "healthy" or "unhealthy" food."[7] The Satter approach also recommends keeping food offerings neutral; without positive or negative pressure.[8] The Satter approach is often cited as evidence for a food neutral approach. The Ellyn Satter Institute website does not provide evidence on the effectiveness of food neutrality.

IE is defined as "an alternative approach that was developed in response to the negative mental and physical health effects caused by traditional diets for weight loss, which involve the deliberate long-term restriction of food. IE allows internal cues to guide one's eating choices and patterns rather than a meal plan or designated rules."[9,10]

This evidence brief will focus on food neutrality as morality (good vs. bad) and judgements (healthy vs. unhealthy) of foods, and not multi-faceted interventions such as ecSatter and IE.

Current Nutrition Guidance Related to Food Neutrality

Taking a positive, inclusive approach is one of the principles of teaching food education in schools. Educational approaches that focus on providing neutral exposures and positive experiences with foods can support food acceptance skills and shape children's eating patterns over time. In Ontario, these positive, inclusive approaches have been included in certain provincial school nutrition guidance, including the Student Nutrition Program School - Nutrition Guidelines 2020 from the Ministry of Children, Community, and Social Services.[11] For example, the guidance includes "Children and youth are easily influenced by casual comments and/or conversations about weight, body size and calories. Show a positive attitude when discussing food and health in front of students." Of note, this guidance does not specify a food neutral approach.

Canada's Food Guide (CFG) does not advocate for a particular educational approach and does not promote food neutrality nor avoidance of food bias. Components of CFG may be seen to incorporate elements of food bias by encouraging water over sugary beverages and limiting highly processed foods. Further, CFG contains guidance specifically aimed at teens reducing their intake of sugary beverages.[12]

Several jurisdictions and organizations in Canada have integrated food neutrality into their school food guidance and resources; for example, eating competence and food neutrality are foundational to the British Columbia (BC) provincial government's "teach food first" Guiding Principles for Educators.[13]

Existing guidance documents and resources do not provide an evidence base for the use of food neutrality as an approach, but rather appear to rely on practice-based expert opinion. Given the growing prominence of the concept of food neutrality in dietetic practice spaces, an evidence brief was done to provide clarity on the state of the current evidence around the impacts of food neutrality on school-aged children and adolescents.

Methods

An evidence brief was conducted to facilitate responsiveness, feasibility, and scope alignment. To identify relevant evidence on this topic, the Shared Library Services Partnership librarian from Kingston Frontenac Lennox and Addington Public Health designed the search strategy, which was peer-reviewed by Public Health Ontario (PHO) Library Services. Searches of the scientific literature were executed on March 6th, 2024 in Ovid MEDLINE, APA PsycInfo, and CINAHL Complete databases for articles published in English from 1998 to present, based on the language capacity of the review team and resources available. The team also reviewed additional references provided in two grey literature reports and other references that were provided by members of the ODPH who were experts consulted for this evidence brief. The full search strategy is available upon request.

Food bias or food neutrality were operationalized as any type of value judgment of "good/bad", since using "healthy" singular or "unhealthy" singular has been traditionally used to define all eating messages. The approach or intervention for food bias or food neutrality was left broad and included any education, policy, frameworks, or interventions. English-language sources published 2014 onwards were eligible for inclusion if they: 1) included school-aged children or adolescents aged 4 to 18 years in any context (e.g., school settings, home, community); 2) focused on a food neutral approach (e.g., messaging that all foods are morally equal, lack of food hierarchies) or food bias approach (e.g., categorization of foods as good/bad, healthy/unhealthy, etc.); and 3) addressed mental or physical health outcomes, and or eating behaviour(s); and 4) provided results from Organization for Economic Co-operation and Development (OECD) member countries. Both review-level evidence (i.e., systematic, umbrella, scoping, rapid, narrative reviews and meta-analyses) and primary research studies (qualitative, experimental and cross sectional studies) were eligible. Evidence-based guidelines for a nutritionally complete diet such as CFG or United States Department of Agriculture's Dietary Guidelines or MyPlate were not included unless they presented specific evidence around food bias and or food neutrality. The same eligibility criteria, except the publication date criterion, were applied to the screening of documents provided by the ODPH in order to be over-inclusive (i.e., documents published before 2014 that met the other eligibility criteria were included).

At least one reviewer screened titles and abstracts, as well as full-text versions of papers, with the content lead validating all inclusions. For all included papers, the content lead extracted relevant data. Quality appraisal was not conducted given there was limited evidence and none of the identified papers directly addressed the concept of food neutrality or food bias.

Findings

No studies were found that addressed the concept of food neutrality. Fifteen studies meeting the inclusion criteria were identified, all of which *indirectly* addressed the concepts of food bias. Within the identified quantitative studies, the impacts of food bias were mostly associated with measures of food intake, food preference, body weight, and nutrition knowledge. Note that nutrition knowledge was not an outcome of interest in the current evidence brief. Several qualitative studies that were identified described children's and adolescents' conceptualization of healthy and unhealthy foods. There was no evidence of the impact of food bias on children's and adolescents' mental health, which are the impacts of most interest in the area of food neutrality.

Qualitative Studies on the Conceptualization of Healthy and Unhealthy

Six qualitative studies examined children's and adolescents' conceptualization of healthy and unhealthy foods and eating, and/or their impacts.[16-21] Of the studies included in this evidence brief, only qualitative studies reported on children's and adolescents' moralized beliefs and perceptions of food, and associated emotions. Five of the six studies were conducted among Australian children and adolescents, with the sixth study among Brazilian adolescents.

One study examined inter-generational transmission of dietary behaviours where food bias constructs were identifiable (i.e., food bias constructs that aligned with how this concept was operationalized in this evidence brief); it described how mothers taught their children to value fruits and vegetables and to restrict unhealthy foods (as classified by the mother), to the reported benefit of their diet quality.[18] Three studies focused on conceptualizations of weight and/or food choices and described how adolescents moralize foods and food choices with mostly negative associations, where examined, including guilt, anxiety, and sense of belonging related to food choices.[16,17,19] Within these studies on conceptualizations, there was an inextricable link between food bias and weight bias. One study in particular described how the two were conflated, and where parents and adolescents viewed obesity as a negative attribute associated with personal responsibility (e.g., unhealthy food choices), and a healthy lifestyle (e.g., healthy food choices) as a means for weight loss and thinness rather than a way to achieve overall good health.[19]

One study described how children had accepted and reiterated food biased health messaging that encouraged consumption of fruits and vegetables.[20] Children expressed being tempted by "unhealthy" foods they considered highly palatable. Of note, the relationship between these observations was not reported directly by the children but instead inferred by the researchers.[20] Finally, one study examined the experiences of mothers and children in response to "healthy" lunchbox programs in Australia, which provided families with examples of healthy/unhealthy or good/bad packed lunches for children in an effort to improve child nutrition.[21] Roughly twenty percent of families reported at least one instance of strict enforcement of rigid rules (e.g., lunchbox policing). The authors reported focussing on a minority of the interviews where examples of intensely negative emotions were experienced by mothers and children. In those instances, mothers felt these programs shamed their children and made them anxious around school lunches.[21]

Nutrition Interventions in School Settings

Three experimental studies examined the impact of various nutrition interventions in school settings that used identifiably food biased constructs;[22-24] for example, moralizing foods as good and bad using happy and unhappy faces, respectively.[23] These three studies were aimed at improving dietary intakes of children, and their measured outcomes were limited to dietary intakes or food ordered. Two studies

delivered nutrition education and found generally that their interventions improved dietary intakes,[22,23] with one of the studies engaging parents through their support of food diaries to track at-home food intakes.[23] One study evaluated tailored feedback for students ordering from the school canteen, which presented a break-down of their food ordered into the proportions (i.e., percent of total order) that were "everyday", "occasional", or "caution" and found no impact on food ordered after a period of four weeks.[24] No studies examined outcomes of particular interest for the area of food neutrality, including impacts on the relationship with food or mental health. Of note, these studies met the inclusion criteria and involved school-based nutrition interventions, but this small set of studies does not represent a review of school-based nutrition interventions generally, since a comprehensive review of those programs was not the focus; they focus only on school-based nutrition programs that use identifiably food biased constructs.

Other Studies Involving Food Biased Constructs

Six other quantitative studies were identified that involved food bias constructs. Three experimental studies measured children's perceptions of healthy and unhealthy foods, and associated food preference.[25-27] Children preferred foods based on enjoyment, with mixed findings on whether they chose foods they understood to be "healthy" or "unhealthy".[25-27] Two cross-sectional studies examined the impact of food biased rules at home (e.g., limited fast food, no sweet snacks/beverages); findings included increases or null associations with markers of diet quality (e.g., fruit and vegetable intake) and increases or null associations with anthropometric measures (e.g., body mass index [BMI]).[28,29] Of note, the relationship between food biased rules at home and dietary quality could be confounded by food availability in the home (i.e., intake directly influenced by what is available). Lastly, one randomized controlled study examined the impact of food biased approach-avoidance training among a clinical population of children and adolescents with BMI greater than the 97th percentile.[30] This study found small positive effects on self-efficacy, self-control, consumption of "problematic" foods, and quality of life at six months post-intervention, but these effects were not sustained at 12-months post-intervention. As with the other studies identified in this evidence brief, none of the abovementioned studies measured the impacts of food bias on the relationship with food or mental health.

Discussion

There is a lack of evidence on the impacts of food neutrality on school-aged children and adolescents, and the term "food neutrality" was not used in any of the peer-reviewed or grey literature. There were no studies found that directly assessed or explored food neutrality in children or adolescents. In the available evidence, food bias was indirectly tested and explored due to the use or presence of food biased (dichotomous) constructs such as healthy/unhealthy and good/bad. The systematic search undertaken for this evidence brief found that key concerns for the area of food neutrality have not been empirically studied. For example, no study has directly assessed the impact of food neutral or food bias school environments on behaviours, physical health, and mental health in children and adolescents aged 4-18 years. A number of qualitative studies have explored food biased conceptualizations of foods and eating, and the associated negative emotions of children and adolescents.[16-21] Experimental evidence is limited to indirectly food biased exposures or interventions, and their outcome measures of food intake and anthropometrics in children and adolescents.[22-30]

Qualitative research methods are used to gain a better understanding of patterns of health behaviours, lived experiences, healthcare needs, to develop behavioural theories and for intervention design.[31-33] While qualitative studies do not offer quantitative evidence of associations between food neutrality or bias and outcomes such as risk ratios, qualitative evidence around this topic offers insight into

participants' conceptualizations of healthy and unhealthy eating, and descriptions of the way(s) that food biases influence thoughts and behaviours. This evidence brief discusses several qualitative studies that explored how children and adolescents can experience food bias, which is inextricably linked to weight bias. Studies describe how the moralizing of foods can occur with both parents and their children/adolescents, and can be associated with inaccurate views of health, for instance, that only individuals with higher body weights need to avoid unhealthy foods or try to increase physical activity.[19] Further, foods perceived as unhealthy were conflated with higher body weights and associated with guilt, anxiety, and sense of belonging related to diet and food choices. On the other hand, qualitative findings report the inter-generational familial transmission of a food biased conceptualization of healthy eating as positive; encouraging more healthful diets for children.[18] The discrepancy between the studies that describe negative emotions and the study that did not may be, at least in part, attributed to the study objectives (conceptualization of weight and health vs. dietary behaviours).

Nutrition education interventions among children and adolescents with identifiable food bias constructs were associated with some improved dietary intakes.[22-24] These studies did not measure how their interventions impacted children's and adolescents' relationship with food nor disordered eating behaviours, therefore there is an incomplete picture of the impacts of food bias. This limitation is due to the fact that these studies were not directly testing impacts of food bias, but rather, their interventions happen to be identifiably food bias. Further limiting the interpretation of data from school nutrition interventions in this evidence brief, is that they are often multi-component (e.g., didactic education and hands-on components such as gardening and cooking classes) which means that the impact of various components cannot be individually assessed, and each component is vaguely described. Generally (i.e., beyond a focus on food neutrality), studies on nutrition interventions in schools use a variety of approaches and find varying degrees of effectiveness in the population of interest (aged 4-18 years).[34-37]

Where food neutrality is presented as evidence-based, the evidence cited is typically related to internally-regulated eating practices (e.g., ecSatter and IE). ecSatter and IE do not include the concept of food neutrality as defined in current practice and for this evidence brief.[1,5] These practices are, however, consistent with approaching food and eating positively, without restriction, and without moral judgement. Importantly for the examination of food neutrality specifically, ecSatter and IE are comprehensive and include multiple pillars, where it is not possible to independently evaluate any single pillar or component. Evidence for ecSatter is almost exclusively in adult populations and cross-sectionally examines the association between the ecSatter Inventory (ecSI2.0) and various health behaviours and outcomes, citing positive associations.[38] The evidence base for IE appears stronger than evidence for ecSatter, due to several clinical studies in addition to cross-sectional findings.[39,40] Similar to studies of ecSatter, IE studies are almost exclusively in adult populations and their translatability to school-age children and adolescents is unknown. Only one intervention study of IE was in a non-adult population, and found that while an IE intervention increased IE scores of high-school students, it did not decrease disordered eating (as measured by the 26-item Eating Attitudes Test).[39,41]

Limitations and Strengths

The main limitation of this evidence brief is a lack of evidence related to the research question. In the absence of direct evidence on food neutrality among children and adolescents, the evidence brief describes indirect evidence on food bias. The quality of this evidence in answering the research question is low, but was important to describe as the best available evidence on the topic.

The main strength of this evidence brief is that it systematically reviewed the literature for the term food neutral, and the concepts of food neutrality and food bias. The search for published evidence was developed by an information specialist and the search strategy was peer-reviewed. Through this comprehensive systematic approach, indirect evidence on food bias among children and adolescents was captured and described, providing a best-available evidence approach for a relatively new topic in public health practice.

Conclusion

This evidence brief finds a lack of studies on the concept of food neutrality and limited (indirect) evidence in relation to food bias, for outcomes that were not related to the key outcomes sought for inclusion (behaviours, physical health, and mental health in children and adolescents). If the term "food neutrality" is to be propagated via use in the field, it is important for it to be clearly defined and evaluated.

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