



Uses of the viable validity concept: A systematic scoping review

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ABSTRACT

Objective: The concept of viable validity was first defined in 2010 within the framework of the integrative validity model. The concept has continued to evolve in the intervening years, and the purpose of this systematic scoping review is to describe and analyze the ways in which it has been deployed and appropriated by various research traditions.

Methods: We began by including all articles which cite Chen's original article "*The bottom-up approach to integrative validity: a new perspective for program evaluation*" (Eval Program Plann. 2010;33(3):205–14) and/or contain the terms "viable validity" or "viable cogency," sourced from 5 databases (PubMed, Web of Science, Scopus, Psycinfo and ResearchGate).

Results: we selected and included 31 articles published between 2011 and 2022. These studies fall into three major research traditions (evaluation science, population health intervention research and humanities and social sciences), providing a broad overview of the conceptual mobilization of viable validity. Paradoxically, our literature reveals the concept of viable validity to be poorly operationalized and only partially mature, owing to a lack of consensus among the research traditions with regard to its definition, as well as the porous boundaries between this concept and adjacent concepts such as feasibility and acceptability.

Conclusion: Viable validity is a complex concept, and its operational application constitutes a major challenge for research into and evaluation of population health interventions.

1. Introduction

Some decades ago, Campbell & Stanley (Campbell & Stanley, 1963) proposed a model of validity which has had a profound influence on subsequent research and evaluation. Campbell's model distinguished between two types of validity: internal and external. Internal validity "is concerned with ascertaining whether or not, in a specific experimental case, the intervention made a difference," whereas external validity "wants to know if an experimental effect can be generalized, and if so to which populations, to which contexts, and using which processing and measuring variables." (Chen et al., 2014). In an article published in 2010, Chen (Chen, 2010) questions the value of this model when applied to population health interventions (PHI), widely regarded as a complex. That complexity is particularly evident in the role of the environment in producing health effects (Pawson & Tilley, 1997; Skivington et al., 2021). Researchers have identified numerous limitations which restrict

the applicability of Campbell's model to PHI research: an exaggerated emphasis on internal validity, failure to take account of the needs and perspectives of stakeholders in the real world, and a failure to take into consideration the practical and functional aspects of population health interventions, limiting their usefulness in real-world conditions (Chen & Garbe, 2011; Chen, 2010). Hence Chen's proposal to supplement internal and external validity with a third category, which he calls viable validity.

Viable validity invokes the perspective of the stakeholders involved in an intervention, exploring the capacity of the intervention to integrate with the system within which it is to be deployed, in the real world rather than the research environment. The concept seeks to ascertain whether stakeholders' experience of an intervention is "practical, affordable, appropriate, useful and measurable in the real world" » (Chen, 2010). Practicality, in this context, refers to the capacity of an intervention to be adequately implemented by ordinary practitioners, rather

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than researchers. An intervention can be regarded as appropriate or adaptable if it can be integrated into the existing organization of the actors involved, adapting to their standard organizational structures so that the associated activities can be effectively coordinated. Affordability refers to the capacity of an organization responsible for implementing an intervention to recruit and/or retain ordinary participants without financial compensation, and thus to bear the cost of the intervention. An intervention can be regarded as useful if the stakeholders involved notice and experience an improvement, in terms of attenuating or resolving an existing problem. Measurability examines whether the expected results of an intervention are clear and measurable, and if there is a consistent logic which determines the capacity of the intervention to deliver the expected results (Chen, 2010; Chen et al., 2014).

Chen argues that we should always begin by evaluating viable validity before seeking to measure the efficacy of an intervention (Chen, 2010). To that end, pilot studies are of utmost importance when preparing an intervention, as well as evaluation measures. Pilot studies seek to gather information in order to prepare for deployment on a larger scale. As Thabane and co-authors have recently shown (Thabane et al., 2019), viability studies can help us to appreciate interventions in their operational context.

Viability studies feature prominently in population health intervention research (Cambon et al., 2019; Decroix et al., 2022; Thabane et al., 2019). Further methodological and operational research is needed to clarify this concept, and this is precisely the purpose of the VAPS program (Viability Assessment of population health interventions within Pilot Studies) (Decroix et al., 2023). The VAPS program seeks to re-examine viability as defined by Chen, studying the concept with reference to research in various fields of public health studies. To do so, we need a better understanding of the ways in which researchers, depending on their research paradigm, engage with the question of integrating interventions into the systems within which they are intended to be deployed. On a theoretical level, the advantages of employing the concept of viable validity when developing complex interventions has already been demonstrated (Cambon et al., 2019; Chen, 2010; Decroix et al., 2022; Thabane et al., 2019). Nevertheless, we need to explore whether and how researchers have taken up the concept: who is using it? How? From what perspectives? In this article we present the results of a literature review encompassing the use and understanding of the concept of viable validity.

Taking as our starting point the definition of the concept of viable validity proposed by Chen in 2010, our objectives for this literature review were: i) to identify the research traditions which have taken up the concept of “viable validity” and the theoretical and methodological approaches utilized; ii) to understand how different authors have appropriated the concept, and from what perspectives (full or partial mobilization of the five criteria, conceptual or operational perspectives); iii) to grasp the positioning of the concept in relation to other, related terms (feasibility, acceptability, longevity etc.).

2. Methods

In conducting this systematic scoping review and drafting the present article, we have made use of the PRISMA Extension for Scoping Review (PRISMA-ScR) checklist (Tricco et al., 2018).

2.1. Identification of articles

In the interests of achieving an interdisciplinary perspective, we searched for articles in 5 different databases: PubMed, Web of Science, Scopus, Psycinfo and ResearchGate. In order to identify pertinent articles, we made use of two search strategies. The first was to identify all publications citing the original article by Chen: ‘*The bottom-up approach to integrative validity: a new perspective for program evaluation*’ (Eval Program Plann. 2010;33(3):205–14). This gave us a list of all articles in which Chen’s article is cited (using the search function “cited by”).

Further to this, we searched the key words *viable validity*, *viable cogency* and *Evaluation* using the Boolean operators OR and AND to form a search equation: (“viable validity” OR “viable cogency”) AND (Evaluation).

2.2. Eligibility criteria

Inclusion and exclusion criteria were imposed in order to effectively target our review. We thus included all articles: - written in English or French and published since 2010 which utilize the concept of “viability” and/or “viable validity” while making explicit reference to Chen; - including relating terms such as feasibility, acceptability, transferability, durability etc. The exclusion criteria were as follows:

- All studies which cited the source article but did not utilize the concept of “viability” and/or “viable validity”;
- Articles which did include the term “viable validity” but without actually engaging with questions of viability or transferability (for example, articles which “erroneously” cited the concept without including a definition, and without addressing the issue of transferability);
- Chapters in books and lectures delivered at conferences, since these contributions are not “peer-reviewed”;
- Articles which were not available in their entirety.

2.3. Selecting the articles

We thus identified an initial list of 238 studies using Covidence®, an online platform for systematic reviews which complies with the methodological standards set out by the Cochrane Community. Several articles appeared more than once on the list, and these repetitions were removed. We then conducted a first round of selection, identifying the studies whose titles and abstracts clearly met our inclusion criteria. These titles and abstracts were then subjected to independent evaluation by two research engineers (C.S and C.D) in order to verify their eligibility. If there was any disagreement, the two evaluators re-read the text together to reach a consensus. A third evaluator (F.A) was consulted whenever difficulties or questions arose during the process of selecting eligible titles and abstracts, and during the in-depth analysis of the articles. F.A. was also consulted whenever difficulties or questions arose during the process of selecting and extracting the data.

2.4. Content analysis

The full text of the selected articles was analyzed using a specially constructed analytical framework, comprising five main themes:

- Identification of articles for which data such as author name(s), title, contact details, year of publication, location of study, publication journal and article type were available;
- Role of viability in the scientific process, with a particular focus on the degree to which the concept of “viable validity” is utilized (e.g. is viability the main object of the article, or is the concept invoked in a short passage of the article when discussing a result?), and the perspective adopted (e.g. is viability the object of the research or evaluation and/or a method?);
- Conceptual/operational mobilization of the concept of viable validity and related terms. We looked at the properties and meanings attached to the concept of “viable validity” as well as related terms such as feasibility, acceptability, longevity etc., mobilization (partial or total) of criteria and definitions adopted for the criteria used;
- Analysis of the methods employed, looking at information such as data gathering and analysis tools, stakeholders involved (explicit or implied targets of the research) and the justification offered for methodological choices;

- Questions of viability and transferability/upscaling, for example discussions of Chen's approach and the conditions associated with the upscaling/transfer of interventions.

We analyzed the content of all of the articles using the concept of research traditions. A research tradition is defined as a set of interrelated studies based upon a consistent paradigm (methodological, theoretical or hypothetical approaches etc.) shared by a group of scientists at a given moment in time (Wong et al., 2013). As per Kuhn's definition (Kuhn, 1996), scientific research occurs within the framework of research traditions based on specific paradigms which embody the shared understanding that a scientific community has of its work, and its commitment to a set of rules and norms. According to (Ridde Valérie, 2021), a paradigm comprises four interconnected dimensions: a) epistemology (relation to data); b) methodology (methods, procedures, techniques); c) ontology (potential manipulation of the objects of the research or the evaluation) and d) teleology (the intentions and interests of researchers, the purpose of their evaluation). These four dimensions were used to identify pertinent articles and assign each to an appropriate research tradition.

This process of identification and categorization involved three steps: i) identifying, for each article, the applicable paradigm on the basis of our four dimensions (epistemology, methodology, ontology and teleology), ii) assigning each article to a domain or field of research (based on elements clearly declared or identifiable in the text and/or the object of study), iii) grouping together articles by domain or field of research and by paradigm to identify research traditions.

As such, for the purposes of this review, a research tradition may correspond to a research field/domain, a research object or an interdisciplinary trend.

3. Results

The results of our searches in the five databases and our process of article selection are presented in the PRISMA diagram (Fig. 1) below. A

total of 31 articles met our eligibility criteria.

3.1. Description of the selected articles

The 31 articles selected for inclusion date from the period 2011–2022. The studies they describe were mainly conducted in USA and France. Among the 31 articles we identified:

Twelve are methodological articles, concerned with research and evaluation methodologies (Cambon & Alla, 2019; Cambon et al., 2012b; Feyaerts et al., 2017b; Harman & Azzam, 2017; Im et al., 2022; Schalock et al., 2017; Schalock et al., 2011; Spencer et al., 2013; Stevens et al., 2021; Thabane et al., 2019; Ton, 2012; Urban et al., 2014)

Twelve are empirical studies focusing on one or more interventions, whose primary objective is not to present the results of a viability study but do mention viability in at least part of the article (Borge et al., 2022; Chen & Turner, 2012; L. Durá et al., 2014; Feyaerts et al., 2017a; Keller et al., 2012; Kothari et al., 2012; Kuhnley & Cueva, 2011; Luesse & Contento, 2018; Martin et al., 2017b; Ribeiro Santiago & Colussi, 2018; Vallata et al., 2022; Vanderpool et al., 2011).

Five articles (Chen et al., 2014; Harshbarger et al., 2019; Inrig et al., 2017; O'Toole et al., 2015; Riches et al., 2020) are primarily devoted to presenting the results of viability studies on intervention(s) (regardless of title)

Two articles contained the protocols of viability studies (Beckerman-Hsu et al., 2020; Martin-Fernandez et al., 2022).

Table 1 contains descriptive information regarding the selected articles.

The studies identified as being methodological or empirical in nature generally mention viability or the concept of "viable validity" in their discussion section. In the five articles devoted to presenting the results of viability studies, viability is mentioned throughout the text. These five articles presenting the results of viability studies have helped to identify the challenges of assessing viable validity. One of the challenges of these viability studies is to give much more power and capacity to stakeholders in the implementation of programs and/or interventions before

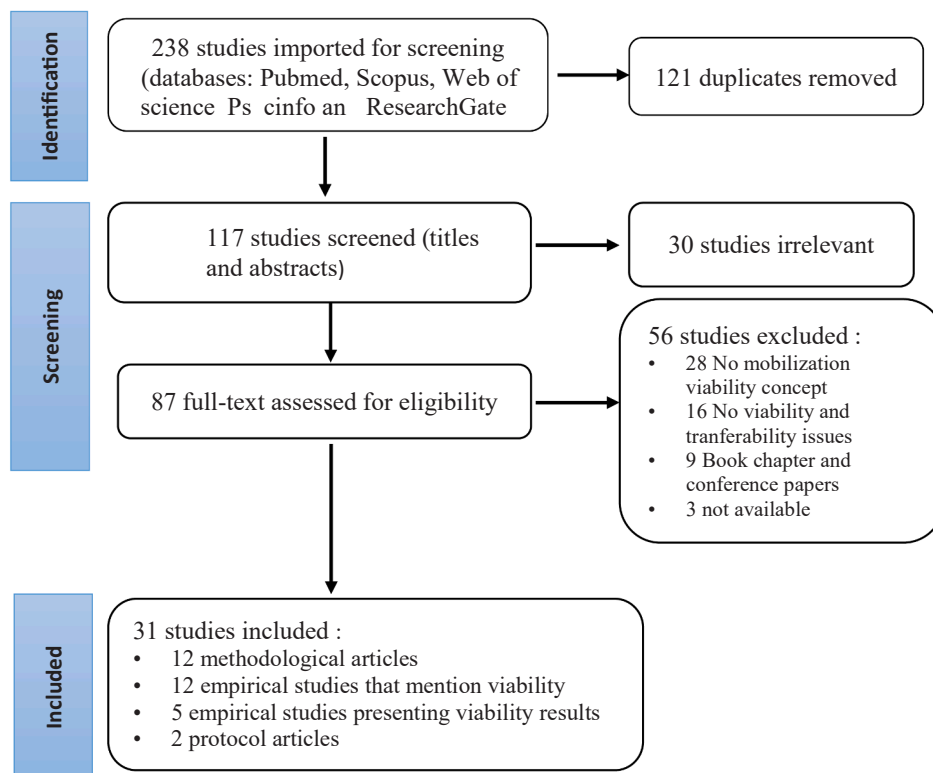


Fig. 1. The flow diagram of the study selection.

Table 1
Description of the selected articles.

Authors	Year	Type of article	Definition of the concept of “viable validity” adopted
Martin (Martin et al., 2017a)	2017	Empirical	Viable validity that findings are “practical, affordable, appropriate, useful and measurable in the real world.”
O’Toole (O’Toole et al., 2015)	2015	Viability	Describes the extent to which an intervention/ evaluation tool is practical, affordable, appropriate, measurable and useful in the real world.
Vanderpool (Vanderpool et al., 2011)	2011	Empirical	Focuses on the perspectives and experiences of ordinary practitioners, with interventions tested in real environments.
Cambon (Cambon & Alla, 2019)	2019	Methodological	Analyzing viability is about checking that an intervention can become a routine presence in real environments. This is a prerequisite for efficacy studies, as recommended by Chen.
Martin-Fernandez (Martin-Fernandez et al., 2022)	2022	Protocol	Evaluates the extent to which an intervention is viable in the real world. Analyzing viability is also essential when studying transferability.
Schalock (Schalock et al., 2011)	2011	Methodological	The extent to which evaluation of efficacy can be generalized from a research setting to a real-world environment. Helps to bridge the gap between interventional research and practice.
Stevens (Stevens et al., 2021)	2021	Methodological	Sine qua non condition for the development of innovations. Analyzing the viability of innovations during pilot studies enables us to study their transferability.
Urban (Urban et al., 2014)	2014	Methodological	A pertinent type of validity because a program which satisfies the criteria of all the usual types of validity (construction, conclusion, internal, external) may still fail if viable validity is not present.
Feyaerts (Feyaerts et al., 2017b)	2017	Methodological	Refers to the perspectives and experiences of “stakeholders, in order to ascertain whether or not an intervention program is “practical, affordable, appropriate, measurable and useful in the real world.”
Chen (Chen & Turner, 2012)	2012	Empirical	Shows that stakeholders are responsible for organization and implementation, and concerned with the viability of interventions.
Kothari (Kothari et al., 2012)	2012	Empirical	Invites stakeholders to tacitly acknowledge the practicality, pertinence and acceptability of a public health program before

Table 1 (continued)

Authors	Year	Type of article	Definition of the concept of “viable validity” adopted
Ribeiro Santiago (Ribeiro Santiago & Colussi, 2018)	2018	Empirical	considering questions of efficacy. Not present
Cambon (Cambon et al., 2012a)	2012	Methodological	Evaluates the capacity of an intervention to recruit and/or retain ordinary people, and to be implemented to a satisfactory standard by ordinary practitioners.
Vallata (Vallata et al., 2022)	2021	Empirical	An indispensable step in the process of translating research into practice.
Beckerman (Beckerman-Hsu et al., 2020)	2020	Protocol	Not present
Schalock (Schalock et al., 2017)	2017	Methodological	Expands the concept of external validity, and focuses on the extent to which results can be generalized from research settings to real settings, and from one real setting to another.
Spencer (Spencer et al., 2013)	2013	Methodological	Not present
Feyaerts (Feyaerts et al., 2017a)	2017	Empirical	The proof that an intervention is successful in the real world and enables political decision-makers to know whether or not a measure is “pertinent and usable” in practice, demonstrating its ability to solve a specific problem.
Chen (Chen et al., 2014)	2014	Viability	The extent to which an intervention is capable of succeeding in the real world. The generalization process described herein uses viability as a catch-all encompassing the durability, feasibility and scope of an intervention
Thabane (Thabane et al., 2019)	2019	Methodological	The extent to which an evaluation provides evidence that an intervention can succeed in the real world, and permits a pilot study to explore and understand how the intervention operates in that real context.
Keller (Keller et al., 2012)	2012	Empirical	Is guided by the viewpoints and interests of stakeholders, and takes real-world participants into consideration in their natural environments, while also considering their mores and cultural values.
Harshbarger (Harshbarger et al., 2019)	2019	Viability	Not present
Ton (Ton, 2012)	2012	Methodological	Highlights the importance of verifying the practical feasibility of implementing interventions in real conditions, noting the risk factors which may cause practical implementation to fail.

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Table 1 (continued)

Authors	Year	Type of article	Definition of the concept of “viable validity” adopted
Riches (Riches et al., 2020)	2020	Viability	Looks to the contributions of stakeholders to determine whether an intervention is affordable, practical, useful in the real world and capable of being implemented without the supervision of researchers.
Im (Im et al., 2022)	2022	Methodological	The viability of a program may not guarantee its validity; nonetheless, a weak viability rating means that an intervention has little chance of succeeding in its target context.
Kuhnley (Kuhnley & Cueva, 2011)	2011	Empirical	An intervention’s chances of surviving in the community, regardless of its efficacy, are increased if it can demonstrate that it is practical, compatible with the implementation capacities of community organizations, and acceptable for both clients and those responsible for implementation.
Harman (Harman & Azzam, 2017)	2017	Methodological	Not present
Luesse (Luesse & Contento, 2019)	2018	Empirical	Viable validity determines whether a program is practical, affordable, appropriate, measurable and useful when designing or testing new initiatives.
Borge (Borge et al., 2022)	2022	Empirical	The viability of an intervention (the evidence that it is appropriate, practical, affordable, and useful) is what ensures that the intervention being developed is directly informed by stakeholder input, and thus has more chance of being implemented
Durá (Lucía Durá et al., 2014)	2014	Empirical	The extent to which a program is practical, affordable, appropriate and useful in the real world
Inrig (Inrig et al., 2017)	2017	Viability	Viability measures the extent to which an organization or county authority could make a significant contribution to BSPAN (Breast Screening & Patient Navigation) to combat breast cancer among uninsured and under-insured women in Texas.

scaling up.

For Riches and colleagues (Riches et al., 2020), the assessment of viable validity has made it possible to identify, during the first phase, the variability of the commitment of the various stakeholders, particularly teachers. Most teachers wanted more power to implement activities mainly or entirely online, to streamline and standardize activities. This stakeholder desire resulted in a modification of the activities during the second phase toward a fully online delivery system. With the move online, teachers appreciated the activities with greater commitment. Thus, thanks to the viability assessment, the authors (Riches et al., 2020)

suggest that “the intervention could be designed to be delivered during an average class period with little to no teacher involvement”.

Inrig and colleagues (Inrig et al., 2016) agree with us. One of the aims of their study was to allow stakeholders to see and engage with their organization’s and county’s ability to contribute to the success of the BSPAN (Breast Screening & Patient Navigation) program in the real world. BSPAN is a program to expand rural access to breast cancer screening procedures for populations in five underserved counties in Texas. The viability assessment went a long way toward showing how “their organization or county was able to contribute significantly to BSPAN’s efforts in breast cancer screening for uninsured and underinsured women in their county.” For example, it helped to reduce the likelihood that stakeholders in a county would reject the intervention simply because the program had not identified or explored factors that were critical to the county’s perspective. Additionally, the viable validity assessment promoted consensus among program staff and stakeholders on the accuracy of the final designation of the county’s capacity to conduct breast cancer awareness and screening activities.

The second issue identified was to bring about positive change for stakeholders, as shown by Chen and co-authors (Chen et al., 2014). According to these authors, the carbon monoxide alarm ordinance in Mecklenburg County, North Carolina has strengthened the capacity of different stakeholders (firefighters, emergency medical service personnel and the health department) to address the problem of CO poisoning by standardizing and routinizing procedures (such as building permit inspections etc.) and residents to comply with the law.

Only one study (Chen et al., 2014) empirically tests all five viability criteria. The other four “viability studies” only partially operationalize the concept of viability using selected criteria: useful (O’Toole et al., 2015; Riches et al., 2020), practical (Inrig et al., 2017; Riches et al., 2020), appropriate or adapted (Harshbarger et al., 2019; Inrig et al., 2017) and affordable (Riches et al., 2020). The measurability criterion was not operationalized in these four studies. The table below shows the different criteria mobilized in the articles presenting the results of viability studies, along with the various meanings attached to these criteria. (Table 2)

3.2. Description of research traditions making use of the concept of “viable validity”

Three research traditions have clearly engaged with the concept of viable validity. They share certain attributes (paradigm and research field/domain), and their boundaries are more or less agreed-upon. We name these three traditions as follows: evaluation science, PHIR (Population Health Intervention Research) and humanities and social sciences.

Evaluation science foregrounds the use of rigorous scientific methods to tackle questions of particular value to the field of evaluation (Donaldson, 2007). In practice, this approach regards program theory as an element of central importance. Population Health Intervention Research (PHIR) is defined as any research activity which uses scientific methods to produce knowledge pertaining to interventions, in the form of policies or programs, in the health sector or outside the health sector but with potential consequences for the health of a target population (Hawe & Potvin, 2009). PHIR seeks to improve both healthy and equal access to healthcare, tackling underlying social, cultural, economic or environmental conditions or directly engaging with health-related behaviors (Craig et al., 2008). The research tradition we define as “humanities and social sciences” includes a number of disciplines devoted to the study of human behavior in its myriad forms and expressions, both individual and collective. Within this tradition, the position adopted by researchers is of particular importance, and is a research topic in its own right (see Feuerhahn, 2017). Table 3 describes these research traditions.

Above and beyond the integrative validity model, which is referenced in all of the articles in our selection, these three research traditions draw upon different theoretical approaches. Evaluation science,

Table 2
Viability criteria used and associated meanings.

Articles	Criteria utilized and associated meanings				
	<i>Practical</i>	<i>Affordable</i>	<i>Appropriate</i>	<i>Useful</i>	<i>Evaluable</i>
Chen (Chen et al., 2014)	Ascertaining whether those responsible for implementation, and the members of the community, are capable of implementing an intervention to a satisfactory standard.	The capacity of an organization responsible for implementation to meet the cost of coordinating and implementing an intervention.	The capacity for an intervention to be coordinated or organized by local agencies and community organizations.	When stakeholders observe and experience progress in terms of alleviating or resolving an existing problem.	whether the expected results of an intervention are clear and measurable, and if there is a consistent logic which dictates the capacity of the intervention to deliver the expected results.
Harshbarger (Harshbarger et al., 2019)	No	No	Describes how the tool is generally integrated into workflows by clinical practitioners, from beginning to end of patient consultations.	No	No
Riches (Riches et al., 2020)	Referring to the ease of use of mobile devices used by pupils in class and at home.	The activities on offer were free of charge.	No	Identifying positive responses to the intervention, and noting major changes in life goals.	No
Inrig (Inrig et al., 2017)	Refers to the perception that the program fits well with the existing clinical information system and protocols.	No	Refers to the fact that the staff and participating women succeeded in running the program.	No	No
O'Toole (O'Toole et al., 2015)	No	No	No	An indicator measuring the improvement, enhanced well-being or problem resolution perceived by beneficiaries.	No

Table 3
Description of the research traditions and their theoretical and methodological approaches.

Research traditions	Dominant paradigm	Number of articles	Types of articles	Methodological and theoretical approaches
Evaluation science	(Post)positivist-evolutionist	10 articles: <ul style="list-style-type: none"> 8 (post)positivist (Chen et al., 2014; Harman & Azzam, 2017; Keller et al., 2012; Martin et al., 2017a; Schalock et al., 2017; Schalock et al., 2011; Spencer et al., 2013; Ton, 2012); 2 evolutionist (Riches et al., 2020; Urban et al., 2014) 	<ul style="list-style-type: none"> 6 methodological articles (Harman & Azzam, 2017; Schalock et al., 2017; Schalock et al., 2011; Spencer et al., 2013; Ton, 2012; Urban et al., 2014); 2 viability articles (Chen et al., 2014; Riches et al., 2020); 2 empirical articles (Keller et al., 2012; Martin et al., 2017a) 	Mixed methods: qualitative (interviews, observations, study of documents, crowdsourcing, literature review) and quantitative (questionnaires, surveys). Theoretical approaches: evolutionary evaluation and exhibited generalization
PHIR	Constructivist-pragmatic-transformational	11 articles: <ul style="list-style-type: none"> 5 constructivist (Feyaerts et al., 2017a; Harshbarger et al., 2019; Thabane et al., 2019; Vallata et al., 2022; Vanderpool et al., 2011); 4 pragmatic (Borge et al., 2022; Chen & Turner, 2012; Inrig et al., 2017; Martin-Fernandez et al., 2022) and 2 transformational (Cambon & Alla, 2019; Stevens et al., 2021) 	<ul style="list-style-type: none"> 5 empirical articles (Borge et al., 2022; Chen & Turner, 2012; Feyaerts et al., 2017a; Vallata et al., 2022; Vanderpool et al., 2011); 3 methodological articles (Cambon & Alla, 2019; Stevens et al., 2021; Thabane et al., 2019); 2 viability articles (Harshbarger et al., 2019; Inrig et al., 2017) 1 protocol article (Martin-Fernandez et al., 2022) 	Mixed methods: qualitative (interviews, observations, case studies, workshops for formal presentations, discussion and co-construction, seminars) and quantitative (questionnaires, surveys). Theoretical approaches: realistic approach, consensus approach
Humanities and social sciences	Constructivist-pragmatic	10 articles: <ul style="list-style-type: none"> 7 constructivist (Cambon et al., 2012a; L. Durá et al., 2014; Feyaerts et al., 2017b; Kothari et al., 2012; Kuhnley & Cueva, 2011; Luesse & Contento, 2019; O'Toole et al., 2015) et 3 pragmatic (Beckerman-Hsu et al., 2020; Im et al., 2022; Ribeiro Santiago & Colussi, 2018) 	<ul style="list-style-type: none"> 5 empirical articles (L. Durá et al., 2014; Kothari et al., 2012; Kuhnley & Cueva, 2011; Luesse & Contento, 2018; Ribeiro Santiago & Colussi, 2018) 3 methodological articles (Cambon et al., 2012a; Feyaerts et al., 2017b; Im et al., 2022) 1 article on viability (O'Toole et al., 2015) 1 article on protocol (Beckerman-Hsu et al., 2020) 	Mixed methods: qualitative (interviews, observations, focus groups, in person and remote meetings, literature review), quantitative (self-completed questionnaires, controlled randomized testing of social support) and participatory methodology. Theoretical approaches: analytical theory involving stakeholders and social science theories.

for instance, makes use of two main theoretical approaches. The first is the theory of evolutionary evaluation, which is rooted in evolutionary theory and holds that programs alternate between phases of evolution and phases of evaluation, each aligned with different forms of validity (Urban et al., 2014). The second approach prioritizes theory-based evaluations, with Chen's work featuring prominently. This often

includes using Chen's exhibited generalization approach to resolve problems of external validity and transferability (Chen et al., 2014). In the PHIR domain, most studies make use of theory-based evaluations, particularly the realistic approach. The realistic approach seeks to understand how an intervention in a given context succeeds or fails in activating the mechanisms which generate effects (Pawson, 1997). The

humanities and social sciences research tradition is more concerned with social science-indebted and stakeholder theories, mobilizing the knowledge of the stakeholders involved in selecting activities and producing results.

All of these research traditions make use of qualitative or mixed methods (quantitative and qualitative) (Creswell & Plano Clark, 2011). The use of consensus methods is particularly common in PHIR. The consensus approach consists of democratically steering the opinion of a working group towards a consensus solution (Fink et al., 1984).

Regarding definitions, viable validity does not present consensual definitions. The concept lends itself to various interpretations by the different research traditions. Evaluation science offers a more fundamental definition of viability, based on notions of validity (Urban et al., 2014), evidence (Martin et al., 2017a) and generalization (Chen et al., 2014). PHIR adopts a more operational definition, and viability is often compared and contrasted with transferability (Cambon et al., 2012a; Martin-Fernandez et al., 2022; Stevens et al., 2021), defined as the extent to which the measured efficacy of an intervention can be reproduced in a different context (Wang et al., 2006). Several authors (Cambon et al., 2012a; Chen, 2010) argue that analyzing viable validity is an essential responsibility of evaluations. Research in the humanities and social sciences, meanwhile, invokes notions of community (Kuhnley & Cueva, 2011), experience (Feyaerts et al., 2017b), cultural values (L. Durá et al., 2014) and ordinary people (Cambon et al., 2012a) when seeking to define the concept of viable validity. Articles discussing the results of viability studies are found in all three of these research traditions: two in the evaluation science group (Chen et al., 2014; Riches et al., 2020), two in PHIR (Harshbarger et al., 2019; Inrig et al., 2017) and one in humanities and social sciences (O'Toole et al., 2015).

3.3. Positioning the concept of viable validity with reference to related terms

The articles in our corpus employ a variety of related terms, including feasibility, acceptability, durability, sustainability and adaptability. Feasibility is the term encountered most frequently, present in all three research traditions (Table 4).

In several of these articles (Ribeiro Santiago & Colussi, 2018), (Harshbarger et al., 2019), (Ton, 2012), we noted the lack of a clear distinction between the concepts of viability, feasibility and acceptability. For example, Ton (2012) conflates viability with practical feasibility. Another article devoted to the results of a viability study (Harshbarger et al., 2019) addresses these related concepts, defining: (i) feasibility as the “extent to which clinical staff are able to successfully administer or use Positive Health Checks (PHC) in intensely busy clinical settings;” (ii) acceptability as “the perception held by stakeholders that the implementation of PHC is pleasant or satisfactory, and that it helps the work of the clinics.” (Harshbarger et al., 2019) These definitions, which are similar to the definition of viability, serve to illustrate that the boundaries between these concepts remain vague.

Table 4

Use of related terms in the research traditions.

Research traditions	Related terms				
	Feasibility	Acceptability	Durability	Sustainability	Adaptability
Evaluation science	Yes (Harman & Azzam, 2017; Ton, 2012)	No	Yes (Chen et al., 2014; Keller et al., 2012)	No	No
PHIR	Yes (Borge et al., 2022; Chen & Turner, 2012; Feyaerts et al., 2017a; Harshbarger et al., 2019; Martin-Fernandez et al., 2022; Stevens et al., 2021)	Yes (Harshbarger et al., 2019; Stevens et al., 2021; Thabane et al., 2019)	Yes (Inrig et al., 2017; Thabane et al., 2019)	Yes (Stevens et al., 2021)	Yes (Vallata et al., 2022)
Humanities and social sciences	Yes (Beckerman-Hsu et al., 2020; Im et al., 2022; Ribeiro Santiago & Colussi, 2018)	Yes (L. Durá et al., 2014; Kuhnley & Cueva, 2011)	Yes (Im et al., 2022; Ribeiro Santiago & Colussi, 2018)	No	No

4. Discussion

4.1. Viable validity is primarily utilized at the theoretical level

Writing in 2010, Chen (Chen, 2010) fine-tuned Campbell's original distinction between internal and external validity by adding a third dimension, which he called “viable validity.” Our documentary analysis provides a broader overview of the current usage of the concept of viable validity. The results of our literature review suggest that viable validity is used in a predominantly theoretical manner in three main research traditions: evaluation science, PHIC and humanities and social sciences.

At the theoretical level, certain authors acknowledge the need to conduct viability studies on potential interventions before worrying about efficacy. Studying viable validity can allow researchers to explore and understand how an intervention fits into its context, avoiding the pitfall of attempting to assess efficacy “in a vacuum” (Thabane et al., 2019). Furthermore, taking viability into consideration when designing studies can provide evaluators with important data regarding the capacity of stakeholders to implement a program without outside help. For example, for Feyaerts and his co-authors (Feyaerts et al., 2017a), whose specific frame of reference is the city of Brussels' policy for integrating immigrants, the most important criterion for decision-makers is not whether a measure is “scientifically credible,” but rather whether it is “pertinent and usable” in practice, and “useful” in terms of promoting integration. A lack of viability can thus lead to the suspension or failure of a newly launched intervention (Im et al., 2022; Urban et al., 2014). In spite of the high stakes associated with viability, and its strong conceptual maturity, viable validity is still under-operationalized at time of writing.

4.2. Operational stakes and challenges

Few researchers have successfully operationalized the concept of viable validity, as witnessed by the relative dearth of articles presenting results of viability studies, and the frequently partial mobilization of the concept (e.g. incomplete mobilization of the viability criteria, viability studies demonstrating scant interest in the real world). The lack of articles operationalizing the concept would suggest that viable validity was a new and largely unknown concept; and yet, it was conceptualized in 2010. These operationalization struggles might be partly explained by the largely theoretical nature of viable validity: there are no practical validation tools available, and few empirically demonstrated results (the first empirical results of a viability study to be published were those presented by (Chen et al., 2014)). These shortcomings raise questions as to the maturity of viable validity as a concept. According to Morse et al. and Pfadenhauer et al. (J. Mitchell Morse et al., 1996; Pfadenhauer et al., 2015), in order for a concept to be considered mature there must be a clear consensus on its definition, with a precise description of its key characteristics, necessary conditions and proven results, as well as clearly defined boundaries distinguishing it from other concepts.

The results of this literature review suggest that these criteria have not yet been met, casting doubt upon the maturity of viability as a concept. Firstly, in order to be mature a concept requires a relatively

consistent and stable definition, shared by the authors that invoke it (J. Mitchell Morse et al., 1996; Pfadenhauer et al., 2015). Although more than thirty articles draw upon Chen's work (Chen, 2010), each research tradition has its own definition of viability. Furthermore, the five articles we identified which contain results from viability studies all use different definitions of viability (indeed, only the study led by Chen himself included measurability as a criterion (Chen et al., 2014)). The malleability of the concept is evident in Chen's work too, since in 2023 he replaced the measurability criterion with a new criterion he calls "cultural compatibility." It is worth noting that cultural considerations were taken on board in the 2012 study conducted by Keller et al., whose definition of viability includes "the mores and cultural values of participants." (Keller et al., 2012) These discrepancies indicate a lack of consensus regarding the definition of viable validity as a concept. Secondly, our literature review reveals a degree of ambiguity regarding the boundaries between viable validity and related concepts such as feasibility and acceptability. Comparative analysis of the use of these terms in relation to the concept of "viable validity" within the different research traditions suggests that they are perceived as being very close to viability; in some cases, the terms are used interchangeably (Harshbarger et al., 2019; Ribeiro Santiago & Colussi, 2018; Ton, 2012).

One challenge frequently besetting the operational use of the concept is the difficulties inherent to operationalizing all of the viability criteria within the same study, particularly the criterion of measurability. However, taking the example of (Riches et al., 2020), even if they do not mobilize all of the viability criteria their intervention displays a certain form of viable validity by showing itself to be affordable, practical and useful in tackling lack of motivation among students. All of which might lead us to wonder whether the viability of an intervention is really such a binary affair. It is not always necessary to consider all of the criteria when assessing the viability of an intervention. Moreover, all of the criteria are open to different analytical approaches depending on the stakeholders involved and the scale of the analysis (micro-system, meso-system or macro-system). Viability is situated, and depends upon the perceptions, experiences and diversity of stakeholders, as well as the multidimensional character of the criteria and the nature of the results obtained (Decroix, 2024).

While some of the viability criteria are indeed operationalized in the existing literature, it seems abundantly clear that viable validity is not yet fully mature as a concept, due to the lack of a widely shared definition, some clear limitations and a low level of operationalization. These factors could restrict the future development of viable validity as a practical tool, which requires conceptual clarity.

4.3. Strengths and limitations of this literature review

This literature review has certain strengths as well as certain limitations. It offers a broad overview of the use of viability as a concept in the existing literature. The subject of our review is the concept of viability as defined by Chen in 2010, engaging with the tradition of theory-based evaluations. Nevertheless, many authors working in the field of population health have conducted pilot studies with objectives very similar to those of viability studies, without invoking Chen and without mentioning viability in their titles (e.g. studies focusing on the feasibility or acceptability of interventions) (Saillour-Glénisson & Salmi, 2023; Skivington et al., 2021). Further research is needed to study the frameworks and concepts developed by other authors for the purpose of evaluating complex interventions, in order to better understand what sets the concept of viability apart from related concepts.

In this respect, the research traditions identified by this review may be of use. The diverse array of databases consulted is one of the strengths of this study, allowing us to include research publications from various disciplines connected with population health. There is certainly room for debate regarding the research traditions we identify, in terms of their boundaries and the different scales at which they operate (discipline, field of study and/or object of study). Nonetheless, the identification of

these three research traditions is a real asset of this review. These three research traditions can provide a working basis for identifying other authors who have used concepts and frameworks closely related to that proposed by Chen.

5. Conclusion

This literature review demonstrates that viable validity is a complex concept, and one that is underused in spite of its high degree of conceptualization. The complexity of its definition and its criteria may explain the fact that the latter are often only partially utilized. But even if a study does not set out to test all the stipulated criteria of viable validity, it is important to consider the conditions which determine the viability of an intervention in the real world, and at every step in the intervention life cycle. It seems clear from the existing literature that the operationalization of "viable validity" as a concept remains a major challenge for research into and evaluation of intervention programs. The concept of viability needs to achieve greater maturity in the sense described by Morse (Morse et al., 1996a,b) in order to facilitate its empirical application in evaluative research.

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CRedit authorship contribution statement

François Alla: Validation, Supervision. **Linda Cambon:** Validation, Supervision. **Judith Martin-Fernandez:** Writing – review & editing, Methodology, Conceptualization. **Charlotte Decroix:** Writing – original draft, Supervision, Methodology, Formal analysis. **Césarine Sambou:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

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