

Review Article

Identifying attributes of food literacy: a scoping review

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Abstract

Objective: An absence of food literacy measurement tools makes it challenging for nutrition practitioners to assess the impact of food literacy on healthy diets and to evaluate the outcomes of food literacy interventions. The objective of the present scoping review was to identify the attributes of food literacy.

Design: A scoping review of peer-reviewed and grey literature was conducted and attributes of food literacy identified. Subjects included in the search were high-risk groups. Eligible articles were limited to research from Canada, USA, the UK, Australia and New Zealand.

Results: The search identified nineteen peer-reviewed and thirty grey literature sources. Fifteen identified food literacy attributes were organized into five categories. Food and Nutrition Knowledge informs decisions about intake and distinguishing between ‘healthy’ and ‘unhealthy’ foods. Food Skills focuses on techniques of food purchasing, preparation, handling and storage. Self-Efficacy and Confidence represent one’s capacity to perform successfully in specific situations. Ecologic refers to beyond self and the interaction of macro- and microsystems with food decisions and behaviours. Food Decisions reflects the application of knowledge, information and skills to make food choices. These interdependent attributes are depicted in a proposed conceptual model.

Conclusions: The lack of evaluated tools inhibits the ability to assess and monitor food literacy; tailor, target and evaluate programmes; identify gaps in programming; engage in advocacy; and allocate resources. The present scoping review provides the foundation for the development of a food literacy measurement tool to address these gaps.

Keywords
Scoping review
Food literacy
Food skills
Attributes

Chronic diseases, including cancers, CVD, chronic respiratory disease and diabetes, are the leading causes of death and disability, globally and in Canada^(1–4). Dietary risk factors are now recognized as the largest contributor to mortality both globally and in Canada^(1,2). Increasing prevalence of large-scale food retail stores and fast-food outlets, combined with industrialization of the global food system, have shifted the food supply in terms of food availability, affordability and quality^(5,6). These shifts have implications for overall diet quality by increasing the accessibility of low-cost, energy-dense and nutrient-poor foods and beverages⁽⁷⁾. Perhaps not surprisingly then, eating patterns observed among

populations of industrialized countries show poor alignment with recommendations for health^(8,9).

There has been increasing consideration of food literacy as a significant influence on eating patterns. ‘Food literacy builds resilience, because it includes food skills (techniques, knowledge and planning ability), the confidence to improvise and problem-solve, and the ability to access and share information, and is made possible through external support with healthy food access and living conditions, broad learning opportunities, and positive sociocultural environments⁽⁶⁾. Broadly speaking, food literacy highlights interconnectivity among food, health and the environment, while fostering a

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greater understanding of food beyond traditional nutrition recommendations and cookery lessons⁽¹⁰⁾. Within the existing research exploring food literacy, there is variation in definitions and the characteristics, or attributes, considered to fall under the umbrella of this concept⁽¹⁰⁾. This variation makes it difficult to generalize and compare results across studies. Prior efforts have also identified a notable absence of evaluated and standardized measurement tools specific to food skills and other attributes of food literacy, including food access, self-efficacy and confidence⁽⁶⁾. The lack of tools inhibits the ability to assess and monitor food literacy; tailor, target and evaluate programmes; identify gaps in programming; engage in advocacy efforts; and appropriately allocate resources. As a result, it is difficult for nutrition practitioners to assess the impact of food literacy on initiating and maintaining healthy diets and to evaluate the outcomes of interventions to support food literacy.

Recent research from Australia⁽¹¹⁾ recommended the development of a measure of food literacy that can be applied across varying contexts, including research, policy and practice, to monitor the relationship between food literacy and overall nutrition and well-being. As an initial step in developing a measurement tool, we conducted a scoping review to characterize the attributes of food literacy as conceptualized by existing peer-reviewed and grey literature. For the purposes of the present study, an attribute was defined as a 'quality or feature regarded as a characteristic or inherent part of someone or something'⁽¹²⁾.

Methods

Given the nascence of the concept of food literacy, the research team elected to use a scoping review methodology, which is useful when a body of literature has not yet been reviewed comprehensively and for the purpose of identifying key concepts⁽¹³⁾. We followed the procedures outlined by Arskey and O'Malley⁽¹⁴⁾ and later expanded by Levac *et al.*⁽¹⁵⁾.

Identification of relevant studies and records

A systematic search was developed, tested and conducted by the team librarian (A.F.) using keywords intended to capture sources that included a conceptual model and/or framework and/or definitions and/or indicators of food literacy and/or food skills. Food skills were included based on previous work that suggested some relevant articles may not be captured with terms limited specifically to food literacy. Keywords included 'food' or 'nutrition*' in combination with 'skill' or 'skilled' or 'skills' or 'literate' or 'literate*' or literacy (* indicates a wild card). The MEDLINE search strategy is shown in the online supplementary material, Supplemental Table 1.

For the peer-reviewed literature (Fig. 1), the keywords were used to search the databases listed in Table 1. When applicable, results were limited using the Scholarly (Peer Reviewed) Journals filter. Results were limited to articles

published in English between 2005 and February 2016 to capture the evolving concept of 'food literacy'. Animal studies and those specific to malnutrition or nutrient deficiencies were excluded. The complete search strategies are available upon request. A total of 851 articles were retrieved from the peer-reviewed literature after removal of duplicates (Fig. 1) and screened. Articles that described an application of food literacy or focused on the description of food skills interventions or outcomes of interventions without addressing the conceptualization and/or definitions of food literacy were excluded. As well, eligible articles were limited to research carried out in Canada, the USA, the UK, Australia and New Zealand. In the typical scoping review methodology, articles for inclusion are not appraised for methodological quality. However, in the current project, articles that did not meet quality and relevance assessment criteria as they pertain to methodological rigour and public health application, as described by Rychetnik *et al.*⁽¹⁶⁾ and Cameron *et al.*⁽¹⁷⁾, respectively, were excluded (e.g. editorials were excluded; case studies were included). A pilot round of independent title/abstract screening by two team members (H.T. and S.E.), using the predetermined inclusion and exclusion criteria, yielded a κ of 0.94. Titles and abstracts were then reviewed independently by these two researchers, leaving forty-five records for full-text review by two independent researchers. After screening, eleven articles remained; hand-searching identified an additional eight articles, increasing the total number of peer-reviewed articles included to nineteen.

For the grey literature (Fig. 2), a search of desLibris, a snowball approach based on known relevant sources and a review of the first ten pages of Google search results were conducted^(14,15). A total of 150 sources were retrieved from the grey literature and screened using the criteria noted above. A total of twenty-seven remained after screening. Hand-searching yielded an additional three sources, resulting in a total of thirty sources retrieved from the grey literature.

Data abstraction and synthesis

For each included source, the type (e.g. peer-reviewed article, report), study methods, population(s) of interest, study location, and food literacy attributes and descriptors were abstracted (see online supplementary material, Supplemental Table 2). Data abstraction was conducted by E.M. and validated by L.P. After a preliminary list of food literacy attributes and descriptors was identified, a conceptual model was developed by the full team to organize and refine the attributes in relation to a definition identified through previous work by the authors⁽⁶⁾. 'Food literacy categories' were then proposed to capture the attributes and their descriptors.

Results

Fifteen food literacy attributes and associated descriptors were identified from the peer-reviewed and grey literature. These were organized into five key themes or categories (Table 2).

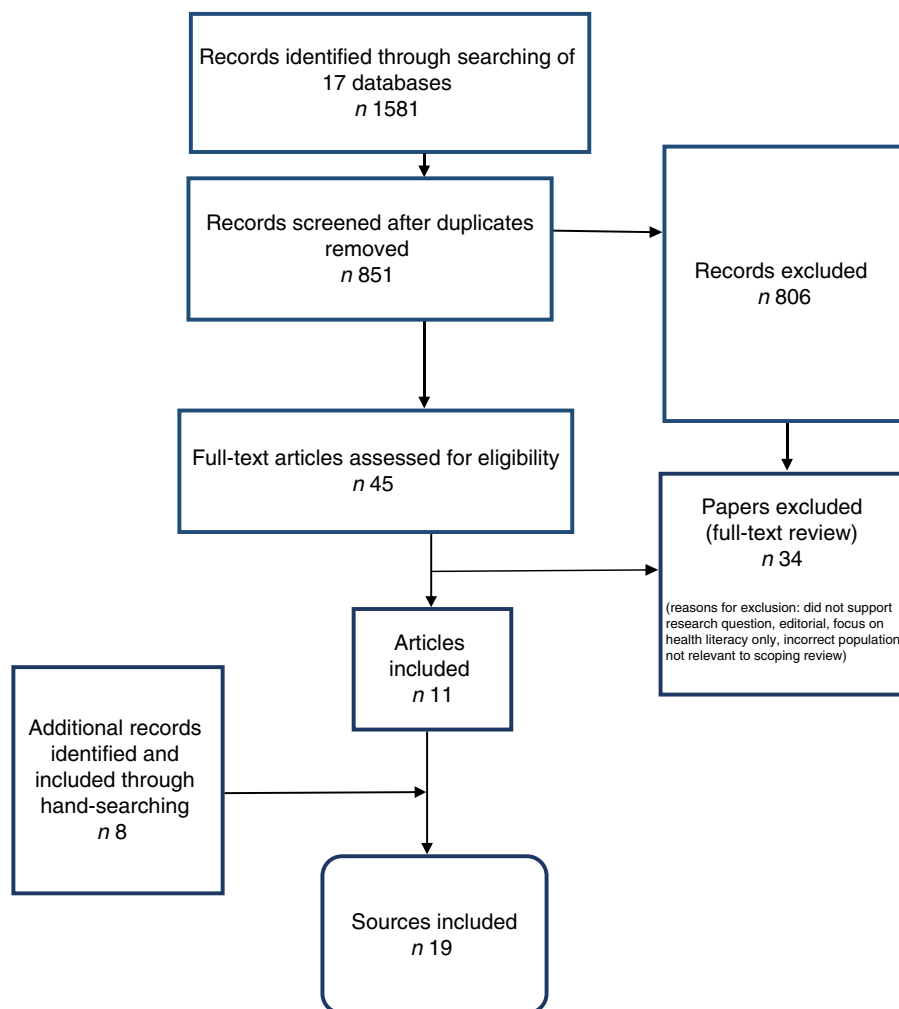


Fig. 1 Peer-reviewed article yield

Table 1 List of electronic databases searched on 12 February 2016

1	Ovid MEDLINE® 1946 to February Week 1 2016
2	Embase 1996 to 2016 Week 06
3	Ovid MEDLINE® In-Process & Other Non-Indexed Citations February 11, 2016
4	PsycINFO 2002 to February Week 1 2016
5	Academic Search Premier
6	AgeLine
7	Child Development & Adolescent Studies
8	CINAHL Plus with Full Text
9	Cochrane Central Register of Controlled Trials
10	Cochrane Database of Systematic Reviews
11	Database of Abstracts of Reviews of Effects
12	Environment Complete
13	Health Business Elite
14	Nursing & Allied Health Collection: Comprehensive
15	Psychology and Behavioral Sciences Collection
16	SocINDEX with Full Text
17	PubMed – results limited to publisher supplied citations

Food and Nutrition Knowledge

This category encompasses attributes related to facts and information acquired through experience or education related to foods and nutrition. Within this category, four

attributes were identified: (i) Food Knowledge; (ii) Nutrition Knowledge; (iii) Food Language; and (iv) Nutrition Language. Much of the literature reviewed focused on the importance of ‘baseline knowledge’ in foods and nutrition knowledge^(11,18–29). This referred to common knowledge of the variety of foods that exist, where they come from (including a connection to local food procurement), how food is produced, basic ingredients, and, to a lesser extent, rudimentary nutritional knowledge about the function of nutrients in the body. The literature suggested that knowledge assists in making informed decisions for ‘balanced food intake’⁽⁹⁾. Scripa⁽²⁶⁾ and Vaitkeviciute *et al.*⁽³⁰⁾ in particular suggested such knowledge would help individuals understand what makes foods ‘healthy’ and ‘unhealthy’, while Vigden and Gallegos⁽¹⁰⁾ spoke to the role of nutritional knowledge as a precursor to the ability to judge the quality of food. Boehl⁽²⁹⁾ and Desjardins⁽⁶⁾ identified the importance of food and nutrition language proficiency, specifically using everyday language to convey and comprehend information about types of foods (e.g. grains, milk products, meat) and food preparation techniques (e.g. sauté, fold).

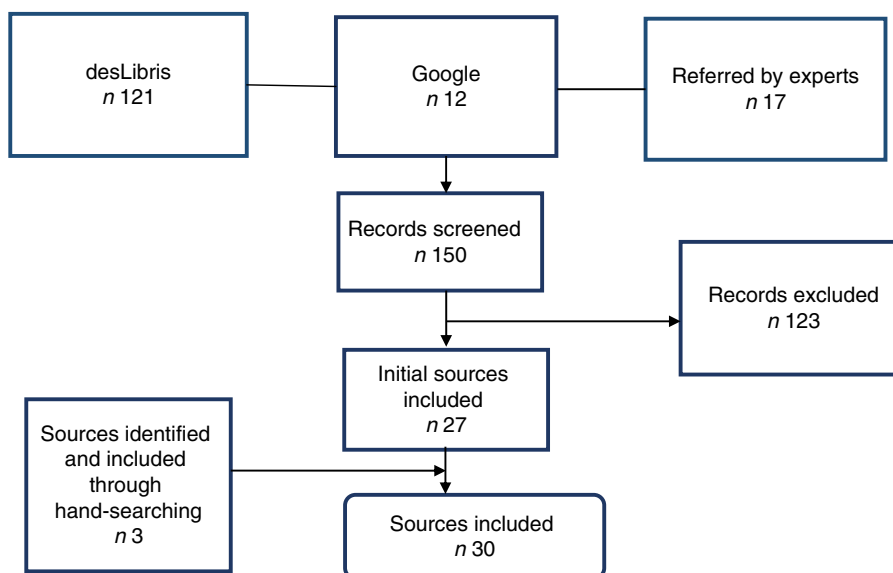


Fig. 2 Grey literature yield

Food Skills

Food Skills are defined as techniques of food purchasing, preparation, handling and storage. Within this category, two attributes were identified: (i) Food Techniques; and (ii) Food Skills Across the Lifespan. Food Techniques was found to be the most explicit food literacy attribute in the literature^(10,18,19,21,31–45) and refers to one's ability to prepare foods using basic kitchen skills (e.g. chop, mix, stir, measure ingredients), as well as possess a basic competence in food preparation (e.g. fry, bake). Food Techniques also referred to the ability to identify cooking equipment needed in preparing food, the ability to read recipes, and the capacity to practise kitchen and food safety, referring to how to store, handle, prepare and dispose of food^(10,18,19,21,25,34,42).

In terms of Food Skills Across the Lifespan, this attribute was conceptualized as the ability to prepare and manage food-related activities in a healthy way to adapt to critical points, transitions and paths along the life course^(18,22,24,45,46).

Self-Efficacy and Confidence

Within the context of the literature, efficacy is defined as the ability to produce a desired or intended result⁽⁴⁷⁾. Applying this to health behaviours, the attributes in this category reflect an individual's capacity to perform in specific settings or situations, including overcoming obstacles to achieve the desired outcome. These abilities are not inherent but rather are acquired through supportive environments. This is the largest category and includes five attributes: (i) Nutrition Literacy; (ii) Nutrition Self-Efficacy; (iii) Food Self-Efficacy; (iv) Cooking Self-Efficacy; and (v) Food Attitude.

Colatruglio and Slater⁽⁴⁶⁾ identified Nutrition Literacy as a 'functional' component of food literacy, which is described as the skill to identify credible, evidence-informed food and nutrition information. They noted that

food literacy extends beyond functional literacy and encompasses developing personal skills regarding food and nutrition while respecting different cultures, family and spiritual beliefs.

Nutrition Self-Efficacy refers to the belief in one's ability to use interactive and critical food literacy skills in decision making about purchasing, preparing and consuming foods with higher nutritional value^(48,49). Arnold⁽⁴⁹⁾ suggests that such self-efficacy reflects the capacity, motivation, or, as framed by Driver and Friesen⁽⁴²⁾, confidence to perform such skills in a variety of settings and situations. Self-efficacy includes the ability to overcome obstacles or challenges that may limit one's ability to purchase, prepare and consume healthy foods. Desjardins⁽⁶⁾ refers to this as 'resiliency'. Gesundheit⁽³¹⁾ and Scripa⁽²⁶⁾ further describe this attribute by suggesting self-efficacy extends beyond awareness of eating healthy and encompasses the desire or self-determination to improve in this capacity.

Food Self-Efficacy was described as the individual's belief in his or her capability to perform food-related skills, including selection, purchasing and preparation of diverse foods and ingredients; planning and creating meals; and applying food skills across different situations^(18,21,22,25,35,41,42,44,48–53). Scripa⁽²⁶⁾ and Vaitkeviciute *et al.*⁽³⁰⁾ further describe this attribute as one's perceived ability to be open to taste and eat healthier food products, which suggests this is not an inherent characteristic, but rather an acquired skill. Whiteley and Matwiejczyk⁽²⁸⁾ particularly emphasize the importance of food self-efficacy in children to promote lifelong positive food attitudes.

Cooking Self-Efficacy refers to competence and confidence in the ability to prepare food, including confidence in cooking techniques, such as using a knife, stir-frying and grilling^(34–36,44,46,52–54), as well as the ability to apply basic principles of safe food hygiene and handling when

Table 2 Food literacy attributes and descriptors from the scoping review

Food literacy category (classification of attributes that have a shared characteristic)	Food literacy attributes (the quality or feature regarded as a characteristic or inherent part of someone or something)	Food literacy attribute descriptors (description of food literacy attributes)
Food and Nutrition Knowledge (facts and information acquired through experience or education related to foods and nutrition)	Food Knowledge	Awareness of the type and/or varieties of foods (e.g. grain, vegetable and/or fruit, milk, meat); understanding of where food comes from (e.g. milk comes from cows), also including where food is produced, processed and sold (in a store and/or restaurant); ingredient science (knowing what is in a food product); ability to make informed food choices (including choices based locally available options)
	Nutrition Knowledge	Awareness of nutrients and their relevance to health and well-being; ability to find reliable information about food; understanding how foods fit into a balanced diet
	Food Language	Commonly used words or terms that distinguish foods by their characteristics and their perceived ease of preparation or required skill set level (e.g. sauté, fold)
	Nutrition Language	Commonly used words or terms that distinguish nutritional characteristics of foods (e.g. high-fibre, low-sodium)
Food Skills (techniques of food purchasing, preparation, handling, storage)	Food Techniques	Ability to perform basic kitchen skills like chop/mix/stir/measure ingredients and prepare meals; ability to perform cooking tasks including the identification of cooking equipment, reading recipes, kitchen and food safety; how to properly handle, prepare, store and dispose of food
	Food Skills Across the Lifespan	Prepare to manage food-related activities in a healthy way to adapt to critical points, transitions and trajectories across the life cycle
Self-Efficacy and Confidence (examines the construct related to health behaviours; the efficacy/capacity of performance in settings or situations, including overcoming obstacles to participate in an exercise)	Nutrition Literacy	The ability to discriminate between evidence-informed/accurate nutrition knowledge/information and non-factual knowledge/information (e.g. the ability to read labels and reading recipes, seek out reliable information)
	Nutrition Self-Efficacy	Belief in one's relative ability to succeed in specific nutrition-related situations or accomplish a task like, for example, choosing the healthiest dinner recipe for the family; capacity to gain nutrition information; awareness/motivation/self-determination/confidence to prioritize nutrition information in food choices
	Food Self-Efficacy	Belief in one's relative ability to basically understand the nature of food and how it is important; understanding the food industry and resilience to the food environment; understanding how to select and purchase nutritious foods and meal within a budget in a complex food environment with a diverse number of choices
	Cooking Self-Efficacy	Belief in one's relative ability to prepare food; confidence to prepare a good-tasting meal from whatever is available; believe in one's ability to use cooking implements and styles (e.g. frying, grilling)
Ecologic (beyond self) (meso- and macrosystems that interact with food decisions/practices)	Socio-Cultural Influences and Eating Practices	Desire or motivation to learn how to prepare food; developing a positive attitude and healthy relationship towards food; respect for food tradition, culture, history, festival; learn to prefer healthy, safe and nutritious food; food preferences, likes and dislikes; the desire to dine in and eat socially at meal times Socio-cultural influence on food choices and eating practices (including values, norms); familial connection with food (i.e. prioritizing family meals, parents increasing interaction and awareness of foods with children); respect for different cultures, family and spiritual beliefs surrounding food; demonstrate self-awareness regarding need for balanced food intake; possessing resiliency around food/eating practices; social support to learn and share food skills

Table 2 Continued

Food literacy category (classification of attributes that have a shared characteristic)	Food literacy attributes (the quality or feature regarded as a characteristic or inherent part of someone or something)	Food literacy attribute descriptors (description of food literacy attributes)
Food and Other Systems	Food and Other Systems Infrastructure and Population-Level Determinants	Awareness and/or understanding of growing, manufacturing, transportation, preparation, consumption and disposal of food products; recognizing implications of food on the social environmental, political, cultural and economic aspects of society; knowledge of how food is connected to overall population well-being and safety; to make sustainable food choices (e.g. buying foods that are produced locally)
Food Decisions (applying knowledge, information, skills to make healthy food choices)	Dietary Behaviour	Financial capacity to access healthy foods and an adequate amount of food (e.g. food security); access to living wages, affordable housing, food and cooking equipment; access to learning environments to increase knowledge and ability about food and cooking Choosing healthy food options

preparing food. Miketinas *et al.*⁽⁵⁵⁾ also refer to the motivation or desire to cook and prepare healthy foods, which may be inherent and further encouraged or taught⁽⁴⁶⁾. Vidgen and Gallegos⁽⁵¹⁾ supplement this description by suggesting Cooking Self-Efficacy includes the ability to make good-tasting meals from ‘whatever food is available’ or ‘making something out of nothing’ by improvising with ingredients on hand and managing available resources⁽⁶⁾. It further involves the ability to conceptualize food preparation^(18,25) and be creative and passionate about food preparation and cooking food⁽²⁴⁾.

Food Attitude is described in the literature as having an interest in learning how to prepare foods, developing positive attitudes towards foods (e.g. children enjoying vegetables), and the enjoyment of cooking and preparing meals^(10,27,38,55–58). It is also associated with the desire to join in and eat socially, and respecting food for its associated traditions, culture, history and links with celebration^(18,25).

Ecologic (beyond self)

This category is defined as the macro- and mesosystems⁽⁵⁹⁾ that interact with food decisions and practices. Within this category, three attributes were identified: (ii) Socio-Cultural Influences and Eating Practices; (ii) Food and Other Systems; and (iii) Infrastructure and Population-Level Determinants. While much of the emphasis in the literature is on food skills and capacity building to support a positive relationship with and understanding of food, several sources acknowledged the importance of understanding that food choices include both socio-economic^(19,55–58) and socio-cultural influences^(59–61). Socio-Cultural Influences and Eating Practices encompass values and norms as well as understanding the impact of food on personal well-being. Food and Other Systems, as an attribute of food literacy, refers to how individuals and populations interact with their food systems and the related impact on individual health, broader societal and economic well-being, and the environment^(42,58). This includes understanding what food is both available and accessible.

Infrastructure and Population-Level Determinants also encompass the financial capacity (e.g. income level, socio-economic status) to make healthy food choices along with other associated factors such as affordable housing, access to grocery stores and access to functional cooking equipment^(57,58,61). Additionally, the availability and accessibility of opportunities to learn about food, especially among children and youth, are noted as an integral aspect of this attribute^(55,62).

Food Decisions

The emphasis of the attribute in this category, Dietary Behaviour, is on the application of knowledge, information and skills to make healthy food choices; for example, ‘actively choosing whole grain options more often’.

Discussion

While early research related to food literacy focused on 'food skills', the literature reviewed here supports a broader conceptualization. Skills related to food selection, preparation, handling and storage were explicitly mentioned as being fundamental to food literacy^(18,21,23,25,29,33,49), yet emphasis was also placed on efficacy, confidence and capacity related to food, nutrition and food preparation, especially in situations that may require addressing or overcoming barriers or obstacles^(22,25,42,50,62).

Beyond the intrinsic factors, the literature also highlights 'extrinsic' characteristics of food literacy. These include broader social determinants of health that may enhance, or inhibit, the extent to which an individual or community has the capacity to develop and practise food literacy⁽⁶¹⁾. Socio-cultural (food tradition, culture and history) and learning environments, family or other similar social supports, and food and cooking facilities can facilitate and enable food literacy for individuals^(6,18,22,27,34,50). In particular, the potential for these determinants to interact with food decisions and practices is noted throughout the literature, as evidenced by growing attention placed on the need for changes to the food system and food environment given their influence on eating patterns^(6,10,11,62,63). Vidgen⁽¹⁹⁾ unequivocally emphasizes that food literacy is highly contextual and the determinants of this context are many, including the social determinants of health. Socio-economic components, such as financial feasibility, for example, may be seen as an essential part of being food literate.

Despite our categorization of attributes to provide conceptual clarity, it is important to emphasize that these attributes are intimately interconnected, as depicted in our

proposed conceptual model (Fig. 3). The present work thus advances previous assumptions that the attributes of food literacy operate in an interdependent manner⁽⁶³⁾. For example, it will be difficult for an individual to achieve food literacy without possessing the appropriate knowledge and skills, as well as the ability to apply them. However, in the absence of self-efficacy and confidence, and without access to resources for purchasing food, equipment and supplies for food preparation, neither knowledge nor ability is relevant. As a result, comprehensive approaches that are aligned with the social determinants of health will be required to impact food literacy and related health outcomes. Previously, there has been much emphasis on public health promotion strategies focused on nutrition education. However, such strategies have often not been successful in changing dietary intake⁽¹¹⁾. Explicitly supporting and building food literacy may more effectively provide the 'scaffolding' needed to navigate the current food system and make healthy food decisions^(11,63).

There is currently no comprehensive, evaluated tool to measure the key attributes of food literacy^(11,13). The attributes of food literacy identified here will be prioritized via a Delphi technique, with the aim of developing indicators for its measurement in the public health context. With such a tool, it will be possible to evaluate interventions targeting food literacy and to inform modifications to ensure that they have the desired impacts, with the long-term goal of promoting healthy eating and reducing disease risk among populations. Additionally, having a common language to describe food literacy can accelerate global knowledge translation, facilitate improved professional dialogue and networks, and streamline current programme offerings⁽⁶³⁾. The research team is in the

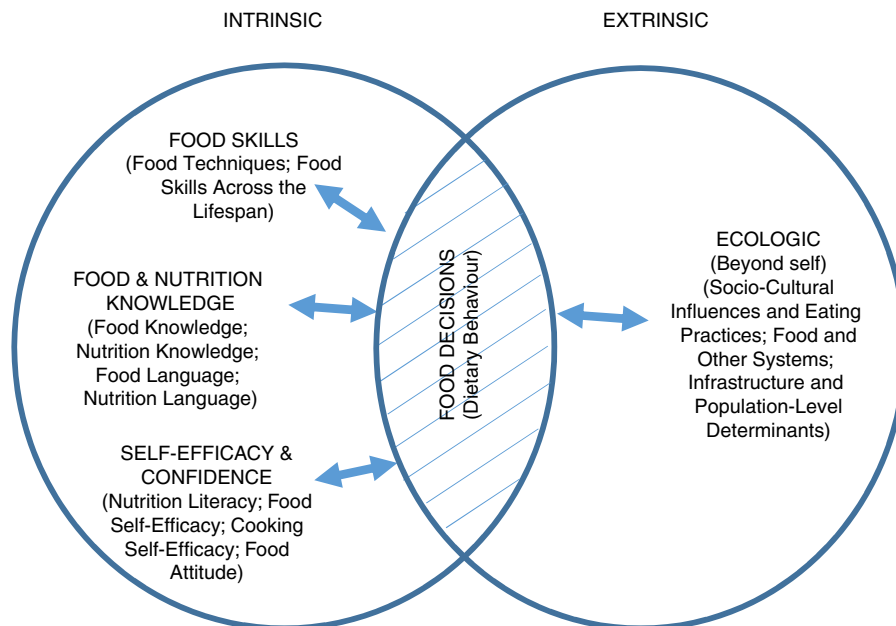


Fig. 3 Food literacy conceptual model

process of completing a research proposal to investigate the development of a food literacy measurement tool to be initially validated/evaluated with a priority population of youth and young adults. Ultimately, it is the research team's goal to validate/evaluate the tool with a variety of populations across the life course as food literacy impacts people of all ages. The attributes identified in the present study can be applied to individuals in all age groups and life circumstances.

The review is not without limitations. It should be noted that a relatively small pool of articles meeting the inclusion criteria was identified. Further, it was challenging to compare findings across articles due to significant differences in study designs, methodologies and samples. As such, the scoping review provides a descriptive interpretation of the evidence available. However, the main goal was to map the available evidence *v.* seeking only the best available evidence from a critical appraisal perspective. Thus, a descriptive interpretation of the attributes was sufficient for the project's purpose. The attributes and the corresponding themes were based on the judgement of the research team, relying on practice-based consensus (i.e. the expertise of a team of nutritionists with extensive experience in public health) to come to decisions.

In summary, food literacy is a complex phenomenon made up of multiple attributes, including those that are both intrinsic and extrinsic. By conceptualizing these attributes, the results of the present scoping review provide the foundation for the development of a measurement tool that can support monitoring and the evaluation of interventions to support food literacy.

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Supplementary material

To view supplementary material for this article, please visit <https://doi.org/10.1017/S1368980017001276>

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