



# From browsing to behaviour change

How digital interventions  
influence offline change  
among adolescent girls



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# Foreword

Digital interventions fill a new space in the development programme portfolio, reaching large audiences and encouraging and relating to populations in new ways. Girl Effect exists to build youth brands and mobile platforms to empower girls to change their lives. We see exciting potential for digital platforms to support girls and offer them new ways to learn and interact and encourage them to adopt new behaviours, which could take the form of adopting new health behaviours, putting aside savings or perhaps raising their hand in class, to name a few.

As we started to launch our digital platforms, we wanted to learn from other digital programmes – specifically wishing to learn the parameters of the behaviour change we could expect to see from a digital intervention that focuses on mid-adolescent girls. To that end, we partnered with New Knowledge Organization Ltd. to explore current research on behavioural change processes, with specific attention to the context of digital trends and opportunities.

The resulting paper focuses on interventions for adolescent girls, but the findings are broadly applicable across multiple audiences. As the review shows, the literature is emerging in this area. While we have promising signs, there is still much to learn about digital interventions and their role in behaviour change. Our wish is that this review will stimulate new questions and ideas as our sector continues to invest in digital platforms, and we collectively explore new ways to support, inform and encourage digital populations globally.

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# Introduction

Over the past decade, there has been a rapid expansion of online tools that aim to support youth opportunity. At this writing, approximately one-third of internet users worldwide are children. These young people engage with digital technologies in their schools, homes, and communities, using desktop and laptop computers, in addition to mobile technologies (tablets or smartphones). While the intentions of online tool initiatives are noble, there is limited research into optimal online engagement. This review of the literature explores possibilities and limitations related to knowledge, attitude, and behaviour change in digital platforms seeking to break the cycle of intergenerational poverty for vulnerable girls around the world.

**The online environment has many affordances that make it ideal for youth to explore their place in society. Positive outcomes can include supporting formal schooling, organising communities that share interests that fascinate a young person, and offering a young person, through gaming tools and stories, insight into life paths from around the globe that were hidden from prior generations.**

With increasing flexibility of use and opportunities to learn online, mobile internet access can facilitate more private user experiences that allow young people safe access to stigmatised or norm-challenging information.

Even so, private internet access can also present risks to the consumer. Some opportunities may reduce children's connections with and reliance on parents, caregivers, and community leaders. These reductions can put young users at risk of undesired, upsetting, and unsafe online interactions. Furthermore, some digital technologies impose limitations on access to and consumption of information (see Livingstone & Bulger, 2014). The small size of a mobile screen or caps on monthly data usage, for example, limit the amount and complexity of content viewable at any given time for many of the world's most vulnerable individuals.

Education scholars Ilana Snyder and Mastin Prinsloo (2007) highlight the fact that access to digital technologies is unequal, a reality that has meaningful implications for the extent to which individuals, families, and communities can participate in society and control their own destinies. However, once the target audience has gained access to a digital tool, other contextual barriers may limit how an individual uses that tool. Demographics that can shape digital practices include geographic location, socioeconomic status, and gender. A 2014 United Nations Conference on Trade and Development report concluded that more information is needed with respect to how women and girls in different geographic and cultural contexts access, use, and benefit from online content, because access to information has the potential to be transformative.

According to a joint study by UNICEF and the London School of Economics (Byrne, Kardefelt-Winther, Livingstone, & Stoilova, 2016), many children (including around one-third of children in Serbia, South Africa, and the Philippines) look for health information online every week. Not surprisingly, researchers and social change advocates have begun to attempt digital interventions that aim to change behaviour. Rising interest in how digital access and use might spur behaviour change has resulted in preliminary research studies. Several theories developed for offline behaviour change have been applied and evaluated in the online context.

Due, perhaps, to the explosion of digital platforms and the fast pace of evolving technologies, there is a notable dearth of robust empirical research to ground digital interventions for behaviour change and increasing need for research that addresses innovations in technology. For instance, studies are needed to 1) effectively apply theories and models of behaviour change to online interventions, 2) follow behaviour change over extended periods of time (3+ years), and 3) assess contextual factors of behaviour change, as behaviours are situated within one's socio-cultural environment and interactions with that environment.

# Method

## ? Research questions

The following research questions guided this literature review.

- What is the knowledge gap in behaviour change?
- How should the experience of girls with online tools evolve over time to maximise impact on behaviour change?
- What measurable impact associated with use of digital platforms might indicate success?
- To what extent can addressing multiple behaviour change objectives on one platform impact behaviour change?
- How can digital tools bridge the gaps among knowledge, attitude, and behaviour?
- What is the relationship between the disruptive nature of a digital platform and sustainable outcomes?
- What are the opportunities to innovate on best practices, given a target audience of adolescent girls?
- What is best practice on how digital can influence behaviour change?
- What is the role of digital in girls' online and offline behaviour change journeys?
- How do we understand impact on the silent consumer?
- How do we measure behaviour change in the silent consumer?
- What is the interplay between behaviour change and choice in social norms?
- To what extent can digital accelerate behaviour change?
- How effective or ineffective or harmful is digital on influencing behaviour change?
- How can we use digital to sustain offline behaviour change?
- To what extent can online format influence behaviour change?
- What combination of content and formats best influence behaviour change?

# Method

## Procedure

Challenged with the task of addressing these research questions, the researchers conducted a search through the peer-reviewed literature via online library databases such as Google Scholar, PsycINFO, JSTOR, and ScienceDirect. Key words and key phrases, such as online behaviour change, sustainability of behaviour change, behaviour change interventions, digital interventions, silent consumer, social norms, and online to offline behaviour change, were used to guide this search through the databases. Articles with higher citations were noted as potentially important articles in the current field of behaviour change related to digital media. Only articles written in or translated into English were included in the literature review.

In the preliminary search through the published literature, each article was scanned for content relating to the core research questions. After this initial review, individual articles were more thoroughly examined to identify behaviour change and digital intervention theoretical models, methods used for empirical studies, and themes generated through conclusions and future directions sections of the articles. Finally, articles were aggregated around themes that linked together two or more of the core research questions. These themes were used as a framework to develop the chapters and subsections of this literature review.

This literature review addresses behaviour change within the online space. Researchers purposefully excluded some areas of study to keep the review focused and accessible. For instance, while wearable devices such as Fitbit and Apple Watch are changing the way that technology is impacting behaviour change, studies related to wearable devices were not included in this literature review.

This review references theories and empirical studies from a variety of disciplines, including digital media (eg, Centola, 2010; Yardley et al., 2016), psychology (eg, Baumgartner, Valkenburg, & Peter, 2011), economics (eg, Seguino, 2007), health education (eg, Fatusi & Blum, 2008), and communications (eg, Howard & Hussain, 2011). This review focuses more heavily on health-related interventions due to the wealth of research and

general literature that has been written about and applied to health-related behaviour change interventions. Examples explored here include using text messages to communicate health-related information or supporting questions and answers through chat-based features on digital platforms.

**While the vast majority of online behaviour change interventions have been pursued in more developed nations, the generalisable findings offer useful insights into the developing mind of adolescents.**

The more recent expansion of digital services that now reach people of the lowest socio-economic status has not been accompanied by commensurate investment in research to ground-truth applicability in these settings. The literature about vulnerable adolescent and teen girls' development of self-efficacy through online engagement is scant and, where that research has been conducted, the findings may not generalize outside of the specific environmental and social factors that continue to exacerbate the cycle of poverty.

# 1

## Theories & models of behaviour change and the influence of social norms

Theories of behaviour change identify the importance of the individual-level and socio-cultural factors preceding a change in behaviour; these factors include one's feelings about change, one's preparedness for change, and one's self-efficacy. Some theories also aim to clarify why and how behaviours change over time. This chapter answers the following research question:

? What is the knowledge gap in the behavioural change literature?

This chapter also explores the impact of social norms and the importance of community in shaping, or shifting, those norms. With special consideration of inequitable gender norms and teen cognitive development, this chapter aims to address the following research question:

? What is the interplay between behaviour change and choice in social norms?

Behaviour change is the modification of any given behaviour and can also include varying activities or tasks that can occur at levels ranging from the individual to global society. In the online environment compared with the offline environment, behaviour changes are often revealed through individual self-reporting (eg., surveys, interviews), as many of the behaviours that are potentially changing occur in the offline space. Consequently, offline behaviour change that is embedded within a model of change that includes an online intervention becomes much more complex in the empirical literature. Hidden offline behaviour changes may not present themselves as behaviour changes in the online world. In general, theories of behaviour change make broader statements about why or how behaviour changes over time, while models of behaviour change situate these theories of change within a model that identifies each of the factors related to the change process. Most of the behaviour change literature referenced in this review was published during the 2000–2008 period, when social media was becoming mainstream and the seminal works in the field emerged.

## Transtheoretical model

One process-oriented strategy that has underpinned many behaviour change initiatives, the Transtheoretical Model (TTM), uses stages of change to integrate processes and principles of change across major theories of intervention, hence the name Transtheoretical. The TTM, which emerged from a comparative analysis of leading theories of psychotherapy and behaviour change, was an effort to integrate a field that had fragmented into more than 300 theories of psychotherapy (Prochaska & DiClemente, 1984). A model of individual-level intentional change, the TTM features a scale for measuring an individual's self-efficacy (confidence in one's own ability to achieve a desired action or change) and outlines six stages of change:

1. Pre-contemplation - no intention to take action within the next six months,
2. Contemplation - an intent to take action within the next six months,
3. Preparation - an intent to take action within the next 30 days and has taken some behavioural steps in this direction,
4. Action - changed overt behaviour for less than six months,
5. Maintenance - changed overt behaviour for more than six months, and
6. Termination - no temptation to relapse and complete confidence in one's ability to maintain the changed behaviour pattern.

In their analysis of the strengths and weaknesses of the TTM, Prochaska, Wright, and Velicer (2008) point out that interventions with high levels of utility and impact have the most potential for change. These authors thus highlight the value of establishing both a utility criterion that can demonstrate efficacy in changing a given behaviour, and an impact criterion that can demonstrate intervention effectiveness in terms of measurable change among the target population.

## Theory of Planned Behaviour

The Theory of Planned Behaviour (Ajzen 1985, 1991; Ajzen & Fishbein, 1980) is a well-established predictive model that assesses beliefs, attitudes, norms, and intentions to predict an individual's behavioural choices. Proposed by Icek Ajzen in 1985, the theory emphasises the concept of perceived behavioural control to account for the effect of one's awareness about one's ability to perform the behaviour.

Scholars Christopher Armitage and Mark Conner (2001) coordinated a meta-analysis of 185 independent, peer-reviewed studies to examine the efficacy of this predictive model. Their data support the use of the Theory of Planned Behaviour to predict behaviours based on intentions, and the authors note that (1) the model showed more predictability when behaviours were self-reported, and (2) one's perceived behavioural control over one's intentions also predicted intentions and behaviours.

Noting that other meta-analyses have failed to show correlations with the main constructs and behaviour, Sniehotta, Presseau, and Araújo-Soares (2013) question the predictive validity of the theory and cite scholars whose criticisms include its static explanatory nature and exclusive focus on rational reasoning (ignoring the role of emotions at the time of decision-making).



## Nudge theory

In 2008, economists Richard Thaler and Cass Sunstein published a proposition that challenged traditional theories of economic interest and progressive personal sphere change by suggesting that higher order positive pursuits drive change more productively than contemplating the elimination of risk or threat. They describe human nature as employing simplifying models to consider opportunities, using groupings or schemas that identify generalised models, past practice, and recommendations. A nudge points a person toward a specific choice by changing the default option, the description, the anchor, or the reference point.

Thaler and Sunstein argue that social change is possible by applying a commercial model of choice direction while preserving freedom of choice. They clarified this contentious proposition by demonstrating that choice architecture is not contained by an individual, but built with reference to significant external social actors (Thaler, Sunstein, & Balz, 2014). The work has been criticised as paternalistic because it suggests that individuals are susceptible to recommendations from key influencers when a simplified, positive path is recommended. Essentially, Nudge Theory suggests that people are primed to follow desire but seek to limit their choices to known sets and are easily drawn toward solutions that fall within a simple set of priorities.

Thaler and Sunstein demonstrate through their work and that of colleagues that choices are made more by who sets the options and how they structure those choices to achieve their ends. Management of choice architecture has been used to encourage single-issue voting in Western democracies, leading to disruption in public policy with outcomes such as the Brexit vote or the polarising issue of abortion in the United States. Youth are particularly susceptible to structured choices made by key influencers. From a liberal perspective, choice can be structured by a well-meaning entity to offer opportunity by decoding or facilitating critical inquiry into power dynamics, concepts first explored by Paulo Freire in his seminal *Pedagogy of the Oppressed* (1970) and codified as a transformative paradigm by scholars such as bell hooks, Peter McLaren, and Henry Giroux. Unfortunately, these same structures are also used by those who seek to oppress young women and profiteers who benefit from the subjugation of the poor.

Unlike the prior theories and models, which focus on an individual's self-directed mental process, Nudge Theory is an economic model that recognises the centrality of social norms and persuasion as active intervention that appeals to perceived desired norms. It suggests that simplified models present gated opportunities that will encourage a behaviour before a person might willingly choose on her own to take an action. A nudge may migrate someone from pre-contemplation to action without having completed assessment of her agency or self-efficacy in that domain. Essentially, Nudge Theory argues that a behaviour might precede agency if choice architects design an intervention to guide recommendations and model decisions about health, wealth, and happiness.



## Social learning & social cognitive theory

Psychologist Albert Bandura has been contributing to the integrated understanding of self in society since the late 1960s.

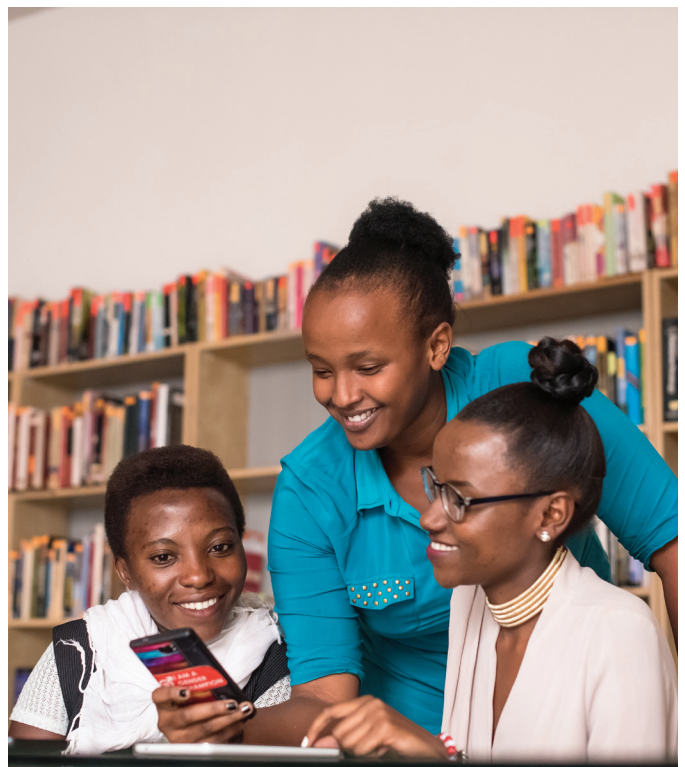
**In addition to showing that behaviour is learned from the environment through observation and social experience, his Social Cognitive Theory (originally called Social Learning Theory) suggests that behavioural change is embedded within the perception of one's belief that they can accomplish a goal (Bandura 2002, 2006).**

Considered a foundational theory, Bandura's non-static and non-linear model has demonstrated how beliefs operate together with goals, outcome expectations, and perceived environmental impediments and facilitators in the regulation of motivation, behaviour, and the state of wellbeing. In this model, a person's belief that they can exercise control has direct psycho-social benefits associated with executive function that can initiate processes related to personal change.

Bandura and many of those testing his theories have demonstrated the legitimacy of this theory as a prime predictor of personal health practice. Wallace, Buckworth, Kirby, and Sherman (2000), for example, found Social Cognitive Theory to be appropriate and useful for predicting exercise-related behaviour change among young adults because the framework accounts for the results of multiple variables and connects personal characteristics (eg., exercise self-efficacy) and social support with future behaviours.

Bandura's research on self-efficacy is considered a foundational learning theory, describing motivation as an overall belief state. Self-efficacy is related to the concept of control beliefs -- the sense that one has the capacity to control or influence outcomes -- as articulated by Fishbein and Ajzen (1980) in their later work on the Theory of Planned Behaviour. However, self-efficacy describes a much larger sense of the self as capable of accomplishing a task. In this vein, promoting the sense of a capable self requires imagining oneself as emancipated from social constraints.

Quite recently, Catherine Burnette (2016) recognised in her research the counter-challenge to the hopeful perspective of self-efficacy. Burnette's work showed that the same mechanisms that promote self-efficacy can be turned on their heads when various social structures are disrupted. She found that oppression and lack of self-efficacy are often comorbid in situations where family divisions and parental impairments are present. She notes that intergenerational patterns of absent parental figures, parental alcohol abuse, and impaired bonding are all associated with a repeated cycle of violence and lack of self-efficacy. Furthermore, Burnette indicated that the centrality of the family led to higher likelihood of gender-specific inequalities and susceptibility to violence as a second form of within-group social oppression that is expected over time. While Burnette's work focused on US Indigenous cultures, which still carries the scars and experiences of cultural oppression that occurred less than one generation ago, the systems demonstrated that Bandura's treatment strategies for emancipation through self-efficacy can also be the path to self-oppression in the face of protracted bias and violence in unstable homes.



## Ecological models

As with Social Cognitive Theory, programs grounded in ecological models of behaviour change include strategic interventions at multiple levels. Analysis within ecological models of behaviour change includes the intrapersonal, interpersonal, organisational, community, and policy levels as layers of influence that impact individuals within their specific environments, recognising that behaviours can interact across levels. If an environment includes substantial barriers to behaviour change, an individual may be less likely to make that change, even if they are motivated and hold the necessary skills for such change. Sallis, Owen, and Fisher (2015) found that ecological models are most effective when informing behavioural interventions targeting very specific behaviours (eg., condom use), but note that it can be difficult for researchers and practitioners to make sense of how broader levels of influence interact with levels more immediate to the individual.



## Behaviour Change Communication Theory

In the specific context of mobile technologies, components of Behaviour Change Communication Theory have been applied to several studies of health and wellness interventions.

**Behaviour Change Communication Theory suggests that positive communication strategies can support interventions focused on an individual interacting with a mobile device.**

This strategy might include disseminating positive messaging and content through mass media channels, community channels, and interpersonal communication.

Public health specialist Santosh Vijaykumar (2008) analyzed 44 peer-reviewed articles and found that most of the mobile interventions described therein focused on the topics of HIV/AIDS and family planning in Africa and Asia. Importantly, Vijaykumar did not find significant outcomes after the target audiences were exposed to these mobile health interventions, suggesting a knowledge and research gap related to the impact of Behaviour change Communication Theory on certain mobile networks or on specific populations. This lack of significance might also reflect disconnections between the mobile intervention used, the change message surrounding the HIV/AIDS topic, or the need to better assess the populations being served by the intervention.

In 2008, Painter, Hynes, and Glanz reviewed 193 peer-reviewed articles and found that while a majority of the health behaviour programmes described in leading journals were grounded in research that had been informed by theories of change, such as the Health Belief Model and Social Cognitive Theory, these programs did not actually reflect theory-based approaches. In the health behaviour articles reviewed, only 36% of the articles (n = 69) use some level of behaviour change theory to inform programmatic practice. Interestingly, non-intervention studies were more likely to develop theory than intervention studies (16% of the studies compared with 6%). While recognising that it is challenging to apply community-level theories of Change, the authors argue that theory-based programmes have higher levels of utility and impact, and conclude that researchers should “strive to use theory more thoroughly by applying, testing, and building theories ... to move the field forward.”

## The interplay of social norms & behaviours

Above, we focused on individual factors influencing social norms. For the remainder of this report, we will explore the impact of different types of social norms and the importance of community in shaping and changing those norms. This issue is particularly relevant for teen cognitive development when youth are still experimenting with identity, and may be more susceptible to influence when inequitable gender norms are part of daily life.

Norms are beliefs about which behaviours are appropriate within a specific group.

### **Social norms create behaviour expectations that influence decisions, either by foreclosing possibilities or creating opportunities.**

There is widespread agreement in the field that whether an individual complies with a norm depends on his/her personal capacities, the strength of the norm, the types of reward, punishment, and economic factors (Vaitla, Taylor, Van Horn, and Cislighi, 2017).

Norms do not impact actions in a static way. Behavioural choices can reflect subtle or profound changes in beliefs and attitudes that occur due to social interactions. In 2009, Mark Manning explored the role of social norms on behaviours, which he defined as “normative beliefs that people relevant to the individual are perceived as having towards the behaviour, coupled with the motivation of the individual to comply with the expected norms of these persons.” He found that perceptions about whether one’s peers engage in socially unapproved behaviours influence whether someone will also engage in that behaviour. In the context of teens, adolescents’ support-seeking typically moves from the parental or family unit to one’s peers, demonstrating the potentially influential role of peers in the behaviour change process.

Philosopher Cristina Bicchieri (2006, 2016) stresses that social norms create conditional behavioural preferences that will change if beliefs about the peer group change. Bicchieri highlights the concept of descriptive norms, perceptions about the quantity and frequency of a given behaviour within one’s peer group, and injunctive norms, beliefs about the approval of a behaviour among peers. Norms remain challenging because it’s difficult to

predict how communication about norms that are positive or negative become resolved consistently. Interventions and communications that undermine harmful norms may produce different outcomes in different regions and cultures. In particular, norms in caste-based and strong patriarchal societies may prove more persistent when challenged by gender-focused interventions.

In 2009, Yee, Bailenson, and Ducheneaut created a Proteus Effect study to understand avatars that fit specific behavioural stereotypes and expectations rather than the characteristics and traits of the individual using the avatar. Researchers found that if an individual infers that other users in the online space expect certain behaviours because of the appearance of that individual’s avatar, the individual then engaged in those expected behaviours. They also found that these online behaviours continued into the offline environment during face-to-face interactions with others. These findings suggest that experimenting with behaviours online can promote increased offline behaviours that are similar.

**In 2011, Netherlands researchers Baumgartner, Valkenburg, and Peter conducted a study that confirmed that perceptions of how peers behave are more likely to influence behaviour than perceptions of whether peers would approve of a behaviour. Consequently, digital interventions targeting adolescents might consider opportunities to illustrate how peers behave in ways that disrupt systems that disempower females in a specific culture.**

### **Inequitable gender norms**

Gender norms and stereotypes are culturally derived and tend to be deeply entrenched in many cultures. Behavioural expectations may impact vulnerability and potential outcomes for girls and boys. For instance, in South Africa, Varga found that gender-specific responsibilities and expectations shape “adolescents’ vulnerability to

risky sexual behaviour and early childbearing, where girls are far more burdened than boys.” In 2009 researchers Jewkes, Morrell, and Christofides also found that “subordinate position in the gender and social hierarchy limits [girls’] ability to make meaningful choices about sexual activity and pregnancy.” They make the case that teenage pregnancy is “a deeply embedded social phenomenon [tightly linked to] ideas of masculinity that confer on men an ability to unduly influence the health of women and encourage women to equate femininity with acquiescence to male wishes.”

**As gender norms may be deeply entrenched in cultural expectations and traditions, change agents may also encounter extreme resistance from the culture they seek to change.**

In contrast, adult behaviours still represent the reference for all social norms. In 2007, Seguino’s international longitudinal study found that women’s paid employment is a key factor in promoting meaningful change for others. Now broadly accepted across the research community, Seguino’s work shows that as “the economic pie expands, there is less male resistance to female economic empowerment, even though relative economic standing is shifting in favor of women.”

**Consequently, interventions targeting a shift in social norms must be developed from and with the support of the culture in which the norms are embedded.**

Furthermore, most researchers are quick to note that any intervention should reach across the entire culture, rather than focusing solely on the girls whose power is limited in their cultural setting.

### **Teen cognitive development & collective identity**

Identity theory is the psychological and sociological study of how individuals understand their sense of self, by introspection, as a function of their social

lives, and through feedback received when they do something (Baumeister, 1998). The social aspects of the self develop during the teen years when young people experiment within social groups to test potential desired identities, receive feedback from communities where they affiliate, and seek out acceptance and approval to determine who they are.

For teens, exploration of the hierarchical structure of an emerging identity is a period of testing the degree to which they are inextricably linked to others, the concept of belonging, and how they are situated within a group. Teens test the limits of their scope of justice, as they explore empathy and ego. This exploration leads some teens to receive validation when they act in their own self-interest, while others enjoy feedback for more altruistic actions.

This testing phase is an emotionally precarious phase since risk perception associated with the limbic system is slower to develop, often into a person’s twenties. Therefore, these identity-developing experiments can be highly challenging if confronted with verbal threats or exclusion. For example, teens engage in “slut shaming” and other tactics that can ingratiate someone into a group they perceive to be valuable. They use these tactics based on shared agreement on the limits of their “in-group,” but inequitably harm the target of shame.

Collective identity is particularly useful to the study of self-efficacy behaviours because it can be used to explain the source of attitudes and beliefs surrounding action. Collective identity is the perception of the self as inextricably linked to the fate and future of a group (Abrams & Hogg, 2004; Stryker, 2000; Tajfel & Turner, 1986). Simply stated, as a teen experiments with her membership in a group as central to understanding her emerging sense of self, she will also likely try to raise her voice and act in ways that are consistent with the beliefs and values of others in that group. This effort ensures that the teen continues to receive positive reinforcement from peers.

In 2012, Ringrose and Renold studied how recoding the sexualisation of teen girls and the rights of young women attempting to reclaim or de-weaponize the term “slut,” and challenge sexual rivalry among women. They demonstrated

that girls would code-switch between their declarations as part of the walks and when they found themselves in school groups with peers outside the sanctioned safety of the march. These experiments showed that performance within groups generates feedback that confirms whether they are accepted within a group, but does not necessarily carry to other settings. Collective identity, therefore, demonstrates that if a group is important to an individual's sense of self, but the content and meaning that binds the group has no relation to a decision faced by one of its members, there would not be a social norm to influence the individual's decision. But if that content is relevant to the meaning of that group, as the Ringrose and Renold study showed, the connection can predict an individual's actions in that setting. Sociologists Fine and Harrington (2004) show that small groups are incubators of social change. It is the dialogues in these small groups may offer useful strategies for encouraging in-group collective identity development in a safe space to help envision socialisation and de-socialisation. It is within the small group where norms and beliefs are developed and promoted, and where activism beyond the group is nurtured (Fine & Harrington, 2004; Brewer, 2001).

**When we consider the overwhelming amount of research that supports the role of context and social influencers over youth development, it becomes clear that opportunities for adolescents to build skills and negotiate their own behaviours in small groups with supportive adults are essential to the identity development phase.**

These venues are the ideal platform for helping youth identify their educational and economic opportunities. Moreover, forums for peer-to-peer education can help young people think critically about gender and how social constructs of gender can place their sexual health at risk. It is these peer-to-peer incubators for self-ideation that can shift young people's perspectives on their social and sexual identities, and empower them to change their behaviours by building self-confidence.



## Conclusions

In measuring behaviour change, this literature highlights the need for more theory-based digital intervention models that inform behaviour change processes and encompass the following factors:

- Preparedness for change, including the individual's attitudes, beliefs, and intentions (eg., Meinhold & Malkus, 2005; see Social Cognitive Theory and Transtheoretical Model);
- Level of self-efficacy (belief in one's own ability to execute an action and shape the world around themselves) (eg., Meinhold & Malkus, 2005; Prochaska, Wright, & Velicer, 2008; Bandura, 2006, 2006; World Bank Group, 2015);
- Social norms in which the individual is embedded (see Theory of Planned Behaviour and Nudge Theory);
- Behaviours across varied environmental levels and barriers that may prevent change (see Ecological Models; Burnette, 2016); and
- Communication strategy for behaviour change (see Behaviour Change Communication Theory).

Researchers in this field recognise the need for studies that systematically identify the individual and contextual factors that impact the efficacy of an intervention, in addition to studies that test, and potentially modify, existing theoretical models. This literature highlights a significant gap: the need for more theoretically based behaviour change intervention models that encompass the socio-cultural contextual factors likely to serve as barriers or catalysts for behaviour change, with recognition that behaviour change is a complex process situated within the ecological system in which the individual is embedded.

Social norms influence the systems in which behaviour change might happen. Information resources, by imparting new knowledge, might serve as catalysts or at least support mechanisms for attitude and behaviour change. Behavioural change requires that individuals have alternatives in choosing and changing their behaviours. Social norms may prevent individuals from even entertaining the attitude change that is often a precursor for behavioural change. Any desire to

shift the social norms of a culture may also require instructions and opportunities for girls to re-conceptualise how they view themselves within their society.

Recognising the importance of community in shaping and reinforcing social norms that might support or inhibit sustained behaviour change, researchers in this field suggest that boys and girls can and should work together to shift social norms. Based on their own study of best practices in the field, Vaitla et al (2007) conclude that “interventions that fail to capture the entire social network might increase girls’ capacity to resist social expectations, but [will] not achieve durable change in those social expectations—possibly increasing, rather than reducing, harm and violence.”

## 2

# The use of digital tools for behaviour change

A wide range of digital tools has been used in behavioural change intervention research. Preference and use of these tools is often culture-specific, reflecting the goals and needs of a given region of the world. In addition, the platforms for these tools, or the online environments supporting the tools, also reflect the cultures in which they are used. For instance, blogs, social media posts, and grassroots/crowd-sourced news sites have been used as political tools to spark uprisings among massive online audiences, reflecting the specific needs of marginalised or disenfranchised populations within a specific regional and cultural context.

This chapter outlines the use of varied types of digital tools to promote behaviour change at the individual and community levels, while also highlighting the use (or lack) of theories and models that measure the efficacy and impact of interventions. We note that the landscape of online tools continues to evolve as patterns of online access and mobile technologies change. The majority of research on individuals' use of digital tools as interventions for their own behaviour change has focused on health-related behaviours; additional research is needed in other outcome areas. The current literature about group behaviour change grounded in digital tools is almost exclusively focused on the Arab Spring.

**?** The following research questions are explored in this chapter:

- What is best practice on how digital can influence behaviour change?
- How can digital tools bridge the gaps among knowledge, attitude, and behaviour?
- To what extent can addressing multiple behaviour change objectives on one platform impact behaviour change?
- What measurable impact associated with the use of a digital platform might indicate success?
- What is the relationship between the disruptive nature of a digital platform and sustainable outcomes?
- How can we use digital to sustain offline behaviour change?
- What is the role of digital in a girl's online and offline behaviour change journeys?
- To what extent can digital accelerate behaviour change?
- How effective or ineffective or harmful is digital on influencing behaviour change?

## Models for online interventions

Deborah MacInnis, Christine Moorman, and Bernard Jaworski (1989) proposed motivation, opportunity, and ability (MOA) theory, positing that three elements impact the degree to which individuals process information. These theorists identify motivation as a force that directs individuals to engage in behaviours, make decisions, or process information to move toward their goals.

**Opportunity speaks to whether a situation is conducive to or impeding a desired outcome; that is, whether the situation is a barrier to desired behaviour change. Ability refers to the extent to which an individual has the necessary resources (the skills and know-how) to realise an outcome.**

This theory continues to have prevailing value in online environments as demonstrated by researchers Gruen, Osmonbekov, and Czaplewski (2005) in their exploration of how e-communities exchange information and rely on recommendations of comments within that community.

Information systems expert Harri Oinas-Kukkonen (2010) notes, “Persuasive technology as a field has the responsibility of educating the general audience about the pros and cons of people’s behaviours being influenced by information systems”. He also raises the point that developers of digital interventions “must realise that they exercise enormous power over the users because their designs always influence [those users] in one way or another, whether they intend them to or not.” Though many voices in the literature agree that a theoretical framework should ground an online intervention (Painter, Hynes, & Glanz, 2008; Korda & Itani, 2013; Cugelman, Thewell, & Dawes, 2011), Laranjo et al (2014) note that few studies integrate a theory of behaviour change.

Medical researchers Mummah, Robinson, King, Gardner, and Sutton (2016) propose a model for the development and evaluation of digital health interventions using 10 phases that flow from integration and designing to assessing and sharing. This framework arose from recognition of the gaps and difficulties in the digital intervention field, including the lack of theory-driven approaches to intervention, low retention rates for interventions

(eg., one-time use of an app), and the fast pace of evolving technologies.

The first phase of the proposed process focuses on use of a qualitative approach to better understand the needs and desires of the target audience. Once the population’s needs have been specified, phase two seeks to fully understand the target behaviours. Phase three suggests the use of a behavioural change theory to ground an appropriate intervention design. The iterative process of building the intervention (phase four), is followed by prototyping the intervention (phase five), and gathering feedback from users (phase six). Once the product is developed (phase seven), pilot tested (phase eight), and evaluated (phase nine), the intervention is shared with a wider audience (phase ten).

Ritterband et al (2009) propose their own model for health-related online behaviour change interventions, which can be applied to non-health behaviours, as well. The model features nine steps (factors) that the authors describe as interactive, connected, and nonlinear in nature. In summary, “the user, influenced by environmental factors, affects website use and adherence, which is influenced by [website administration] support and website characteristics. Website use leads to behaviour change and symptoms improvement through various mechanisms of change. The improvements are sustained via treatment maintenance.” User characteristics include both fixed (eg., age, gender) and variable traits (eg., mindset, attitudes), and all characteristics must be considered in this model of change. The environment includes multiple levels ranging from family and friends to society and policy.

**Regarding the intervention platform, thoughtful consideration of website design (format) and use by the individual is encouraged.**

Is it aesthetically pleasing to visit the site? How easily can users access the content? Ritterband et al note that the mechanisms of behaviour change, which can include information, motivation, attitude, beliefs, and self-monitoring, must be assessed to identify specific pathways users take toward behavioural change and sustained change over time.

## Digital intervention best practices

With a meta-analysis consisting of 29 studies related to 30 online health-related interventions, statistical cybermetrics researchers Brian Cugelman, Mike Thelwall, and Phil Dawes (2011) contributed substantially to understandings of behaviour change intervention efficacy. In general, the 30 interventions used feedback mechanisms and personalisation for the user (eg., tracking goals), and many highlighted the consequences of users' behaviour, helped them with goal setting, included skill development, and contained normative pressure. The research team found that effect sizes measuring behavioural change were relatively small across the 29 studies.

**Surprisingly, shorter interventions achieved the largest impacts, whereas an increase in intervention time decreased behavioural impacts. More comprehensive online interventions out-performed control groups and lower-tech online interventions, but were not actually stronger than print-based interventions.**

Bailey et al (2015) found that strong interventions related to sexual wellbeing and health in the United Kingdom reflected the needs of the target population, targeted the mechanisms of behaviour change, matched behavioural change techniques with user needs, promoted long-term intervention use, and included feasible and sustainable interventions.

Based on meta-analysis, Lustria et al (2013) note that digital interventions have advantages over traditional print, television, and audio modes because online interventions can be flexibly designed to include interactive components, opportunities for feedback, and conveniently timed messaging to engage diverse users in targeted ways. These researchers explored the impact of online, tailored intervention programs on healthy behaviours and health outcomes in various patient populations. Tailoring, in the online context, involves “developing individualised messages based on pre-assessment of key individual-difference variables or characteristics linked to the underlying model of behaviour change.” Because tailoring increases the personal relevance of health messages, Lustria et al found that tailored

messaging is both more likely to command users' attention and be more persuasive. Lustria et al also found that tailored messaging makes it more likely that users will process – and have a positive perception of – educational materials. These researchers conclude that this study provides evidence for the overall efficacy of online, tailored interventions for short- and long-term behaviour change.

Korda and Itani (2013) highlight the importance of matching the intervention with the target audience. For instance, interventions targeting Millennials (those born in North America, Western Europe, Australia, and New Zealand between the mid-1980s and the early 2000s), also known as Generation Y, might reflect this demographic's overall preference for watching online videos, frequent cell phone use of various functions, and relatively infrequent interest in podcasts – with recognition that regional variability might exist. In a similar vein, Baños et al (2017) found that levels of engagement and use increased when interventions iteratively modified their platform to reflect emerging trends with adolescents.

Krebs, Prochaska, and Rossi (2010) found that iterative assessments and feedback are important for users as they move toward shifts in behaviour, based on meta-analysis of digital interventions designed for health-related behavioural changes. Yardley et al (2016) also recommend a user-centered approach to create more effective online platforms, ideally with feedback from the target audience. Based on consultations with a series of experts on digital engagement and behaviour change interventions, Yardley et al suggest that digital interventions should, furthermore, be perceived as having benefits that outweigh their costs. For instance, platform users might find that an online game is fun and exciting, even if they do not otherwise consider the content itself exciting. Yardley et al make the case that tailored content can – and should – include choices about the format of the platform itself.

Health services researchers Holly Korda and Zena Itani (2013) found that tailoring messaging to the target audience could improve intervention effectiveness. They suggest interventions with multiple, complementary, focal-themed messages that encourage users to engage with the platform and interact with other users on the platform. However, further research is needed to explore the social component of online behaviour change interventions.

## Information sharing with technology

Liesbeth Rijdsdijk (2013) has written extensively on the topic of how adolescents communicate about sexual health in Uganda. She emphasises the value of a comprehensive, rights-based approach to educating adolescents about sexuality, and suggests that programs must be flexible and interactive, answering adolescents' questions and preparing them to make educated choices. Rijdsdijk finds that online interventions are practical only "if part of the programme ensures sufficient availability of computers and electricity," and that the internet, especially mobile phones, "can provide an enabling environment for interactive dialogue and critical discussion" – factors Rijdsdijk deems essential for behaviour change related to sexuality issues. This article points to the importance of considering the accessibility of the digital intervention modeling target populations.

Ybarra et al (2014) found that online technology-based education has encouraging potential for preventing HIV among adolescents in South Africa. Technology use was common among teenagers in the relevant population, even those who lived in lower-income communities, and adolescents reported an elevated level of interest in learning through technology. Technology-based education programs were perceived to be a novel and useful method of dealing with students' fatigue relating to HIV prevention messaging.

**Online environments facilitate the spread of quick, concise, massive messaging, and digital tools such as mobile phones have been used to effectively move messages through social network platforms such as Facebook and Twitter for widespread information sharing and receiving.**

Health researchers Nicole Ippoliti and Kelly L'Engle (2017) reviewed 17 studies on adolescents sharing reproductive health information via mobile phone technology around the world; more than half were based in Africa. The authors found that most of the reviewed projects used text messages for information sharing, but some used informational hotlines or social media applications. Many programs also provided a chat option that gave adolescents opportunities to pose health-related questions and receive timely answers. The findings

suggest that mobile phones can be effectively used as an information source for adolescents, and that mobile phone reproductive health interventions can specifically target adolescents who live in cultures that stigmatise sexuality and reproductive health. Information scientist and health systems expert Williams Nwagwu (2007) described the ways in which adolescent girls in Nigeria utilised the internet to gather information on reproductive health. Nearly three-quarters of the 1,145 adolescent girls studied, some of whom were attending school and some were not, had previously used the internet. Based on data collected, Nwagwu concluded that the internet "is not a first choice of source of reproductive health information" for girls in the sample. The girls who were not attending school more commonly used internet information resources, but the in-school girls had a more favorable perspective on the information they found on the internet. Though Nwagwu views the internet as a promising resource for health information for adolescent girls, his findings suggest that in-school and out-of-school girls have different information-seeking challenges, and he cautions that "unguided reliance on the net for health information sidelines parents and teachers and other care givers who sometimes possess skills that are more suitable, both in curriculum and in local content, for adolescent education."

### The gaps in knowledge, attitude, & behaviour

While it might seem that new knowledge (awareness-raising) alone will help change attitudes that, in turn, change behaviours, individuals use mental models to respond to new information in various, and sometimes unexpected, ways. These expected responses potentially create what appears to be a knowledge-attitude or an attitude-behaviour gap. The attitude-behaviour gap is recognised as a failure to explain or predict behaviour based on attitudes.

As described in Chapter 2, several studies show that behaviours can be changed without changing attitudes (eg, by changing the perception of social norms). Additionally, attitude change does not necessarily lead to a change in behaviour– we often say one thing but do the opposite. The

## Use of social media

current literature suggests that numerous internal and external factors affect behaviour and the reasons underpinning decisions about behaviour in a specific instance. Furthermore, barriers such as conflicting attitudes, beliefs that it is not their responsibility to act, or logistical constraints might inhibit someone from assuming a new attitude or behaving in ways that reflect a specific attitude. Papaoikonomou, Ryan, and Ginieis (2011) are among the researchers who thus posit that models of behaviour and behaviour interventions must consider social, individual, and institutional behaviour barriers.

Acknowledging that there is a great deal of variability regarding whether attitudes will predict behaviour in the longer term, social psychologists Laura Glassman and Delores Albarracin (2006) assessed factors that shape the extent to which behaviours will last into the future. In general, they found that attitudes that are stable and accessible (easy to recall) are more likely to predict future behaviour because such attitudes “are likely to be available as criteria for a later behavioural decision.” The findings suggest that repeated and direct experiences with a given attitude object (any target of judgement) can make an attitude more accessible and more familiar, increasing expressions of the attitude and, consequently, attitude-behaviour associations.

Digital interventions that link theory and practice to change norms and catalyse improvements in girls’ lives are very scarce, and those that exist are still in nascent stages of implementation. Though there is thus not yet a developed body of literature related to how digital interventions might bridge gaps between knowledge, attitude, and behaviour, a more holistic approach would go beyond increasing girls’ knowledge and confidence to identify other potential barriers to behaviour change, and ensure that the platform provides users with numerous direct experiences with attitude objects that will be easy to recall.

Social media is loosely defined as forms of electronic communication through which users create online communities to share information, personal messages, ideas, photos, etc. Various social media networks (eg, Facebook, blogs, message boards) have been used for online health intervention in recent years. Damon Centola (2010) presents two competing hypotheses that explain how the composition of a social network can support and spread information. The first hypothesis explains how networks with longer ties, or mere acquaintances versus close friends, have the potential to spread social behaviour further and more quickly. Contact with only one individual is effective enough to transmit a message because the long ties in this hypothesis connect many networks through digital relationships. An alternative hypothesis suggests that receiving the message through multiple channels or through close, clustered social networks of close friends and family that overlap across different platforms can provide social reinforcement for behaviour change. Findings from Centola’s study of these hypotheses support the use of closely structured and socially reinforcing environments to support behaviour change. Laranjo et al (2014) similarly found that meta-analysis supports the use of clustered social networks for the encouragement of behavioural change, particularly for easy behavioural change (eg, adopting a new diet).

**Consequently, individuals might be more likely to adopt a message or move toward behaviour change if they hear the message from multiple sources in a close social network.**

Beyond health interventions, much of the current literature in the field speaks to the effective use of digital tools for political activism in the offline world. Drawing on the Arab Spring and other political examples, Philip Howard and Muzammil Hussain (2011) describe how specific digital tools (eg, the internet, mobile phones) and particularly social media (eg, Facebook, Twitter), were used to build online networks for peers, create social capital, and organise political actions for offline implementation. These communication scholars provide examples of how YouTube videos spread information about abusive conditions prior to the Arab Spring. This occurred in parallel to bloggers

## Addressing multiple behaviour change objectives

posting about the conditions and those on Facebook sharing similar messaging. Howard and Hussain share the views of many other researchers: without accessible online tools, the messages of the Arab Spring could not have spread so quickly or efficiently. Consequently, the coordinated offline political actions that characterised the Arab Spring may not have been possible without these online tools.

In terms of data that might shed light on information sharing via social media, in 2013 Korda and Itani published an article citing the limitations of Google Analytics click data. More recently, Wang, Ramachandran, and Chaintreau (2016) presented a workshop paper that explains how to effectively use accessible click data to explore information dissemination pathways on social network sites. Wang et al gathered data from a private Twitter publisher dataset (via Twitter analytics), a public retweet dataset, and a public clicks dataset from Bitly's Application Programming Interface. They looked specifically at tweets and retweets of BuzzFeed information. Of potential interest is their finding that retweeting a single URL many times may not result in a user's increased clicks on the information.

In another 2013 article, brand research specialists Payal Kapoor, K. R. Jayasimha, and Ashish Sadh claimed that the drivers of eWord-of-mouth (eWOM) behaviour on social media are unique, noting that nurturing relationships and networking are major functionalities of these platforms. As they interact with other users, individuals using social media often engage in eWOM behaviour, diffusing brand and content-related information, as well as brand experience feedback, across their broader network audience. eWOM can thus originate from sources with which a user of social media may have no significant prior relationship, unlike traditional WOM, which primarily originated from known and trustworthy sources. Because the influence of eWOM is likely to be moderated by credibility perceptions, these researchers point to the importance of establishing credibility with respect to both the source and the information itself. Empirical findings indicate that eWOM on social media is capable of influencing consumption-related behaviour and brand equity, and, followed closely, eWOM may provide insight into sentiments about brand and content experience, as well as perceptions of credibility.

Research into best practices for multiple behavioural change objectives is a nascent field. There is limited research into the efficacy of behaviour change interventions that address multiple behaviours, though results from Krebs et al's (2010) meta-analysis suggest that targeting multiple behaviours may not hinder the efficacy of an intervention.

Health behaviour change researchers recognise that multiple unhealthy behaviours frequently co-occur in any given individual, and that multiple-behaviour interventions might thus yield greater impact than single-behaviour interventions. Multiple Health Behaviour Change (MHBC) interventions are defined as "efforts to promote two or more health behaviours," such as decreasing tobacco use and engaging in medical screenings. The most comprehensive analysis to date has been Judith Prochaska, Bonnie Spring, and Claudio Nigg's (2008) review of then-recent activities that had achieved success, including large-scale MHBC interventions that addressed smoking, weight management, and lack of physical activity. However, much of the current literature on digital interventions and behavioural change objectives has not addressed or effectively measured how multiple behavioural change objectives on one platform can impact the target behaviours.



## Measuring & sustaining behaviour change

Bailey et al (2015) conclude from their mixed-methods study of digital interventions designed to support sexual wellbeing for youth ages 13 to 24 in the United Kingdom that there is limited evidence on the effects of interventions for actual [sexual] behaviour, even if knowledge improves. These researchers note the difficulties associated with measuring the efficacy of interventions, as well as intervention retention. However, they do identify incentives and reminders (eg, text messages) as two strategies that might encourage users to sustain longer-term engagement with the intervention.

Results from Cugelman et al.'s (2011) meta-analysis suggest that impact increased for one to four months post-intervention, but significantly declined thereafter. The researchers note that these trends are potentially explained by factors such as the high adherence effects in shorter interventions. Consequently, digital interventions may show significant behaviour changes in the short term, but may fail to sustain behavioural change beyond approximately four months. With this consideration, interventions intended for long-term behavioural change (beyond four months) might consider opportunities to continually reinforce change and sustain engagement with the individuals targeted for the intervention.

Reflecting another significant limitation in the field, the existing literature consistently reflects the dearth of behaviour change interventions that accurately represent the needs of adolescents or follow users' engagement and behavioural change over an extended period to establish the efficacy and sustainability of the intervention. Of nine digital intervention studies recently reviewed by Baños et al (2017), only one study reported data at a two-year post-intervention time point, and even that study neglected any additional behaviour change support or maintenance evaluation. We note that very few studies of online interventions report the use of an integrated scaffolding strategy to support deeper levels of learning and sustained behaviour change.

Public health scholars Marcia Ory, Matthew Lee Smith, Nelda Mier, and Meghan Wernicke (2010) co-wrote an introductory article for a special issue on the topic of sustaining health behaviour change in the American Journal of Health Behaviour that summarises the lack of synthesis in the field,

which they suggest is "limited by the lack of consistent definitions or constructs for measuring maintenance across behaviours." The terms maintenance and adherence, for example, should not be conflated in the literature.

Because there is limited literature that effectively explores digital behaviour change interventions over an extended period, much of the digital intervention literature is context-specific, allowing little comparison across multiple interventions due to the variation found among digital platforms. As a result, questions also remain about sustainability and duration of change, in addition to how much change is sufficient. The current literature highlights how seemingly minor levels of change, measured via effect sizes, should not be overlooked in measuring intervention efficacy (Cugelman et al., 2011). In other words, even if behaviour change interventions are considered effective in shifting one's behaviour, we might expect the effect sizes measuring change to be relatively small.

**These seemingly small behaviour changes might reflect how girls modify and experiment with their identities or creatively negotiate social norms in slight increments, and at their own pace. Every girl takes her own path, at her own pace, towards the decisions that impact her wellbeing. These seemingly minor shifts may, over time, move a culture towards more equitable social norms.**

Behavioural change maintenance for more than two years post-intervention is, as mentioned, a major gap in the current literature. The few studies that do report longer-term follow-up note that lifestyle change interventions make the strongest impact, but, without sustained support, positive effects may decrease. Consequently, Ory et al (2010) reason that behavioural intervention could be paired with environmental changes to sustain behavioural change over longer periods of time, and recommend that practitioners deepen their understanding of participants who report a lack of behavioural change or sustained change over time. Additional suggestions for future topics of research include the integration of cultural sensitivity into intervention work, participation selection for behaviour change interventions, and the efficacy of behavioural change interventions.

## Conclusions

The current chapter presents findings about the use of digital tools for behaviour change. There is consistent agreement that **online interventions should be grounded within theories**, and the proposed models for interventions recognise the need for 1) an assessment of the target population's desires and needs (eg, engaging digital tools that are fun and match users' information-seeking strategies), 2) digital interventions that match the needs of the target population (eg, user-friendly sites), and 3) the evaluation of intervention efficacy. For example, iterative feedback may support users as they work toward changing their behaviours (Krebs, Prochaska, & Rossi, 2010). As an added consideration, lack of accessibility of a digital tool may also prevent a behaviour change outcome.

Although the literature generally agrees on appropriate methods for modeling interventions, limited research has explicitly considered how digital interventions might transform offline gender norms and impact agency. This is not surprising, given that a tremendous cultural shift must occur to deem effective a digital behaviour change intervention aiming to change gender norms or build girls' agency. Furthermore, the lack of literature measuring behaviour change over extended periods of time (2+ years) limits conclusions about shifting cultural norms or the sustainability of offline behaviour change.

**Digital interventions might consider small, incremental behaviour changes as measures of success and more realistic for the platform and the current goals of the intervention.**

Even with the limitations of the current literature, some studies are beginning to suggest that certain online interactions or social processes might build offline agency, particularly for vulnerable populations. For example, Howard and Hussain (2011) describe how online tools and environments were used by vulnerable populations during the Arab Spring. These tools supported consumers' feelings of empowerment and increased agency, which could then be further leveraged to spur offline behavioural change. However, additional studies are still needed to clarify the links and build theories to explain the process by which digital tools can effectively shift social norms, build

agency in a target population, and result in offline behavioural changes.

Three research questions related to digital interventions were not sufficiently reported in the current literature to draw direct conclusions. There remain several very large and closely linked questions in the field that require directed research to disentangle these issues:

- What is the role of digital in a girl's online and offline behaviour change journeys?
- To what extent can digital accelerate behaviour change?
- How effective or ineffective or harmful is digital on influencing behaviour change?

Additional research is also needed to explore the efficacy of targeting multiple behaviour change objectives on one platform, as well as how online environments and designers of such environments can effectively encourage long-term, sustained behavioural change that extends beyond four months. Research is also needed to explore the social component of online behaviour change interventions.

The current research does find that repeated direct experiences with a specific attitude or reminders about a specific behaviour can strengthen the attitude-behaviour relationship. Eword-of-mouth behaviour, a key characteristic of social media platforms, can be a powerful tool for spreading information and has been shown to influence behaviour. Some research also finds that close, more clustered social networks can help facilitate and support behaviour change through consistent reinforcement. These findings reflect those networks that girls already perceive to be highly relevant to their lives, both online and in real life. Perceived credibility, however, is a moderating factor that must be taken into consideration.

# 3

## Understanding the silent consumer

A common phenomenon in the field of social media research, many users of online platforms view available content online, but do not actively contribute to the content or to online discussion of the content. The term lurking is often used to describe this more passive form of silent engagement with digital tools. Sun, Rau, and Ma (2014) identify the following reasons for lurking: environmental factors, personal preferences, individual-group relationships, and perceived privacy issues with the platform. These scholars argue that lurkers and posters may share motivations for online engagement, but accomplish their goals differently.

 This chapter specifically addresses the following research questions:

- How do we understand impact on the silent consumer?
- How do we measure behaviour change in the silent consumer?

## Describing the silent consumer

Online community researcher Noella Edelman (2016) notes that lurkers serve as listeners consuming information for their own social networks, and might be viewed as informational bridges between divided online communities.

**Certainly, silent consumers should not be considered unengaged users of the online content they access; lurkers might actively consume online information and subsequently disseminate that information via alternative offline and online channels.**

Lai and Chen (2015) conducted an online survey of 324 self-identified users of a large online platform based out of Taiwan (Mobile01), finding that those who lurked and those who actively posted appear to have different motivations. Three different factors appeared to motivate whether individuals engaged silently with the platform or actively posted information on the site. First, those who posted actively expected some level of reciprocity from other users. Lai and Chen conclude that, if lurkers feel the social norm of reciprocity on a site, they might be more motivated to post. Second, users who reported that they intrinsically enjoyed helping others also engaged in more information sharing. Lai and Chen conclude that those who did not share information, the lurkers, may not experience the same level of satisfaction from helping other people. Third, the researchers found that user perception of the site moderator's enthusiasm influenced whether lurkers would actively post. This finding suggests that moderator reassurance of posted content may encourage lurkers to engage with the online community in more public ways. Based on these findings, the different motivating factors that characterise active and passive users of online platforms should be considered in behavioural change interventions.

Han and colleagues (2014) examined the effects of lurking and posting on psychosocial health outcomes for 325 female breast cancer patients in online support group environments. Han et al found that predictors of type of engagement included ethnicity (Caucasian participants were more likely to post messages) and whether the user lived alone (those living alone were less likely to post messages). Users with less knowledge about

breast cancer were more likely to post; those who perceived higher levels of bonding (close, intimate relationships with others) were more likely to lurk. However, during the 6-week to 3-month period, gaps between lurkers and posters appeared to lessen. Lastly, users who lurked seemed to benefit more from the online support group with respect to wellbeing, depression, and perceived social support when compared with users who posted.

**Beyond illustrating differences between lurkers and posters in more intimate online environments, these findings suggest that silent online engagement benefits lurkers in valuable ways, and that active and silent users might be expected to experience different benefits, or benefit to different degrees, based on their type of engagement with the platform.**

Sun, Rau, and Ma (2014) suggest that lurkers might be transformed into active contributors in online communities that provide a reward for active contribution (external stimulus), improve platform usability, and encourage lurkers to contribute by paying special attention to newcomers in the online community.

Cyberpsychology researcher Sanna Malinen (2015) offers a literature review that disentangles the binary approach to active-passive users, making the case for a more complex understanding of online community participation. Malinen reviewed 83 studies published between 2002 and 2014, and identifies several limitations in the current field. For instance, there is not yet a universal definition of online community, creating problems with research method and measurement. More research is also needed to understand social influence of others in online communities; how do peers shape our attitudes and behaviours online? There is also a lack of longitudinal research measuring how online communities change over time. Malinen highlights the wealth of descriptive research that assess quantity of online interactions, but points out that more research is needed that explores the quality of online interactions. As an example, instead of measuring the frequency of posts on a

## Conclusions

discussion board, one might consider themes in the content of those posts. Malinen recommends the development of a consistently used definition of online community, to facilitate direct comparisons of results across multiple studies. She also identifies the need for the development of a theoretical framework for user participation that defines participation, rather than relying on quantitative measures of engagement.

In keeping with Malinen's suggestions, future research might seek to understand social influence in the context of the extent to which people impact others' participation in online environments, and whether barriers to social interaction are inherently imposed by digital tools. Although measuring behaviour change for lurkers or silent consumers is difficult, self-report measures have been frequently used (eg, surveys). Additional research might consider alternative forms of data collection, such as back-end data or interviews, which could accurately capture the experiences of these silent users. Furthermore, research into the users of online platforms might reveal how lurking and active users differ in their personal characteristics, in addition to whether each category of site usage results in varying forms of impacts (or lack thereof).



# 4

## Developmental age: Adolescent behaviour patterns online

Chapter 3 of this review highlighted the need for behaviour change interventions that are tailored toward and reflect the needs and desires of their target audience. This chapter focuses on developmental issues appropriate for adolescent girls age 14 to 16, such as the role of peer groups and the formation, maintenance, and modification of one's identity.

This chapter also seeks to address the question:

- ? How should the experience of girls with online tools evolve over time to maximise impact on behaviour change?

## Role of peers

Self-efficacy and social dependence, principles underlying a great deal of the literature related to adolescent behaviour, appear to be universal. Analyses of these principles in the context of adolescent communication online are consistent with findings from research undertaken prior to the advent of social media as a place to explore belonging and self-disclosure (see Davis, 2012). Adolescent patterns of experimentation, and of connecting with known and unknown others, have been validated in the developmental psychology literature as occurring universally, irrespective of whether exchange and identity experimentation occurs online or offline (see Subrahmanyam & Greenfield, 2008).

**Given the universal importance of social dependence for this age cohort, peer influence and social norms are often researched in the context of adolescents' vulnerabilities and negative behaviours, though recent research has begun to identify contexts in which peer influence might support prosocial behaviours.**

Prosocial behaviour is positive, voluntary behaviour that aims to benefit others. Hoorn et al (2016) engaged 197 adolescents (mostly Dutch) in a social game consisting of three conditions. The researchers found that changes in an individual's prosocial behaviour depended on what behaviour was supported by the peer group. Prosocial behaviour declined when peers were selfish with the gaming simulation, but remained the same when no peer feedback was shared with the participant, highlighting how peers can negatively and positively influence an adolescent's prosocial behaviour. While these findings may not replicate in caste-based or strong patriarchal societies, they are consistent with many digital developers' aim of developing relevant tools that reinforce positive peer influences and the power of prosocial behaviour.

## Online identity exploration & empowerment

According to developmental psychologists Kaveri Subrahmanyam and Patricia Greenfield (2008), the online space can be used to explore the core adolescent developmental tasks identified by renowned psychosocial development theorist John Hill: identity formation, autonomy, intimacy, and sexuality. Subrahmanyam and Greenfield emphasise, though, their finding that adolescents particularly and consistently use online spaces for peer connectivity and identity construction. Adolescents are also increasingly using social network sites to gain information about their offline world. Further research is needed to explore how the offline-online overlap might support adolescent identity exploration and construction, and how online experimentation might extend into offline environments.

Many studies highlight how online communication can support adolescents' identity development. Wängqvist and Frisé (2016) reviewed 1,613 articles about adolescent identity development in peer-reviewed journals and academic databases between 2010 and 2015. Regarding online environments, three themes emerged: 1) opportunities for identity exploration, 2) means for self-presentation, and 3) requisites for social interactions or the specific environmental circumstances that facilitate peer-to-peer exchanges online. The authors describe how online environments may support identity explorations in ways that offline environments do not. For instance, individuals may feel more comfortable exploring a new sexual identity in an online space.

**Some adolescents also use online platforms to create private spaces that allow more autonomous interactions with others without parental supervision.**

As mentioned, research has yet to clarify how such exploration may impact one's sense of identity across contexts, and the authors note that research is needed to explore how online identity exploration is linked to a changing identity narrative over time. Anonymity and disembodiment in online contexts, and how those factors contribute to identity development, have been topics of limited research, to date, perhaps due to the prevalence of research on social network sites that tend not to be characterised by a high level of anonymity.

Since cyberpsychologist John Suler first introduced the Online Disinhibition Effect in 2004, numerous media and identity studies have confirmed that individuals behave online in ways they would not behave in person. For example, an individual may be more likely to voice a controversial opinion about a political candidate online than in face-to-face exchanges with others. People might also “share very personal things” or “show unusual acts of kindness and generosity, sometimes going out of their way to help others.” Researchers note that online users can explore and construct their identity through one, or many, of these forms of disinhibition. Suler illustrates how different online spaces may facilitate different self-expressions, showing how the possibilities of a specific online environment may facilitate or prevent a user from reflecting the Disinhibition Effect during online social interactions.

Research exploring the Online Disinhibition Effect often includes samples with adolescents (eg, Hollenbaugh & Everett, 2013), but cross-sectional or longitudinal research is needed to explore whether this effect is heightened during specific developmental ages such as adolescence, a period that is often marked by identity experimentation and shifting behaviours towards family and peers.

New media technologies researcher Katie Davis (2012) interviewed 32 adolescents about their online conversations with peers. Two themes emerged from the research:

Online communication supports a sense of belongingness and allows for self-disclosure.

Within the sample, girls were more likely than boys to self-disclose with peers online, which is consistent with gendered findings from offline communication studies. Internet safety, privacy, and security remain persistently hot topics in the media, particularly in teen-targeted magazines. Further research is needed to determine whether adolescents’ online engagement strategies have shifted toward less disclosure over time.

In a prior qualitative study, Davis (2010) interviewed 20 girls ages 17 to 21. These girls shared how they expressed themselves through their blogs, and said they benefited from the social interactions facilitated through this communication tool. Reading and responding to the posts of others

was a frequent blogging activity, and Davis argues that responding behaviours may enhance intimacy through disclosure among girls in the online space. Girls reported gaining insights from their peers, but also described how blogging experiences gave them insight into their own personal identities. These bloggers explained that initial anxieties led them to rely on their peers for much of their blogging content. Though peer relationships remained the primary motivation for blogging, girls in the study consistently reported that their anxieties decreased over time.

Jessalyn Keller (2012) also explored girls’ use of online blogs, looking specifically at how girls blog to engage with feminist political activism. She examined the content of two popular blogging communities and interviewed four adolescent girl bloggers from these communities. Keller suggests that “girls’ participation in blogging communities ... exemplifies participatory culture as space that may offer girls more political agency as cultural producers than other more traditional spaces for political activity, such as youth caucuses or other formal organisations, which are often directed and ran by adults.”

**As such, these online blogging communities allow adolescent girls opportunities to engage with content and even produce online content in ways that might be contrary to offline social norms.**

Even if girls are not self-identifying as feminists through their writing, they are “holding a lens to a social and cultural phenomenon, producing critiques that highlight gender inequalities in different ways.” Keller points out that many girls may not have the luxury of allocating leisure time to blogging.

Social psychologist Sonia Livingstone (2008) explains a developmental trade-off when adolescents engage with the online world; the internet affords opportunities for social engagement, identity development, and intimacy, but also may increase misunderstandings and risks related to privacy. With a sample of 16 teenagers, Livingstone found that the affordances of specific social network sites might impact the teenagers’

opportunities-risk balance. For instance, “teenagers were found to work with subtle classification of “friends,” graded in terms of intimacy, which is poorly matched by the notion of “public” and “private” designed into social networking sites.” Livingstone concludes that, “deciding what not to say about oneself online is, for many teenagers, an agentic act to protect their identity and their spaces of intimacy.”

Communication researchers Patti Valkenburg, Alexander Shouten, and Jochen Peter (2005) investigated identity development and self-presentation strategies used by 600 individuals ages 9 to 18 years old from the Netherlands. Half reported engaging in some form of identity experimentation online, citing self-exploration via the reactions of others as their strongest motivation. Other motivations included overcoming offline difficulties, social facilitation (i.e., opportunities to develop relationships with others), and social compensation. Regarding social compensation, an individual who struggles with social relationships in offline environments may choose to use the online environment to compensate for offline deficits.

**Age significantly predicted the type and extent of online identity experimentation. Compared with their older peers, younger adolescents were more likely to experiment online and more likely to experiment for social facilitation.**

Gender differences between boys and girls were also identified; girls were more likely to “explore their selves and investigate how they appear to be in the eyes of others.” This study did not address exploration of gender non-conformity, nor could it account for emerging identities not considered socially acceptable in that society.

Recognizing that identity is, by its very nature, social, Shanyang Zhao, Sherri Grasmuck, and Jason Martin (2008) explored identity and self-presentation through a Facebook content analysis of 63 college student Facebook users. Students in the sample more often displayed highly socially desirable characteristics versus characteristics that reflect how they actually behave with their

peers face-to-face. Many of these students were relatively honest about their identities on Facebook, but individuals were also able to, and did, exaggerate specific characteristics to appear more socially desirable, such as popularity among one’s peers. The authors conclude that their findings illustrate how individuals may choose to present or relate to certain identities based on their social environment.

Religiosity is one such type of social identity, as identification with a religious practice provides both a perspective of the world and distinct group membership. Embedded within a specific belief system, an individual’s religious identity can provide “a sense of unwavering stability and solid ground, more so than would be gained from other social identities,” according to social identity and health sciences researchers Renate Ysseldyk, Kimberly Matheson, and Hymie Anisman (2010). These authors highlight how religion forms a cohesive collective identity among a group of individuals and how conflict can spark between members of different religious groups or between individuals with conflicting ideologies. These authors conclude that viewing religiosity from a social identity perspective allows researchers to identify ways in which religion-based group membership might support or conflict with other identity constructions.



## Conclusions

The literature included in this chapter provides specific guidance on issues that digital tool developers can use to tailor online experience to reflect the desires and needs of adolescent girls. For instance, as new users begin to engage with the platform and continue to use the platform, they are likely to encounter peer groups online. In recognition of adolescents' desires for intimacy and self-disclosure, developers might consider ways that platforms can safely and effectively facilitate online disclosure and peer interactions.

As adolescent girls seek out opportunities to navigate and negotiate multiple identities, digital tools could also provide ample spaces for safe identity exploration and resources on different identities (eg, employment and workplace identity). Furthermore, as girls transition from adolescence into emerging/early adulthood, developers might consider opportunities for girls who are experienced with digital platforms to assume leadership roles in creating and curating content for other users.



# 5

## Opportunities to innovate

With any online tool or platform, innovative content and format keeps the tool or platform relevant and engaging for the target population. This chapter focuses on best practices from the literature that might guide how digital tools are designed.

**?** Articles in this chapter explore the following questions:

- What are the opportunities to innovate on best practices, given a target audience of adolescent girls?
- To what extent can online format influence behaviour change?
- What combination of content and formats best influence behaviour change?

Researchers Wen-Ying Sylvia Chou, Abby Prestin, Claire Lyons, and Kuang-Yi Wen (2013) located 514 peer-reviewed publications from large online databases to study health interventions that used digital tools. The majority were reviews, commentaries, or descriptive studies; only 34 were direct intervention studies.

Many of the reviewed interventions did not capitalize on the participatory nature of online environments by, for example, allowing or encouraging user-generated content and information sharing. Chou et al explain how comments on user-generated content can serve as valuable indicators of information reception and understanding, and recommend that emerging health-related behaviour change interventions consider and track how user-generated material might influence intervention efficacy. With respect to user trust, many of the reviewed studies drew attention to the inconsistent and inaccurate health information being communicated via popular social media channels such as Twitter. Chou et al state that, as users recognise inaccuracies, they are likely to express more concern about the source of health information.

Trust in the information source thus needs to be explored when evaluating intervention efficacy, and steps should be taken to provide evidence of information accuracy and platform credibility. Chou et al conclude by highlighting the lack of studies on digital health interventions for underserved populations, and the need for research that explores whether digital interventions are bridging the digital divide by increasing information accessibility and decreasing barriers to information.

## Why girls should create online content

Literacy scholars Barbara Guzzetti and Margaret Gamboa (2004) used qualitative analysis to illustrate how online magazines have the potential to promote social justice and refute stereotypical notions of gender, and to confirm that high school girls author online articles to explore their emerging identities and to support the identity development of other girls. The authors note that the development of an affinity group helped support the girls in this sample in their writing and self-expression.

Though this research focused on classroom-based writing, the findings contain implications for non-formal writing environments.

**For instance, authorship of online content may allow adolescent girls to not only create and negotiate identities, but also to advocate for their interests and express themselves in ways that conflict with offline social norms. As a girl engages in online writing as a form of personal agency, she is also adopting an identity that supports her developing self-efficacy. This agentic process has the potential to increase girls' self-awareness and build their confidence to support changes in attitude and, potentially, behaviour over time.**

Though the online ecology has certainly changed since this study was published, the principles remain robust, and writing as a strategy for empowerment has become more broadly accessible with new online technologies and social sharing possibilities.

As girls' attitudes are linked with social norms surrounding the expression of one's voice, changes in online social norms (eg, personal expression) might also shift changes in offline norms, illustrated through girls' offline behaviours. These opportunities to engage in agentic behaviours online might also be reinforced by website administrators who encourage girls to continue their contributions, building online voices that might transfer into the offline space.

Health communication researchers Leslie Hinyard

and Matthew Kreuter (2007) make a case for the use of narrative approaches for sustained behavioural change, suggesting that narratives might be particularly useful for issues related to morality, religion, personal values, personal meaning, and social relationships, as these are issues around which reason and logic may have limited influence. Hinyard and Kreuter cite dual-process models of persuasion, the Transportation-Imagery Model, Social Cognitive Theory (discussed in Chapter 1), the Precaution Adoption Process Model, and the Theory of Reasoned Action as theoretical support for the use of narrative communication in behavioural change research. These authors argue that narratives can be effectively leveraged as persuasive tools of engagement for sustained health-related behaviour change because narrative structure is personal, realistic, and memorable. Narrative is a cohesive and coherent story with an identifiable beginning, middle, and end that provides information about scene, characters, and conflict; raises unanswered questions or unresolved conflict; and provides resolution.

As girls grapple with stories that they've read and stories that they personally narrate online, they are experiencing situations and characters that conflict with each other and with the girls' offline experiences or behaviours. Based on a purely constructivist approach towards learning, these conflicting narratives might result in girls learning more about the content of the articles, in addition to themselves as developing adolescents. The combination of knowledge gained from reading narrative accounts from and about their peers and the conflict that emerges from online-offline discrepancies could also impact offline behaviours as the girls work to resolve these inconsistencies.

## Best practices related to digital content & format

The packaging of the information available in online tools can dramatically impact whether and how the information is consumed by girl users and, consequently, whether the consumption of such information will impact a shift in attitudes, knowledge, and/or behaviours for the girls. The following section highlights some of the best practices related to information sharing, drawing on a pop culture artifact, BuzzFeed.

The website BuzzFeed has effectively promoted information gathering and information sharing by packaging information in concise and aesthetically appealing formats. Librarian and researcher Christina Manzo (2015) has identified specific best practices of BuzzFeed;

1. **Attracting attention**– BuzzFeed articles have eight-word headlines, which is the suggested number of words for the highest click-rate. They also use the “Bite-Snack-Meal” model; the bite is the headline, the snack is the thumbnail image and short description of the article, and the meal is the full article.
2. **Personalising content**– BuzzFeed generates user-personas that personalise users’ content experiences. These personas are based on click-data research suggesting that individuals with given characteristics may choose to read certain articles over others.
3. **Ownership over content organisation**– BuzzFeed users can categorise and organise their articles in ways meaningful to them, and users are prompted to vote on future content.
4. **Featuring timely content**– The format of the BuzzFeed page encourages users to focus on trending topics by listing them first, above other issues. This format allows BuzzFeed to provide users with timely, consistently updated information.
5. **Easily shareable content**– Users can easily share BuzzFeed content with other online users through various social network sites (eg, Facebook, Twitter). Information is pre-packaged to allow for this easy sharing, which promotes the BuzzFeed brand to a wider audience.

Buzzfeed’s format seems ideally suited for information sharing via stories or narrative accounts of information; users can organise (for personal use) and provide feedback on articles. BuzzFeed also presents opportunities for the personalisation of informational content via user personas.



## Conclusions

The articles reviewed in this chapter highlight a strong case for narrative approaches and related innovative practices that digital tool developers might use to improve usability by adolescent girls and associated behaviour outcomes. Based on best practices in the literature, digital platforms might benefit from tailoring recommendations for articles and other activities toward users' profile characteristics and the ways in which the user has navigated the site. For instance, if a girl is particularly interested in information about how menstrual periods are linked with pregnancy, site designers could suggest articles that include either menstrual periods or pregnancy-related content. This is one of many strategies that can be used to support girls' development and behaviour change.



# Afterword

One of the grand challenges of our time is understanding how digital technologies are implicated in the evolution of values and beliefs around the world. Researchers have long studied the basics of how mental processes are influenced, and the consequential actions people take. But digital media and social connectivity has changed how people perceive their relationships with information and one another. Research on this phenomenon is still emerging.

New Knowledge Organization Ltd. is dedicated to helping social change agents like Girl Effect effectively use theory and research to create a world where all people have opportunities to thrive. From *Browsing to Behaviour Change* offered our interdisciplinary research team an opportunity to apply a range of theories on behaviour change and digital technologies to a pragmatic challenge. The resulting paper represents research from the perspective of a wide range of disciplines, including psychology, public health, sociology, philosophy, communications, anthropology, feminism, and more. It also explores the opportunities and limitations in everything from practitioners' work to theory. We believe that this interdisciplinary approach is the only way to confront the grand challenges of our time.

We hope all readers can use this work as a point of departure. The shifting sands of digital technologies and social connectivity will require a great deal more study to understand which techniques are enabling or inhibiting human thriving. We hope that readers and their organisations can use this information to mount large-scale change by empowering marginalised populations throughout the world. We anticipate they will use the information they gain from their experiments to lay the next stepping stone on a path to a society where all people can live to their greatest potential.

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**New Knowledge Organization Ltd.**

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