



A conceptual framework and exploratory model for health and social intervention acceptability among African adolescents and youth

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ABSTRACT

Intervention acceptability has become an increasingly key consideration in the development, evaluation and implementation of health and social interventions. However, to date this area of investigation has been constrained by the absence of a consistent definition of acceptability, comprehensive conceptual frameworks disaggregating its components, and few reliable assessment measures. This paper aims to contribute to this gap, by proposing a conceptual framework and exploratory model for acceptability with a specific priority population for health and developmental interventions: adolescents and youth in Africa. We document our multi-staged approach to model development, comprising both inductive and deductive components, and both systematic and interpretative review methods. This included thematic analyses of respective acceptability definitions and findings, from 55 studies assessing acceptability of 60 interventions conducted with young people aged 10–24 in (mainly Southern and Eastern) Africa over a decade; a consideration of these findings in relation to Sekhon et al.'s Theoretical Framework of Acceptability (TFA); a cross-disciplinary review of acceptability definitions and models; a review of key health behavioural change models; and expert consultation with interdisciplinary researchers. Our proposed framework incorporates nine component constructs: affective attitude, intervention understanding, perceived positive effects, relevance, perceived social acceptability, burden, ethicality, perceived negative effects and self-efficacy. We discuss the rationale for the inclusion and definition of each component, highlighting key behavioural models that adopt similar constructs. We then extend this framework to develop an exploratory model for acceptability with young people, that links the framework components to each other and to intervention engagement. Acceptability is represented as an emergent property of a complex, adaptive system of interacting components, which can influence user engagement directly and indirectly, and in turn be influenced by user engagement. We discuss opportunities for applying and further refining or developing these models, and their value as a point of reference for the development of acceptability assessment tools.

1. Introduction

Acceptability is a concept that is gaining traction and interest within the realm of social interventions. Particularly in the health sector, it has become an increasingly key consideration in the development, evaluation and implementation of healthcare interventions (Sekhon et al., 2017). Acceptability has in fact been described as a necessary - although not sufficient - condition for effectiveness of an intervention (Diepeveen

et al., 2013; Sekhon et al., 2017). However, this area of investigation has been largely constrained by the absence of a consistent definition of 'acceptability', comprehensive conceptual frameworks disaggregating its components, and few reliable or standardized assessment measures (El-Den et al., 2015; Lewis et al., 2015; Sabben et al., 2019). Comparison and synthesis of acceptability findings across different studies can therefore be challenging (El-Den et al., 2015).

There is a clear need to further theorize and unpack this multi-

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faceted construct of acceptability, and to identify acceptability frameworks that are relevant for specific priority populations, contexts and intended behaviour change (Munro et al., 2007). Moreover, it is important to further theorize and empirically test the links between acceptability and intervention engagement. From a public health and social intervention perspective, the concept of acceptability is arguably useful to the extent that it is able to predict and explain key outcomes of interest, such as intervention uptake, retention and efficacy (Perski and Short, 2021).

This paper aims to contribute to this gap, by proposing a conceptual framework and exploratory model for acceptability with a specific priority population for health and developmental interventions: young people in Africa. According to the World Health Organization definition, young people (10–24) comprise both adolescents (10–19) and youth (15–24) (Blum and Nelson-Mmari, 2004). Young people under the age of 25 account for almost 60% of Africa's population, making it the world's youngest continent (Fox and Signé, 2021). These young people have the potential to thrive and contribute positively to future African societies and economies. But they also face considerable health and developmental challenges (Kabiru et al., 2013; Mpedzisi and Warth, 2021) that may differ across regions and countries. For example, Sub-Saharan Africa (SSA) has the highest rate of out-of-school adolescents (37%) (Deloumeaux, 2019). Countries in SSA also have a high prevalence of adolescent pregnancy, unsafe abortion, child marriage and gender based violence compared to other regions of the world (Bankole et al., 2020; Malhotra and Elnakib, 2021; Santhya and Jejeebhoy, 2015). HIV incidence rates among adolescents in SSA are still high, with limited evidence of decline over time (Birdthistle et al., 2019; Karim and Baxter, 2019). However, countries in Western and Central Africa have an overall higher percentage of adolescent pregnancies compared to Eastern and Southern Africa. For example, 21% of adolescents in Rwanda, in East Africa, were likely to have given birth to a child before 20 years of age, compared to 74% of their counterparts in Niger in West Africa (Neal et al., 2020). The prevalence of child marriage (marriage before age 18) is also estimated to be highest in West and Central Africa (37%) compared to Eastern and Southern Africa (32%) and the global average (19%) (UNICEF, 2022).

Achieving Africa's SDG objectives and the Africa Agenda 2063 vision will require developing health, education and economic interventions and services that are effective and suited to the needs of adolescents and youth (Shettima, 2016; World Health Organization & UNAIDS). It will be important for young people to find these interventions acceptable (Diepeveen et al., 2013; Sekhon et al., 2017) and for researchers and practitioners to better conceptualise, assess and strengthen acceptability in this population.

In this study, we employ a multi-staged approach to model development, comprising both inductive and deductive components and incorporating both systematic and interpretative review approaches. We adopt Sekhon et al.'s (2017) definition of acceptability, according to which acceptability is a reflection of the extent to which people delivering or receiving an intervention consider it to be appropriate, based on their anticipated or experienced cognitive and emotional responses. We first develop and propose a theoretical framework to guide acceptability research with young people, using Sekhon et al.'s Theoretical Framework of Acceptability (TFA) as our starting point of reference (Sekhon et al., 2017). We then extend this conceptual framework to develop an exploratory model for intervention acceptability with young people, by hypothesizing relationships between the framework's components and between acceptability and intervention engagement. We see the movement from a framework to exploratory model as an important first step in the process of developing a behavioural theory for acceptability with young people.

2. Background

2.1. Sekhon et al.'s theoretical framework for acceptability (TFA)

We will refer to Sekhon et al.'s Theoretical Framework of Acceptability as our key point of reference for the deductive component of this analysis as, to our knowledge, there is no other published work that uses a similar systematic approach to define, theorize and unpack the construct of acceptability in relation to health or other developmental interventions (Sekhon et al., 2017). We recognize that theories are dynamic entities that can evolve over time and that there can be value in extending and integrating existing models to advance behavioural theory (Munro et al., 2007; Weinstein and Rothman, 2005).

Sekhon et al. (2017) argue that further theorizing the construct of acceptability is important to: develop a better understanding of what acceptability is; whether it is a multi-component construct and what its components are; how it is proposed to relate to other factors, such as intervention engagement or adherence; and how it can be measured. In a 2017 paper, Sekhon et al. contributed to addressing this conceptual gap, by proposing a conceptual definition of acceptability for healthcare interventions, and a model to illustrate its components (TFA), using both inductive (empirical) and deductive (theoretical) approaches (Sekhon et al., 2017). They define acceptability as follows: "A multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention" (Sekhon et al., 2017, p. 4). Their theoretical framework for acceptability (TFA) comprises the following seven component constructs, considered core empirical indicators of acceptability (Sekhon et al., 2017, p. 8): affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. These constructs and their definitions are presented in Table 1.

Sekhon et al. (2017) also propose that acceptability can be anticipated or experienced, and potentially assessed at three different time points in relation to the intervention delivery period: before the delivery of the intervention (anticipated or prospective acceptability) during intervention delivery (concurrent acceptability) and post-intervention delivery (retrospective acceptability) (Sekhon et al., 2017). The authors posit that the extent to which the component constructs may influence each of these temporal assessments of acceptability is an empirical question (Sekhon et al., 2017).

Sekhon et al.'s Theoretical Framework of Acceptability has made a valuable contribution to the scarce conceptual literature in the field and has been used to guide many empirical studies in recent years. However, there is still much scope to apply and test the framework in specific populations. The TFA was developed primarily from reviews of biomedical studies conducted predominantly with adult samples in high income countries; moreover, its components are based on definitions and variables used by study authors, and not on data from potential or actual intervention end-users. Little is known about its relevance and completeness in investigating acceptability among young people, in less-resourced settings and beyond the biomedical health sector. Moreover, to our knowledge, beyond the TFA there is little theoretical work unpacking acceptability and its component constructs, and no known theoretical work with young people, or specifically in Africa.

As part of a network of researchers focusing on promoting the health and wellbeing of adolescents and youth in Africa in the (Somefun et al., 2021), the objective of this study is to further theorize the construct of acceptability with this population of young people. Specifically, this paper aims to:

- i) Develop a conceptual framework of acceptability among young people in Africa, to be used as a guide for acceptability research and intervention development with young people in Africa and potentially more broadly.

Table 1

The seven component constructs included in Sekhon et al.'s Theoretical Framework of Acceptability (TFA) (Sekhon et al., 2017).

Acceptability						
A multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experiential cognitive and emotional responses to the intervention						
1. Affective attitude	2. Burden	3. Ethicality	4. Intervention coherence	5. Opportunity costs	6. Perceived effectiveness	7. Self-efficacy
<i>How an individual feels about the intervention</i>	<i>The perceived amount of effort that is required to participate in the intervention</i>	<i>The extent to which the intervention is a good fit with an individual's value system</i>	<i>The extent to which the participant understands the intervention and how it works</i>	<i>The extent to which benefits, profits or values must be given up to engage in the intervention</i>	<i>The extent to which the intervention is perceived as likely to achieve its purpose</i>	<i>The participant's confidence that they can perform the behaviour(s) required to participate in the intervention</i>

ii) Develop an exploratory behavioural model that extends this framework, by hypothesizing linkages between acceptability components and between acceptability and intervention engagement. In this way we move beyond a framework as an organizing structure, towards a theory, which also provides explanations of how phenomena relate to each other and may permit outcomes to be predicted (Davis, 1989).

We note that, as indicated by Hox (1997) and Sekhon et al. (2017), to theorize, it is necessary to identify and define the concept for measurement before proceeding to describe its properties, scope and sub-domains. We adopt the definition of acceptability proposed by Sekhon et al. although we extend it beyond acceptability of healthcare interventions specifically to interventions more broadly: A multi-faceted construct that reflects the extent to which people delivering or receiving an intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention.

3. Methods

3.1. Overall approach

Similarly to Sekhon et al. (2017), we used a combination of inductive and deductive approaches to further theorize the construct of

acceptability with young people in Africa. Combining these approaches is posited to strengthen the process of theorizing (Sekhon et al., 2017; Xu and Zammit, 2020). Our model development was both multi-staged and iterative. A key element of this process was an interpretative review, which includes what could be described as a critical interpretative synthesis (CIS) approach (Dixon-Woods et al., 2006). The primary objective of the review work was the development of concepts and theory, grounded in the included studies, as opposed to merely pooling and summarising data with *a priori* well specified concepts (Dixon-Woods et al., 2006). Data synthesis involved both induction and interpretation, and included an interactive and dynamic dimension. It has been argued that conducting interpretative reviews in areas where there is a large body of diverse evidence calls for an approach that can draw on both the strengths of systematic review methodologies and recent developments in methods for interpretative synthesis (Dixon-Woods et al., 2006). Our model building approach combined a number of components and methods, described in more detail below and illustrated in Fig. 1.

3.2. Systematic review of acceptability studies with young people in Africa

3.2.1. Search strategy and data extraction

We conducted a systematic review to identify primary research studies with young people (10–24) in Africa over a decade (2010–2020), that assessed the acceptability of interventions aimed at positively influencing their developmental outcomes. The review was carried out

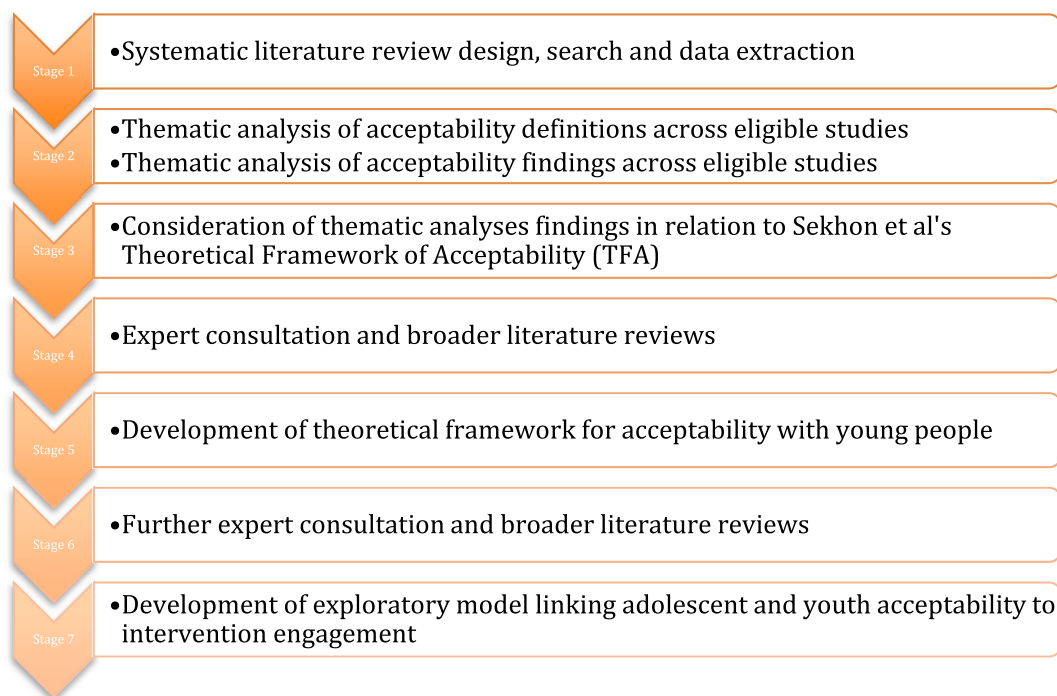


Fig. 1. Process diagram illustrating our multi-staged model development approach.

in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Further detail of our search strategy, including inclusion criteria and an example search term, are contained in [Table S1](#) and in a recently published mapping review paper ([Somefun et al., 2021](#)).

Papers were included if they 1) reported primary research assessing acceptability (based on the authors' definition of the study or findings) of one or more intervention(s) with adolescents and young adults 10–24; 2) assessed acceptability of intervention(s) aimed at positively influencing one or more development outcome(s), as defined by SDG indicators; 3) reported on research conducted in Africa; 4) were in the English Language; 5) were peer-reviewed and 6) were published between January 1, 2010 and June 30, 2020 ([Somefun et al., 2021](#)). We chose the approximately 10-year period, taking into account the available researcher time and other available resources to conduct this review, and its relatively broad scope in terms of types of interventions and developmental outcomes included ([Somefun et al., 2021](#)).

We developed detailed extraction sheets, using Excel software, to extract study characteristics and findings of eligible papers that were relevant specifically for the framework and model development. For reliability, information was extracted separately by at least two of the first three authors, and differences were resolved through discussion among the first three authors.

3.2.2. Systematic review analysis

The systematic review analysis for the purpose of this study consisted of various stages. First, we identified and extracted definitions of acceptability across papers. We made a similar distinction to [Sekhon et al. \(2017\)](#) between a conceptual definition, which defines a construct in abstract or theoretical terms, and an operational definition, which defines a construct by specifying the procedures used to measure that construct ([Sekhon et al., 2017](#)). Where available, we extracted explicit or conceptual definitions of acceptability provided by the study authors. Where these were not available, we derived implicit or operational definitions, by reviewing the methods, variables and indicators used by the study authors to assess acceptability and using a reasonable level of inference ([Sekhon et al., 2017](#)). We also considered whether the studies used a conceptual framework to define acceptability or guide the study design.

Second, we conducted an inductive analysis of the explicit and implicit definition content, to systematically cluster and synthesise distinct themes. Themes identified within the definition content were grouped together according to similarity; a construct label was then attributed to each group based on what best described it. We also recorded the frequency with which each theme was raised across papers, noting that some definitions could incorporate more than one theme. This part of the analysis was conducted by the first three authors, through an iterative process involving independent initial identification of themes, group discussion, going back to the paper content where necessary and refining themes.

Third, we synthesized and analysed acceptability findings from data collected with young people across review papers. We conducted descriptive and content analyses to synthesise paper findings on reasons for or factors shaping acceptability and unacceptability (thematic content analysis of findings across papers ([Braun and Clarke, 2006](#))) and factors found to be quantitatively associated with acceptability (synthesis of correlational analyses conducted by study authors). We note that syntheses of different types of evidence are envisaged within an interpretive review and critical interpretative synthesis ([Dixon-Woods et al., 2006](#)). The content analysis of factors shaping acceptability was conducted by means of an iterative group process, led by the first three authors in collaboration with co-authors and a broader group of academics. We also recorded the frequency of themes across studies, and the types of interventions for which they were raised.

Lastly, we reviewed themes emerging from both the thematic analysis of study acceptability definitions and the thematic analysis of study

acceptability findings with young people, against [Sekhon et al.'s](#) Theoretical Framework of Acceptability (TFA). This part of our analysis was guided by the following three questions: i) which emerging themes fit entirely or partially within TFA components? ii) which TFA components are not represented by these emerging themes? and; iii) which emerging themes extend beyond the TFA components, while still representing cognitive and emotional responses to the intervention?

3.3. Broader review of acceptability and health behaviour literature and expert consultations

A consideration of review findings, in relation to the TFA's component constructs, informed our development of a preliminary conceptual framework for acceptability with young people. As part of the deductive component of our model development, we then undertook a review of behavioural theory and models from multiple disciplines. These broader reviews, on-going discussion among our research team members, and expert consultation sessions within our networks of multi-disciplinary health and social science researchers contributed to: 1) refining and finalizing our conceptual framework: In deciding on whether to add, omit or adjust constructs, we adopted a critical approach that sought to more clearly define these constructs, consider whether they would add value, whether the conceptual distinction between constructs would be maintained and whether they represented cognitive or emotional responses to the intervention, in line with the adopted definition of acceptability ([De Vries, 2017](#); [Sekhon et al., 2017](#)); 2) develop an exploratory behavioural model for acceptability with young people, by starting to hypothesise potential relationships between constructs in the framework, and between these constructs, intention to engage and intervention engagement. Similar to [Sekhon et al. \(2017\)](#), we reviewed the types of constructs and relationships between constructs from various theories, and considered their applicability to our conceptual framework and behavioural model.

3.3.1. Expert consultations

Expert consultations consisted of sessions with groups of researchers within our university departments and multi-disciplinary networks to test our ideas, request feedback on our methods, thinking and preliminary results and provide guidance on the most appropriate literature and studies to consult. These sessions allowed for a critical review of our model development process and thinking and pointed us to potential additional relevant literatures or sources to review. Each session was around 60–90 min and included 10–20 early career and senior academics and practitioners working with adolescents in fields including psychology, psychiatry, sociology, anthropology, social work and policy, economics, epidemiology, reproductive health and public health. Most participants were affiliated to academic institutions in Africa (mainly in South Africa but also other countries including Botswana, Ghana, Nigeria and Sudan), and high-income countries such as the United Kingdom and the United States; many held dual affiliations. The majority of attendees had worked extensively with children and youth across Africa, mainly in research, but also in policy development, advocacy, monitoring and evaluation and interventions developed for children, adolescents and caregivers. Many had worked for and/or were collaborating with NGOs based in Africa, adolescent advisory groups and large development agencies such as WHO, UNICEF and UNAIDS. We held five sessions over the course of a year, between January 2021 and February 2022, on average one session every two to three months.

3.3.2. Broader literature review

Our broader literature review was relatively organic and iterative; it was achieved through a combination of approaches including key word searches in online search engines and academic databases, a review of citations of key papers, a review of specific resources identified through expert consultation sessions and, on occasion, checking definitions in online dictionaries. We identified and reviewed the most frequently used

theories of behavioural change in interdisciplinary health literature, that could explain or predict the action of taking up a new product or intervention (Davis et al., 2015). These included the eight theories of behaviour or behaviour change of potential relevance to public health interventions, identified by Davis et al. (2015) as accounting for 75% of published articles across psychology, sociology, anthropology and economics disciplines: the trans-theoretical model (TTM), the Theory of Planned Behaviour (TPB), Social Cognitive Theory (SCT), the Information-Motivation-Behavioural Skills Model (IMB), the Health Belief Model (HBM) the Health Action Process Approach (HAPA), self-determinism theory and Social Learning Theory (precursor of SCT). We also reviewed critiques of these health theories and more recent developments in the health behavioural literature, guided by the psychology researchers involved in the feedback sessions (Kok and Ruiter, 2014; Sniehotta et al., 2014; Weinstein and Rothman, 2005). Moreover, we reviewed literature from various other disciplines, beyond health, where ‘acceptability’ is commonly or increasingly used, to determine how the construct of acceptability is conceptualized across disciplines and positioned and theorized within conceptual models. This included key papers and models from the information systems (IT) and technology literature, the digital health literature, implementation science theory and the field of environmental science (Davis, 1989; Perski and Short, 2021; Proctor et al., 2011; Shindler et al., 2004).

In this paper we do not attempt to provide an exhaustive summary of literature consulted, but instead refer to selected paper and models that were most useful in informing the development of our framework and exploratory model.

4. Results

4.1. Systematic review: number of eligible studies and overall characteristics

After screening 4692 titles and abstracts, 55 eligible studies were included in the systematic review, assessing 60 interventions for acceptability (see PRISMA flow diagram in Fig. S1). Most identified studies were from South and East Africa, with around half conducted in South Africa and Uganda; only seven studies were from West and Central Africa and only one from North Africa (Somefun et al., 2021). Based on their key components, the majority of interventions were classified as HIV or HPV vaccine interventions (10), E-health (10), HIV testing interventions (8), support group interventions (7), contraceptive interventions (6), voluntary medical male circumcision programs (VMMC) (4), school-based sexual and reproductive health education (4), economic support programs (4) pre-exposure prophylaxis (PrEP) (2). The remaining five studies consisted respectively of nutritional therapy, a psychosocial—home-based care intervention, a counselling support intervention to address substance abuse, cervical cancer screening and a rectal microbicide intervention for HIV prevention. The primary objectives of most (57) interventions were focused on HIV- or sexual and reproductive health-related outcomes and therefore linked to SDG3 (UN General Assembly, 2016).

From the review, thirty (30) studies focused on adolescents aged 10–19 only, fourteen (14) focused on youth aged 15–24, and eleven (11) focused on adolescents and youth aged 10–24. Twenty studies described their methodology as solely qualitative, 18 as quantitative and 17 as mixed methods. Eleven of the qualitative studies used only focus group discussions (FGDS), seven used only in-depth interviews (IDIs) and two used both methods. Most of the quantitative studies employed structured survey questionnaires, while mixed-methods studies combined FGDS or IDIs with survey questionnaires, online surveys and evaluation reports (citation omitted). As indicated in Supplementary Table S2, a wide range of questions and indicators were used to measure acceptability. None of the studies used a standardized previously validated instrument, although two papers drew from existing instruments (Smith et al., 2019; Van Der Straten et al., 2010). Further details on study

characteristics are presented in Table S2 and in our recently published mapping review (Somefun et al., 2021).

4.2. Explicit and implicit definitions of acceptability

Only seven of the 55 eligible studies provided an explicit definition of acceptability (Sekhon et al., 2017); of these, three studies also used a conceptual framework within which to position this definition (as indicated in Table S2). Three definitions focused on the preference for or willingness to use and complete the intervention (Katahoire et al., 2013; Smith et al., 2016; Tonen-Wolyec et al., 2019). Two definitions focused mainly on responses to the intervention, referring respectively to Sekhon et al.’s TFA (MacCarthy et al., 2020; Sekhon et al., 2017) and the Bowen feasibility framework (Bowen et al., 2009; Parker et al., 2013). Two studies conceptualized acceptability as an implementation outcome and focused on relevance, value, appeal, likeability and usability (Kibel et al., 2019; Sabben et al., 2019); one of these studies based their definition on the Technology Acceptance Model’s (TAM) framework (Davis, 1989).

A further three studies referred to a conceptual framework despite not providing an explicit definition of acceptability: Khoza et al. (2019) referred to the social ecological framework (Golden and Earp, 2012); Sayles et al. (2010) to value-expectancy and social marketing theories (Sayles et al., 2010) and Turiho et al. (2017) to symbolic interactionism theory (Jeon, 2004) and some aspects of the Health Beliefs Model (HBM).

However, the vast majority of papers in this review (45) did not provide an explicit definition of acceptability nor refer to a specific conceptual framework. For the majority of these papers (n = 43), we were able to derive an operational definition or ‘implicit’ definition from the questions and indicators used by the authors to assess acceptability. It should be noted that, given the multiplicity of questions and indicators in some studies, many definitions were multi-dimensional. For the remaining two papers it was not possible to derive an explicit or implicit definition since the papers did not focus solely on assessing acceptability as an outcome, did not explicitly define acceptability, and did not clearly indicate which questions or indicators were specifically linked to the reported acceptability findings (Carney et al., 2020; James et al., 2018).

4.3. Thematic analysis of acceptability definitions

Our thematic analysis and clustering of extracted explicit and implicit definitions from the 53 papers led to the identification of 12 themes. These are represented in Table 2, which also indicates the number of times each theme emerged across papers within an explicit or implicit definition. The most frequently recorded themes were: overall attitudes to the intervention (referring to what study participants felt or thought about the intervention broadly, including whether they liked it overall); willingness to use the intervention; understanding of the intervention; barriers and facilitators to use and access; perceived effectiveness of the intervention; and willingness to recommend or distribute the intervention to others. It should be noted that we included ‘perceived good or bad consequences of the intervention’ as a distinct theme from ‘perceived effectiveness’, in that the former referred to (anticipated or experienced) positive effects of an intervention beyond its stated objectives or effects on the outcomes it sought to influence (e.g. broader social effects), as well as potential negative effects of an intervention.

Most of these themes appeared to be relevant for prospective, concurrent or retrospective acceptability (Sekhon et al., 2017). However, the last three (satisfaction with the intervention, uptake and willingness to recommend or distribute it to others) pertained mainly to concurrent or retrospective acceptability, in that they would require the end-user to have already had some level of exposure to the intervention or have at least agreed to participate. It is also noteworthy that six studies equated acceptability of the intervention with intervention uptake.

Table 2
Explicit and operational definitions of acceptability derived from reviewed papers.

Definition	Explicit (number of papers)	Operational (number of papers)
1. Overall attitudes towards the intervention (thoughts or feelings)	4	19
2. Willingness to use the intervention	3	16
3. Understanding of the intervention	2	14
4. Perceived ability to use the intervention	2	4
5. Barriers and facilitators of access and use	0	14
6. Perceived effectiveness of the intervention	1	11
7. Perceived good or bad consequences of the intervention	0	5
8. Relevance and value to the young people or community	2	5
9. Belief that others would use or approve of intervention	0	2
10. Satisfaction with the intervention	1	6
11. Intervention uptake	1	5
12. Willingness to recommend or distribute to others	0	10
No clear explicit or operational definition	2	

4.4. Thematic analysis of acceptability findings with young people

Eight key themes emerged from a qualitative thematic analysis of acceptability findings across papers, mainly to explain why young people found interventions acceptable or not. These were: understanding of the intervention, ease of use, intervention costs and barriers to access, perceived positive effects of the intervention, perceived negative effects of the intervention, relevance to these young people’s needs and to broader social and cultural norms, the acceptability of others, and the influence of prior engagement with the intervention on acceptability. These themes were based on mainly (qualitative and quantitative) data collected from young people, although some were supported by correlational analyses conducted by study authors. These key themes and their emerging subthemes are represented in Fig. 2. The text in Supplementary Table S3 also provides examples of how these themes emerged from the study data, in order to better contextualise findings.

4.5. Consideration of emerging themes in relation to Sekhon et al.’s Theoretical Framework of Acceptability

As indicated, we reviewed our emerging themes against Sekhon et al.’s Theoretical Framework of Acceptability (TFA) (Sekhon et al., 2017) based on the following three questions: i) which emerging themes fit entirely or partially within TFA components? ii) which TFA components are not represented by these emerging themes? and; iii) which emerging themes extend beyond the TFA components, while still representing cognitive and emotional responses to the intervention?

With regard to the first question of which emerging themes fit entirely or partially within Sekhon et al.’s Theoretical Framework of Acceptability (TFA) components, various themes across these two analyses appear to fit well with four components from the TFA: *affective attitudes*, *intervention coherence*, *self-efficacy* and *perceived effectiveness* of the intervention. Specifically, the themes *overall attitudes to or perceptions of the intervention*, *whether participants liked the intervention* and *satisfaction with the intervention* from the definitions were well aligned with the *affective attitudes* construct in the TFA. Some of the study findings appeared to also relate explicitly to the *affective attitudes* component, for example where participants explicitly indicated liking interventions or finding them appealing. The *ability or perceived ability to use the intervention* theme from the definitions and references to *ease of use* in the findings analysis fit well with the TFA *self-efficacy* component, while themes related to *understanding of the intervention*, in both analyses, were well-aligned with the *intervention coherence* component in the TFA. There were also multiple references to perceived effectiveness of interventions, which speak directly to the *perceived effectiveness* component of the TFA. Moreover, concern with direct or opportunity costs, emerging from our analysis of findings, fit with both the *burden* and *opportunity cost* components of the TFA. References to religious beliefs or ‘morality’ could in part also resonate with the TFA *ethicality* component.

With regard to TFA components not represented by these emerging themes, none of the themes emerging from acceptability definitions (Table 2) clearly fit within the remaining three components of the TFA (*opportunity costs*, *burden* and *ethicality*). It could however be argued that these TFA components could, conversely, fit within some of the broader emerging themes from our definitions analysis, such as *barriers and facilitators of access and use*, *perceived good and bad consequences of the intervention*, and *relevance and value to the young people and community*.

In response to the third question, some of the themes emerging from study definitions and findings appear to extend beyond TFA components. For example, *perceived good and bad effects of the intervention* can extend beyond perceived effectiveness to broader individual or social

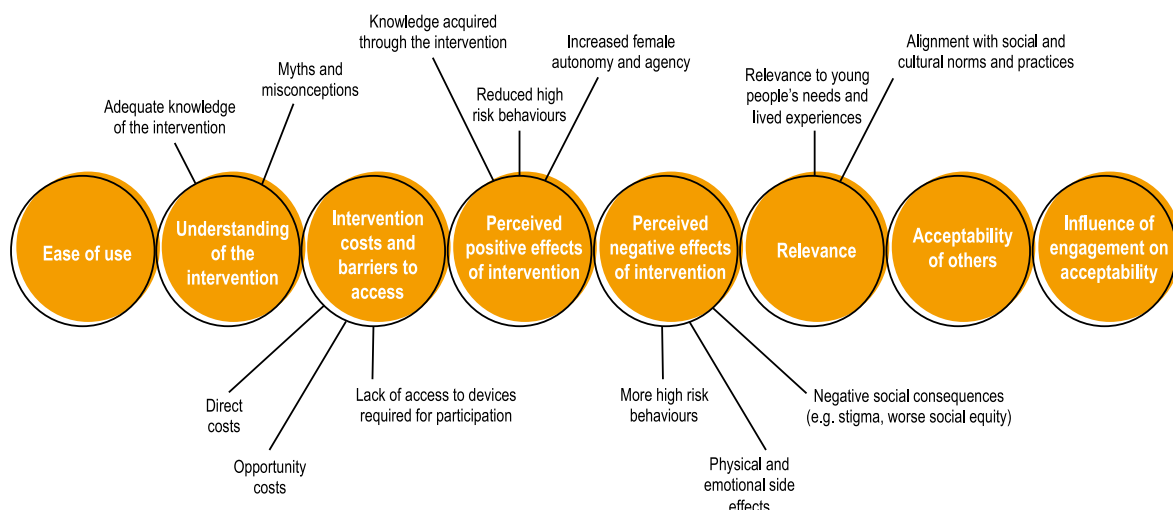


Fig. 2. Themes explaining young people’s acceptability or unacceptability of interventions.

consequences not restricted to an intervention’s objectives. Themes reflecting the *belief that others would use or approve of the intervention*, the *intervention’s relevance to young people’s needs and contexts* and *alignment to social and cultural norms and practices* are also not clearly reflected in the TFA components.

Lastly, as articulated by Sekhon et al. (2017), themes linked to intervention engagement or willingness to engage with the intervention are not included in the TFA since these constructs are not considered to represent cognitive or affective responses to an intervention, and therefore do not fit within the author’s definition of acceptability. They are instead considered separate constructs related to intervention engagement that may predict or be predicted by acceptability (Perski et al., 2017; Sekhon et al., 2017).

4.6. Theoretical framework for young people’s acceptability

Drawing from the above analysis relating themes emerging from our systematic review analyses to the TFA components, and from broader reviews of inter-disciplinary acceptability and health behaviour literature, we developed a framework for acceptability among young people in Africa, and potentially beyond (see Fig. 3). We have called it the *Accelerate Framework for Young People’s Acceptability* (or *Accelerate Framework*).

Our framework proposes nine components of acceptability. In line with Sekhon et al.’s definition of acceptability, these represent cognitive and affective factors posited to represent and shape young people’s responses to an intervention. There is considerable overlap between Sekhon et al.’s Theoretical Framework of Acceptability (TFA) and our proposed framework, to the extent that our *Accelerate Framework* could be considered a modified and extended version of the TFA. However, certain components have been added, others combined, and the definition of others extended to widen their domain. Below we will go through each of the components included in our framework and discuss the rationale for their inclusion and definition. Below and further in

Supplementary Table S4 we will also highlight some of the key behavioural models and theories where these constructs, or similar constructs, are included, and how they are defined and posited to influence behavioural change.

We have maintained the *self-efficacy* component that, as defined in the TFA, refers to young people’s confidence to perform the behaviours required to participate. This component includes the belief that young people can use the intervention as required (particularly for biomedical products) and perceived ease of use of the intervention. It may also reflect anticipated or experienced barriers to access and use, to the extent that these may be perceived as not enabling the young person to do what is needed to access an intervention or participate in it. Self-efficacy is a widely used term considered a key component of most major health and technology acceptance theories (Ajzen, 1991; Davis, 1989; Munro et al., 2007; Rosenstock et al., 1988; Schwarzer, 2014).

Affective attitudes is a second component we have maintained unchanged from the TFA. Affective attitudes describes how one feels about a target behaviour (e.g. one enjoys the behaviour or finds it satisfying (McEachan et al., 2016), as opposed to cognitive attitudes that describe one’s thoughts, beliefs and factual knowledge about a behaviour (McEachan et al., 2016). Both dimensions of attitudes are commonly used and tested in psychology behavioural theories (Ajzen, 1991), though affective attitudes have been shown to be more strongly associated with behaviour and to better reflect impulsive (versus reflective) influences in behaviour (McEachan et al., 2016; Stevens et al., 2019). Affective attitudes could therefore reflect ‘gut feeling’, likeability, satisfaction or enjoyment.

We have also included a component described as *Understanding of the intervention*. This component is similar to the TFA’s *Intervention Coherence*, as it refers to the extent to which young people have adequate knowledge of the intervention and understand it. Sekhon et al. (2017) define intervention coherence in the TFA as “the extent to which the participant understands the intervention, and how the intervention works.” (pg 9). This definition was derived from the illness perception

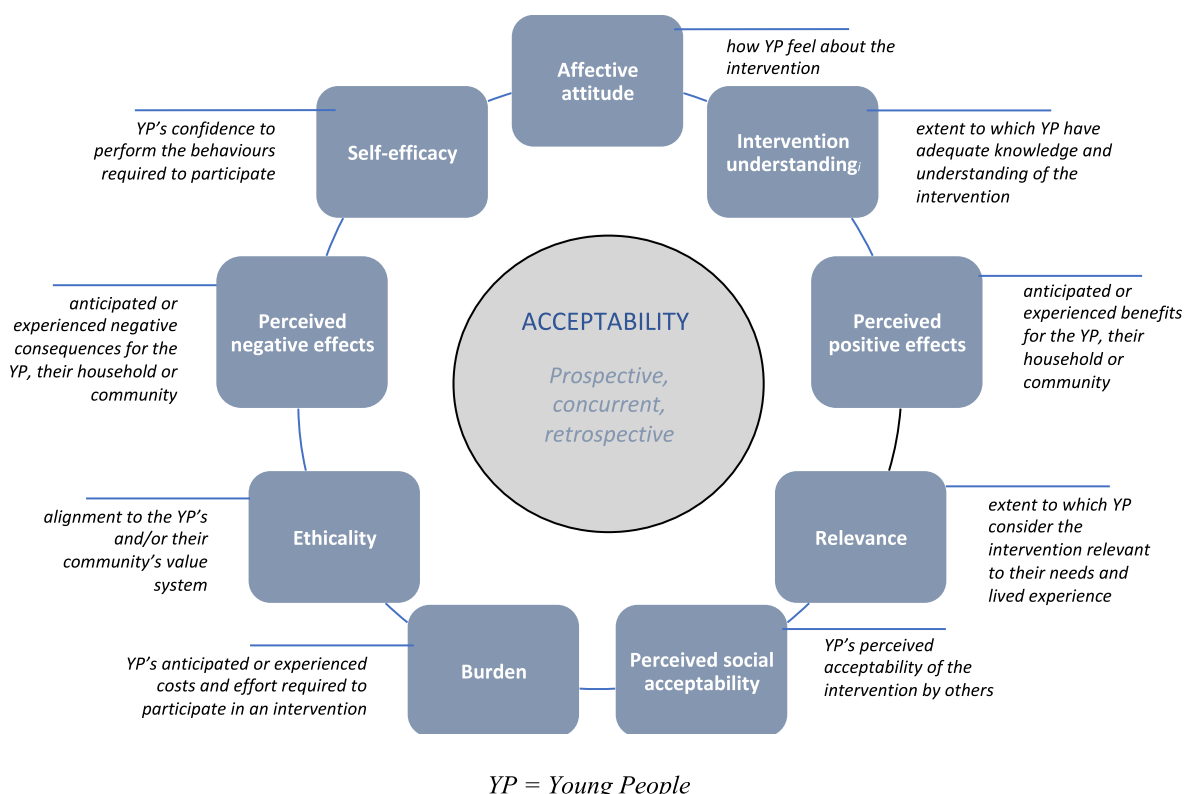


Fig. 3. Accelerate framework for young people’s acceptability.

literature where ‘illness coherence’ describes the extent to which a patient’s illness representation provides a coherent understanding of the illness (Sekhon et al., 2017). We believe, however, that the understanding of an illness and that of an intervention are distinct concepts, and that *understanding of the intervention* more clearly conveys the construct represented in our model. More broadly in behavioural studies, understanding and knowledge have been shown to influence behaviour and adoption of innovation, both directly and indirectly (De Vries, 2017; Eggers et al., 2016; Jeffrey and William, 1992; Rogers, 2010).

Moreover, we have included four components in our framework that are not present in the TFA. These are: *relevance*, *perceived social acceptability*, *perceived negative effects* and *perceived positive effects* of the intervention. The *relevance* component in our model refers to whether young people consider the intervention relevant to their needs and lived experience, for example whether they consider it to address a priority in their life and whether they consider its content and delivery to resonate with their current reality and experiences. Relevance is defined as “closely connected with the subject you are discussing or the situation you are in” (Oxford Learner Dictionary: Hornby, 1995). In developing a model for digital health intervention engagement, Perski et al. (2017) describe ‘personal relevance’ as the extent to which a digital intervention is perceived to apply to the individual and their particular situation (Perski et al., 2017, p. 259). Relevance is also closely related to other constructs in key health and innovation adoption models, such as *compatibility* or belief in a personal threat of illness (Rogers, 2010; Rosenstock et al., 1988).

Perceived social acceptability in our framework reflects the extent to which young people believe the intervention to be acceptable (or not) to other key individuals in their lives or communities, such as partners, caregivers, peers and school or community leaders. There is a growing consideration of the concept of ‘social acceptance’ or ‘social acceptability’, for example in the environmental field. Though clear definitions are often not provided (Tabourdeau et al., 2020), these terms commonly refer to the collective judgment of projects and/or acceptability among various stakeholders (Shindler et al., 2004). This model component is also closely linked to the concepts of social norms and perceived or subjective norms used in various health behavioural models (Ajzen, 1991; Perkins and Berkowitz, 1986).

The *Perceived positive intervention effects* component in our model includes anticipated or experienced benefits of the intervention for the young person, their household or community. It incorporates the TFA’s *Perceived effectiveness*, but also extends beyond this, to anticipated or experienced positive effects of an intervention that may go beyond intended objectives. Many health and technology acceptance behavioural models include constructs representing anticipated effectiveness or benefits of an intervention (Bandura et al., 1999; Blackwell, 1992; Redding et al., 2000).

Perceived negative intervention effects is a further additional component we have added to represent anticipated or experienced negative consequences of an intervention, for the young person, their household or community. The incorporation of perceived negative effects of (health) behaviours in behavioural theory is less common. However, it may be incorporated within or closely aligned with other constructs, such as *perceived barriers* to performing a recommended action (Rosenstock et al., 1988).

In our framework, *ethicality* reflects the intervention’s alignment to the young person’s value system and/or the broader value system of the community and context in which they are embedded. Sekhon et al. (2017) defined ethicality in their framework as “the extent to which the intervention has good fit with an *individual’s* value system”, based on the Oxford dictionary definition of ethical as “morally good or correct”. Other definitions of *ethical* include a connection to beliefs and principles about what is wrong and right (Hornby, 1995). While we have chosen to use the same name for this component in our framework, we propose extending its definition to include a fit with a broader (community)

value system, versus simply individual values; this remains in line with the broader definition of ‘ethicality’. This extension more explicitly incorporates perceived social and cultural norms that may affect young people’s acceptance of the intervention. These are the informal, mostly unwritten, rules or expectations that define behaviour and thoughts based on shared beliefs within a specific cultural or social group (Cislaghi and Heise, 2018; National Academies of Sciences & Medicine, 2018).

Lastly, our *Burden* component refers to the anticipated or experienced costs and/or effort required to participate in an intervention (including time and cognitive effort). This is in line with the definition in Sekhon et al.’s framework, drawn from the Oxford dictionary definition of burden, as a “heavy load”. We maintain the component name and definition but consider it to include both direct costs and opportunity costs (financial resources or other things that have to be given up to participate), which are represented as two separate components in the TFA. We combine these two constructs both to minimize the number of model components, and because we believe that both types of costs fall within the construct definition of effort or costs linked to participation. Our *burden* component overlaps to some extent with the *perceived barriers* construct in the HBM, which can include perceptions that an action (in this case intervention participation) is expensive or inconvenient (Rosenstock et al., 1988).

4.7. Exploratory model linking young people’s intervention acceptability to intervention engagement

Based on our extended literature review and expert consultation, we further developed our framework into an exploratory model for young people’s acceptability. This model links the acceptability framework components to each other and to intervention engagement (illustrated in Fig. 4).

Our model incorporates elements of complex systems theory (Hilpert and Marchand, 2018), dynamic self-regulatory models, and behavioural models based on social cognitive theory (Ajzen, 1991). Similarly to Perski and Short, who propose an acceptability model for the digital health sector, we posit that acceptability cannot be encapsulated by any one proposed acceptability component or construct. Rather, it is best represented as “an emergent property of a complex, adaptive system of interacting components” (Perski and Short, 2021, p. 1474), representing cognitions and affect, which influences, and in turn is influenced by, user engagement (Perski and Short, 2021).

We therefore hypothesise that the 9 components in our *Accelerate Framework* for young people’s acceptability constitute a complex system of interacting components and that acceptability may be considered an emergent property of this system (Hilpert and Marchand, 2018; Perski and Short, 2021). We also assume that there may be multiple potential relationships between these components, and that some may be temporal or causal. For example, understanding of an intervention will likely influence perceptions of positive or negative effects, as well as one’s ability to effectively access and participate in an intervention (self-efficacy). We hypothesise, however, that the existence, direction and strength of the relationships between components may be different in different contexts and are therefore best tested empirically in specific populations and for specific behaviours (Hilpert and Marchand, 2018).

We note that the construct of acceptability emerging from this complex system inevitably incorporates an assessment of interventions, representing the impression users form about how they think and feel about an intervention (Perski and Short, 2021; Marcinkowski and Reid, 2019). We posit that this assessment can be overall positive or negative and influence young people’s intention or willingness to engage with an intervention, and actual use or engagement.

We further hypothesise that user acceptability can influence engagement directly or indirectly, through intention to engage or other potential mediating factors to be tested in empirical research. In this regard our model incorporates an element of social cognitive models,

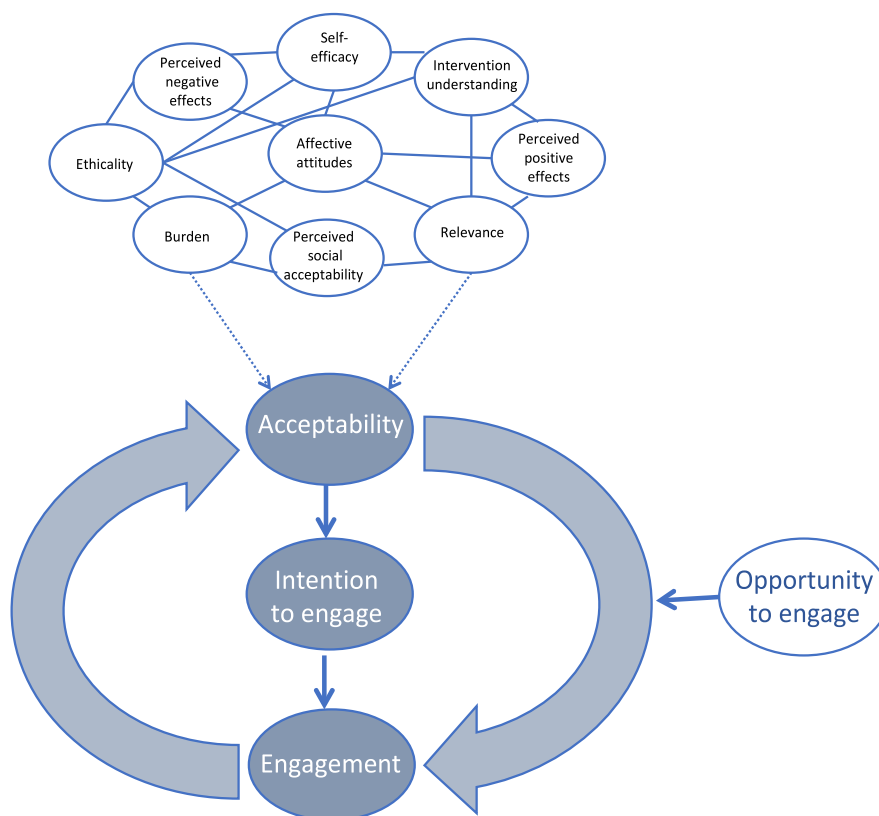


Fig. 4. Exploratory model linking acceptability to intervention engagement among young people.

that hypothesise that individual attitudes towards a particular behaviour can influence behavioural intentions (intention to perform the behaviour) and in turn intention can influence behaviour (Ajzen, 1991; Davis et al., 2015; Munro et al., 2007). However, our model also recognises that this may not be the only pathway explaining behaviour or behaviour change (Marcinkowski and Reid, 2019; McEachan et al., 2011) and that the attitude-behaviour relationship needs to be placed in the context of a wider set of theoretical relationships thought to influence behaviour (Marcinkowski and Reid, 2019). For example, a failure to act on intention may be explained by various factors, such as social influence, self-efficacy, action planning, the role of emotions and unconscious influences on behaviour (De Vries, 2017; Marcinkowski and Reid, 2019; Sniehotta et al., 2014). In fact more recent dual process models suggest multiple potential pathways to behaviour, that may include reflective determinants and impulsive determinants (Evans and Stanovich, 2013).

Moreover, we hypothesise that actual engagement with the intervention will, in turn, influence acceptability. This feedback loop between intervention acceptability and engagement incorporates what could be considered a self-regulatory element. Not only are beliefs hypothesized to affect action (in this case intervention engagement), but experiences with these actions can shape how we think and feel about them (Weinstein and Rothman, 2005). New information is repeatedly combined with past experience to influence behavioural decisions (Leventhal et al., 1992; Munro et al., 2007). The feedback loop between acceptability and engagement in our model also allows us to incorporate the temporal and potentially dynamic aspect of acceptability (Koelle et al., 2019). It reflects the fact that acceptability is not static, but may change over time as a result of changing contextual factors or experience with the intervention (explaining for example, differences in prospective and retrospective acceptability) (Perski and Short, 2021; Sekhon et al., 2017).

Lastly we use the broad term 'intervention engagement' in the model, drawing from the adopted definition and model of Perski et al.

(2017), as this definition can incorporate multiple dimensions of users' interaction with the intervention such as the frequency, depth and duration of intervention use, as well as interest and enjoyment (Perski et al., 2017). However, unpacking and theorizing engagement further is beyond the scope of this paper. Models developed by other authors can be drawn on to further extend theories and models linking acceptability to intervention engagement (Perski et al., 2017; Perski and Short, 2021).

5. Discussion

We believe this paper makes a valuable contribution to the literature as the first known systematic analysis to propose an acceptability framework and exploratory model specifically with young people, in this case African adolescents and youth. As argued above, there is a dearth of theoretical work in this area with this population group, yet much scope for utilizing frameworks and models to guide empirical research and intervention development.

Our proposed acceptability framework for young people retains many of the components and constructs included in Sekhon et al.'s Theoretical Framework of Acceptability (TFA). However, it also introduces adaptations and extensions of certain TFA components, as well as the addition of new components. These additional dimensions include the extent to which young people consider the intervention to be relevant to their needs and lived experience, both in terms of objectives and content/delivery, as well as its perceived alignment to social, cultural and faith norms and practices. They also include perceived positive consequences of the intervention, which may be different to or extend beyond objectives defined by intervention developers and implementers, as well as the often-overlooked anticipated or experienced negative consequences that may be central to young people's acceptability. Lastly, perceived social acceptability emerges as an important component of acceptability, reflecting the extent to which young people believe the intervention to be acceptable to other individuals central to their lives and communities. We note that an overall key difference

between our framework and the TFA is the greater emphasis of our framework on social factors, which emerged from our review work as central in shaping young people's intervention acceptability.

While our model building has been based on a rigorous multi-staged documented process, this work has a number of limitations. Imposing limiters was necessary to contain the scope of our systematic review, though this may have excluded grey literature, literature published in other languages besides English (e.g. from Francophone countries in Africa) and studies conducted before or after the 2010–2020 time period. We conducted a thematic analysis of both acceptability definitions and findings across papers; however, as indicated above, emerging themes from study findings cannot be considered in isolation from the questions and indicators (and therefore explicit or implicit definitions) used by the authors – although they may extend beyond these.

While we did our best to be as transparent as possible in documenting the theorizing process, as with any interpretative analysis, full transparency and replicability are not possible (Dixon-Woods et al., 2006). However, on-going dialogue within our research team and multi-disciplinary network ensured that our thinking was challenged and multiple perspectives considered. Moreover, as indicated by Sekhon et al. (2017) in describing the limitations of their theorizing process, given the large number of existent theories and constructs potentially relevant to acceptability, the consideration of theories and constructs cannot be exhaustive. At times this process was informed by our knowledge of the health psychology and broader literature, and the feedback from our colleagues and experts consulted to review and define constructs. This deductive process is therefore inevitably selective and subject to bias (Sekhon et al., 2017). We also did not exhaustively summarise findings of literatures reviewed to inform this process, as the scope would have been too broad.

We recognize that our predominant affiliations (the majority with South African institutions), our countries of origin (South Africa and Nigeria), our gender (mainly female) and focal areas (mainly health-related research) as authors may, to some extent, have influenced our methodological approaches and the interpretation of findings. Most of the authors have affiliations to South African universities (4). Two of the authors are affiliated to academic institutions in the UK. However, all authors have a track record of using quantitative and qualitative methods to better understand the health and wellbeing of young adults in Africa and have worked on research studies from multiple African countries (beyond South Africa). In particular, the two authors with a primary UK-based affiliation have extensive experience, spanning decades, of designing and managing multi-disciplinary research across Africa. Moreover, to help achieve reflexivity, we have always held regular investigator meetings within our team, as well as consultation with our broader networks (as described above), and employed a collaborative approach to data analysis.

Lastly, we recognize that our systematic review findings have various programmatic, as well as theoretical, implications. Since this paper documents our process of model building and our proposed framework and behavioural model, we have chosen to focus on the theoretical dimension of this work. A discussion of implications for intervention development and implementation is, however, included in our recently published mapping review (Somefun et al., 2021) and will be further developed in on-going work.

We do not see this model as final, but as a first step in a longer-term process that other researchers can potentially build on (Schwarzer, 2014; Weinstein and Rothman, 2005) to further explore the interaction between components of acceptability and their relationship to intervention uptake and engagement (Perski and Short, 2021). These models will need to be tested empirically and potentially further refined. We acknowledge that testing complex systems can require a complex design, such as dynamic systems modelling, and be resource-intensive (Hilpert and Marchand, 2018; Perski and Short, 2021). However, rather than seeing this as an obstacle for empirical testing, it should be seen as providing opportunities for more specific empirical testing in different

contexts, and with different interventions and populations. Even when not applied in its entirety, our exploratory model can provide an overarching framework to help guide and position acceptability research, highlighting components that are being tested or emerging from empirical data, and those that are not. Valuable contributions can be made, for example, by further exploring one or more acceptability components and how they may change over time, the interaction between specific components of the system, and ultimately the dynamic relationships between model constructs over time (Hilpert and Marchand, 2018).

Nevertheless, some further considerations may be useful when considering refining or extending these models. Recognising the common tension between generalizability and utility, we have attempted to find a balance by including key constructs but also not making our models too complex to be understood or applied (Davis, 1989; Kok and Ruiter, 2014). However, models are necessarily simplifications of reality and cannot adequately capture the complexity of human behaviour. They may need to be extended or adjusted through empirical research for specific populations, interventions, and outcomes as there may be additional or different factors explaining similar phenomena in different contexts (De Vries, 2017). This has been the case with many behavioural models; for example social cognitive theories have been extended in certain cases when applied in practice to interventions (Snihotta et al., 2014).

The focal population of our research over the past few years has been African adolescents and youth, and we set out to develop a framework specifically for this population group. However, our framework and exploratory model may be relevant and applicable – in part or in their entirety – to broader adolescent and youth populations and broader (child or adult) populations. These would need to be applied and tested with other population groups. Moreover, our intention was to propose a framework and model for young people's acceptability not confined to the health sector, but more broadly applicable to social interventions. However, most of the available published acceptability studies included in our systematic review assessed health-related interventions. There is therefore still scope to determine the extent to which this framework is broadly applicable beyond health and whether adjustments will need to be made for other specific types of interventions.

The social dimension of acceptability also merits greater consideration. One aspect of this would be to determine whether this model can be effectively used for other key stakeholders central to an intervention's success and/or for multiple stakeholders linked to an intervention. The second aspect refers to the influence of social factors on young people's acceptability. We believe we have, to some extent, addressed this in our framework and model, by introducing the constructs of *social acceptability* and *relevance* and extending the definition of ethicality. Nevertheless, these components cannot entirely capture the deep-rooted influence of social and cultural factors on all beliefs and cognitions (Perski and Short, 2021). It may be useful to further the thinking in this area by applying a social ecological perspective (De Vries, 2017; Kremers et al., 2006; Lawrence and Kreuter, 2005; Sallis et al., 2006). Here too, however, much more would need to be done to expand evidence on factors shaping acceptability beyond the individual level and how these may interact to promote behavioural change (Hall et al., 2018). Further thinking would also be needed to determine how best to embed an acceptability model within a broader ecological perspective.

Lastly, our framework and exploratory model could be used as a point of reference for the much-needed development of appropriate instruments to assess acceptability among young people. Various authors have highlighted the challenges related to an absence of validated measures and thresholds to determine acceptability (Perski and Short, 2021; Sekhon et al., 2017). This is problematic, for example, when a decision needs to be made as to whether to progress to a randomized controlled trial or scale up an existing intervention (Perski and Short, 2021). The development of acceptability frameworks and models can

usefully identify the constructs at the core of acceptability, and point to potential indicators to be considered and developed to assess acceptability. However, there is still a large gap in terms of indicators and analytical approaches to quantitatively assessing acceptability, and how best to use generated data to inform real-life intervention design, investment and scale-up decisions. The development of more reliable measures would be important to assess acceptability, at one point in time, but also over time, allowing us to better track and understand the temporal or longitudinal dimension of acceptability. Measurements at different time points, that explore the variance in acceptability over time, would allow us to investigate the relationship between prospective, concurrent and retrospective acceptability, as well as the relationship between levels of acceptability and key intervention outcomes such as uptake, retention and efficacy. This would be highly valuable for health and social research, policy and interventions.

Author contributions

Marisa Casale: Conceptualization; Formal analysis; Writing – original draft. **Oluwaseyi Somefun:** Data curation; Formal analysis; Methodology; Writing – original draft. **Genevieve Haupt Ronnie:** Data curation; Formal analysis; Project administration; Writing – review and editing. **Chris Desmond:** Funding acquisition; Conceptualization; Writing – review and editing. **Lorraine Sherr:** Funding acquisition; Conceptualization; Writing – review and editing. **Lucie Cluver:** Funding acquisition; Validation; Writing – review and editing.

Declaration of competing interest

None.

Data availability

No primary data was used. Information relative to the systematic review process and extraction is contained in supplementary files.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2023.115899>.

References

- Ajzen, I., 1991. The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50 (2), 179–211.
- Bandura, A., Freeman, W.H., Lightsey, R., 1999. *Self-efficacy: the Exercise of Control*. Springer, pp. 158–166.
- Bankole, A., Remez, L., Owolabi, O., Philbin, J., Williams, P., 2020. From Unsafe to Safe Abortion in Sub-Saharan Africa: Slow but Steady Progress. Guttmacher Institute. <http://www.guttmacher.org/report/from-unsafe-to-safe-abortion-in-sub-saharan-africa>.
- Birdthistle, I., Tanton, C., Tomita, A., de Graaf, K., Schaffnit, S.B., Tanser, F., Slaymaker, E., 2019. Recent levels and trends in HIV incidence rates among adolescent girls and young women in ten high-prevalence African countries: a systematic review and meta-analysis. *Lancet Global Health* 7 (11), e1521–e1540.
- Blackwell, B., 1992. Compliance. *Psychother. Psychosom.* 58 (3–4), 161–169.
- Blum, R.W., Nelson-Mmari, K., 2004. The health of young people in a global context. *J. Adolesc. Health* 35 (5), 402–418. <https://doi.org/10.1016/j.jadohealth.2003.10.007>.
- Bowen, D.J., Kreuter, M., Spring, B., Cofta-Woerpel, L., Linnan, L., Weiner, D., Bakken, S., Kaplan, C.P., Squiers, L., Fabrizio, C., 2009. How we design feasibility studies. *Am. J. Prev. Med.* 36 (5), 452–457.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology* 3 (2), 77–101.
- Carney, T., Johnson, K., Carrico, A., Myers, B., 2020. Acceptability and feasibility of a brief substance use intervention for adolescents in Cape Town, South Africa: A pilot study. *Int. J. Psychol.* 55 (6), 1016–1025.
- Cislaghi, B., Heise, L., 2018. Theory and practice of social norms interventions: eight common pitfalls. *Glob. Health* 14 (1), 83. <https://doi.org/10.1186/s12992-018-0398-x>.
- Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* 319–340.
- Davis, R., Campbell, R., Hildon, Z., Hobbs, L., Michie, S., 2015. Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health Psychol. Rev.* 9 (3), 323–344.
- De Vries, H., 2017. An integrated approach for understanding health behavior; the I-change model as an example. *Psychol. Behav. Sci. Int. J.* 2 (2), 555–585.
- Deloumeaux, L., 2019. New Methodology Shows 258 Million Children, Adolescents and Youth Are Out of School - <https://uis.unesco.org/sites/default/files/documents/new-w-methodology-shows-258-million-children-adolescents-and-youth-are-out-school.pdf>.
- Diepeveen, S., Ling, T., Suhrcke, M., Roland, M., Marteau, T.M., 2013. Public acceptability of government intervention to change health-related behaviours: a systematic review and narrative synthesis. *BMC Public Health* 13 (1), 756. <https://doi.org/10.1186/1471-2458-13-756>.
- Dixon-Woods, M., Cavers, D., Agarwal, S., Annandale, E., Arthur, A., Harvey, J., Hsu, R., Katbanna, S., Olsen, R., Smith, L., Riley, R., Sutton, A.J., 2006. Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Med. Res. Methodol.* 6 (1), 35. <https://doi.org/10.1186/1471-2288-6-35>.
- Eggers, S.M., Aaro, L.E., Bos, A.E.R., Mathews, C., Kaaya, S.F., Onya, H., de Vries, H., 2016. Sociocognitive predictors of condom use and intentions among adolescents in three sub-saharan sites. *Arch. Sex. Behav.* 45 (2), 353–365. <https://doi.org/10.1007/s10508-015-0525-1>.
- El-Den, S., O'Reilly, C.L., Chen, T.F., 2015. A systematic review on the acceptability of perinatal depression screening. *J. Affect. Disord.* 188, 284–303. <https://doi.org/10.1016/j.jad.2015.06.015>.
- Evans, J.S., Stanovich, K.E., 2013. Dual-process theories of higher cognition: advancing the debate. *Perspect. Psychol. Sci.* 8 (3), 223–241. <https://doi.org/10.1177/1745691612460685>.
- Fox, L., Signé, L., 2021. The fourth industrial revolution (4IR) and the future of work: could this bring good jobs to Africa. *Evid. Synth. Pap. Ser.* 51.
- Golden, S.D., Earp, J.A.L., 2012. Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. *Health Educ. Behav.* 39 (3), 364–372.
- Hall, K.L., Oh, A., Perez, L.G., Rice, E.L., Patel, M., Czajkowski, S., Klesges, L., 2018. The ecology of multilevel intervention research. *Trans. Behav. Med.* 8 (6), 968–978.
- Hilpert, J.C., Marchand, G.C., 2018. Complex systems research in educational psychology: aligning theory and method. *Educ. Psychol.* 53 (3), 185–202.
- Hornby, A.S., 1995. *Oxford Advanced Learner's Dictionary of Current English*, fifth ed. Oxford University Press, Oxford, England. <https://search.library.wisc.edu/catalog/999766027502121>.
- Hox, J., 1997. In: Lyberg, L.E., Biemer, P., Collins, M., Leeuw, E.D., Dippo, C., Schwarz, N., Trewin, D. (Eds.), *From Theoretical Concept to Survey Question*. Survey Management and Process Quality. John Wiley & Sons, Inc, New York: NY, pp. 47–69.
- James, S., Martin, C.E., Moalusi, B., Beery, M., Pahad, S., Imrie, J., 2018. Integrated access to care and treatment (I ACT) support groups for adolescents living with HIV in public healthcare facilities in South Africa: feasibility and acceptability for scaling up. *AIDS Care* 30 (9), 1107–1113.
- Jeffrey, D.F., William, A.F., 1992. Changing AIDS-risk behavior. *Psychol. Bull.* 111 (3), 455–474.
- Jeon, Y.H., 2004. The application of grounded theory and symbolic interactionism. *Scand. J. Caring Sci.* 18 (3), 249–256.
- Kabiru, C.W., Izugbara, C.O., Beguy, D., 2013. The health and wellbeing of young people in sub-Saharan Africa: an under-researched area? *BMC Int. Health Hum. Right* 13 (1), 1–7.
- Karim, S.S.A., Baxter, C., 2019. HIV incidence rates in adolescent girls and young women in sub-Saharan Africa. *Lancet Global Health* 7 (11), e1470–e1471.
- Katahoire, A.R.P., Wani, J.A.M.P.H., Murokora, D.M.D., Mugisha, E.P., LaMontagne, D.S.P., 2013. Acceptability of HPV vaccine among young adolescent girls in Uganda: young people's perspectives count. *Int. J. Child Adolesc. Health* 6 (2), 211–219. <http://www.proquest.com/scholarly-journals/acceptability-hpv-vaccine-among-young-adolescent/docview/1625518600/se-2?accountid=14500>.
- Khoza, N., Zulu, P., Shung-King, M., 2019. Acceptability and Feasibility of a School-Based Contraceptive Clinic in a Low-Income Community in South Africa, vol. 20. Primary health care research & development.
- Kibel, M., Shah, P., Ayuku, D., Makori, D., Kamaara, E., Choge, E., Nyairo, J., Abuya, P., Wahome, M., Wachira, J., 2019. Acceptability of a pilot intervention of voluntary medical male circumcision and HIV education for street-connected youth in Western Kenya. *J. Adolesc. Health* 64 (1), 43–48.
- Koelle, M., Olsson, T., Mitchell, R., Williamson, J., Boll, S., 2019. What is (un) acceptable? Thoughts on social acceptability in HCI research. *Interactions* 26 (3), 36–40.

- Kok, G., Ruiter, R.A., 2014. Who has the authority to change a theory? Everyone! A commentary on Head and Noar. *Health Psychol. Rev.* 8 (1), 61–64.
- Kremers, S.P., de Bruijn, G.J., Visscher, T.L., van Mechelen, W., de Vries, N.K., Brug, J., 2006. Environmental influences on energy balance-related behaviors: a dual-process view. *Int. J. Behav. Nutr. Phys. Activ.* 3, 9. <https://doi.org/10.1186/1479-5868-3-9>.
- Lawrence, G., Kreuter, M., 2005. *Health Program Planning: An Educational and Ecological Approach*. Boston Burr, Madison New York.
- Leventhal, H., Diefenbach, M., Leventhal, E.A., 1992. Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognit. Ther. Res.* 16 (2), 143–163. <https://doi.org/10.1007/BF01173486>.
- Lewis, C.C., Fischer, S., Weiner, B.J., Stanick, C., Kim, M., Martinez, R.G., 2015. Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria. *Implement. Sci.* 10 (1), 155. <https://doi.org/10.1186/s13012-015-0342-x>.
- MacCarthy, S., Wagner, Z., Mendoza-Graf, A., Gutierrez, C.I., Samba, C., Birungi, J., Okoboi, S., Linnemayr, S., 2020. A randomized controlled trial study of the acceptability, feasibility, and preliminary impact of SITA (SMS as an Incentive to Adhere): a mobile technology-based intervention informed by behavioral economics to improve ART adherence among youth in Uganda. *BMC Infect. Dis.* 20 (1), 1–10.
- Malhotra, A., Elnakib, S., 2021. 20 years of the evidence base on what works to prevent child marriage: a systematic review. *J. Adolesc. Health* 68 (5), 847–862.
- Marcinkowski, T., Reid, A., 2019. In: *Reviews of Research on the Attitude–Behavior Relationship and Their Implications for Future Environmental Education Research*, vol. 25. Taylor & Francis, pp. 459–471.
- McEachan, R., Taylor, N., Harrison, R., Lawton, R., Gardner, P., Conner, M., 2016. Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Ann. Behav. Med.* 50 (4), 592–612.
- McEachan, R.R.C., Conner, M., Taylor, N.J., Lawton, R.J., 2011. Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: a meta-analysis. *Health Psychol. Rev.* 5 (2), 97–144. <https://doi.org/10.1080/17437199.2010.521684>.
- Mpedzisi, P., Warth, A., 2021. African Continental Youth Policy as A Tool for Harnessing the Demographic Dividend. *The Demographic Dividend and the Power of Youth: Voices from the Global Diplomacy*. Lab, p. 75, 2050.
- Munro, S., Lewin, S., Swart, T., Volmink, J., 2007. A review of health behaviour theories: how useful are these for developing interventions to promote long-term medication adherence for TB and HIV/AIDS? *BMC Publ. Health* 7 (1), 1–16.
- National Academies of Sciences, E., & Medicine, 2018. *Addressing the Social and Cultural Norms that Underlie the Acceptance of Violence: Proceedings of a Workshop—In Brief*.
- Neal, S., Channon, A.A., Chandra-Mouli, V., Madise, N., 2020. Trends in adolescent first births in sub-Saharan Africa: a tale of increasing inequity? *Int. J. Equity Health* 19 (1), 1–11.
- Parker, L., Maman, S., Pettifor, A., Chalachala, J., Edmonds, A., Golin, C., Moracco, K., Behets, F., 2013. Feasibility analysis of an evidence-based positive prevention intervention for youth living with HIV/AIDS in Kinshasa, Democratic Republic of the Congo. *AIDS education and prevention. Off. Pub. Int. Soc. AIDS Edu.* 25 (2), 135.
- Perkins, H.W., Berkowitz, A.D., 1986. Perceiving the community norms of alcohol use among students: some research implications for campus alcohol education programming. *Int. J. Addict.* 21 (9–10), 961–976. <https://doi.org/10.3109/10826088609077249>.
- Perski, O., Blandford, A., West, R., Michie, S., 2017. Conceptualising engagement with digital behaviour change interventions: a systematic review using principles from critical interpretive synthesis. *Trans. Behav. Med.* 7 (2), 254–267.
- Perski, O., Short, C.E., 2021. Acceptability of digital health interventions: embracing the complexity. *Trans. Behav. Med.* 11 (7), 1473–1480.
- Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunge, A., Griffey, R., Hensley, M., 2011. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm. Pol. Ment. Health* 38 (2), 65–76.
- Redding, C.A., Rossi, J.S., Rossi, S.R., Velicer, W.F., Prochaska, J.O., 2000. Health behavior models. *Int. Electron. J. Health Educ.* 3 (Special issue), 180–193.
- Rogers, E.M., 2010. *Diffusion of Innovations*. Simon and Schuster, New York.
- Rosenstock, I.M., Strecher, V.J., Becker, M.H., 1988. Social learning theory and the health belief model. *Health Educ. Q.* 15 (2), 175–183.
- Sabben, G., Mudhune, V., Ondeng'e, K., Odero, I., Ndivo, R., Akelo, V., Winskell, K., 2019. A smartphone game to prevent HIV among young africans (tumaini): assessing intervention and study acceptability among adolescents and their parents in a randomized controlled trial. *JMIR Mhealth Uhealth* 7 (5), e13049. <https://doi.org/10.2196/13049>.
- Sallis, J.F., Cervero, R.B., Ascher, W., Henderson, K.A., Kraft, M.K., Kerr, J., 2006. An ecological approach to creating active living communities. *Annu. Rev. Publ. Health* 27, 297–322. <https://doi.org/10.1146/annurev.publhealth.27.021405.102100>.
- Santhya, K.G., Jejeebhoy, S.J., 2015. Sexual and reproductive health and rights of adolescent girls: evidence from low-and middle-income countries. *Global Publ. Health* 10 (2), 189–221.
- Sayles, J.N., Macphail, C.L., Newman, P.A., Cunningham, W.E., 2010. Future HIV vaccine acceptability among young adults in South Africa. *Health Educ. Behav. : Off. Pub. Soc. Pub. Health Edu.* 37 (2), 193–210. <https://doi.org/10.1177/1090198109335654>.
- Schwarzer, R., 2014. Life and death of health behaviour theories. *Health Psychol. Rev.* 8 (1), 53–56.
- Sekhon, M., Cartwright, M., Francis, J.J., 2017. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Serv. Res.* 17 (1), 88. <https://doi.org/10.1186/s12913-017-2031-8>.
- Shettima, K., 2016. Achieving the sustainable development goals in Africa: call for a paradigm shift. *Afr. J. Reprod. Health* 20 (3), 19–21.
- Shindler, B., Brunson, M.W., Cheek, K.A., 2004. Social acceptability in forest and range management. *Soc. Nat. Resour.: Summ. Knowl.* 14, 1–17.
- Smith, P., Tolla, T., Marcus, R., Bekker, L.-G., 2019. Mobile sexual health services for adolescents: investigating the acceptability of youth-directed mobile clinic services in Cape Town, South Africa. *BMC Health Serv. Res.* 19 (1), 584. <https://doi.org/10.1186/s12913-019-4423-4>.
- Smith, P., Wallace, M., Bekker, L.G., 2016. Adolescents' experience of a rapid HIV self-testing device in youth-friendly clinic settings in Cape Town South Africa: a cross-sectional community based usability study. *J. Int. AIDS Soc.* 19 (1), 21111 <https://doi.org/10.7448/ias.19.1.21111>.
- Sniehotta, F.F., Presseau, J., Araújo-Soares, V., 2014. Time to retire the theory of planned behaviour. *Health Psychol. Rev.* 8 (1), 1–7.
- Somefun, O., Casale, M., Haupt Ronnie, G., Desmond, C., Cluver, L., Sherr, S., 2021. A decade of research into the acceptability of interventions aimed at improving adolescent and youth health and social outcomes in Africa: a systematic review and evidence map. *BMJ Open* 11 (12), e055160.
- Stevens, C.J., Gillman, A.S., Gardiner, C.K., Montanaro, E.A., Bryan, A.D., Conner, M., 2019. Feel good now or regret it later? The respective roles of affective attitudes and anticipated affective reactions for explaining health-promoting and health risk behavioral intentions. *J. Appl. Soc. Psychol.* 49 (6), 331–348.
- Tabourdeau, Guillaume, Grange, Camille, 2020. From User Acceptance to Social Acceptance. In: *SIGHCI 2020 Proceedings*. 10. <https://aisel.aisnet.org/sighci2020/10>.
- Tonen-Wolyec, S., Batina-Agasa, S., Muwonga, J., Mboumba Bouassa, R.-S., Kayembe Tshilumba, C., Bélec, L., 2019. Acceptability, feasibility, and individual preferences of blood-based HIV self-testing in a population-based sample of adolescents in Kisangani, Democratic Republic of the Congo. *PLoS One* 14 (7). <https://doi.org/10.1371/journal.pone.0218795> e0218795-e0218795.
- Turiho, A.K., Okello, E.S., Muhwezi, W.W., Katahoire, A.R., 2017. Perceptions of human papillomavirus vaccination of adolescent schoolgirls in western Uganda and their implications for acceptability of HPV vaccination: a qualitative study. *BMC Res. Notes* 10 (1), 431. <https://doi.org/10.1186/s13104-017-2749-8>.
- UN General Assembly, 2016. *Transforming Our World: the 2030 Agenda for Sustainable Development*. <https://stg-wedocs.unep.org/bitstream/handle/20.500.11822/11125/unepswiosmlinf7sdg.pdf?sequence=1>.
- UNICEF., 2022. *Child Marriage in West and Central Africa: A Statistical Overview and Reflections on Ending the Practice*. <https://data.unicef.org/resources/child-marriage-in-west-and-central-africa-a-statistical-overview-and-reflections-on-ending-the-practice/>.
- Van Der Straten, A., Sahin-Hodoglugil, N., Clouse, K., Mtetwa, S., Chirenje, M.Z., 2010. Feasibility and potential acceptability of three cervical barriers among vulnerable young women in Zimbabwe. *BMJ Sex. Reprod. Health* 36 (1), 13–19.
- Weinstein, N.D., Rothman, A.J., 2005. Commentary: revitalizing research on health behavior theories. *Health Educ. Res.* 20 (3), 294–297.
- World Health Organization & UNAIDS, 2015. *Global standards for quality health-care services for adolescents: a guide to implement a standards-driven approach to improve the quality of health care services for adolescents*. World Health Organization. <https://apps.who.int/iris/handle/10665/183935>.
- Xu, W., Zammit, K., 2020. Applying thematic analysis to education: a hybrid approach to interpreting data in practitioner research. *Int. J. Qual. Methods* 19, 1609406920918810. <https://doi.org/10.1177/1609406920918810>.