

Review

Social Cognitive Theories and Electronic Health Design: Scoping Review

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Abstract

Background: There are several social cognitive theories (SCTs) and models that support platform design in electronic health (eHealth) promotion trials. The rationale for this scoping review was to determine how social design features (informational aid, expressive support, gaming, and tailored content) are used to promote self-efficacy, engagement, knowledge, and behavior change.

Objective: This study aimed to review a broad spectrum of digital health interventions in the literature seeking trials that use SCTs for the design of eHealth applications.

Methods: The author conducted a systematic scoping review of 161 Web-based health interventions from published randomized clinical trials using 1 or more tools to address the social cognitive determinants in their website design from January 2006 to April 2016. An iterative approach was used in the selection of studies and data extraction. The studies were analyzed for quality and coded for type of social design features employed.

Results: Expressive interaction tools were found in 48.6% (54/111) of studies categorized as a strong recommendation by the Joanna Briggs Institute criteria. Overall, less than half of the studies addressed participant social support and motivational needs (43.8%). The vast majority of studies (100%) relied on the use of the Web for delivery of informational aid and tailored content for the individual participant (75.9%).

Conclusions: This review fills a research gap by linking social theory to Web strategy to improve the impact and sustainability of eHealth interventions. A Digital Health Intervention Model was developed to provide a framework to enhance future Web-based health intervention design and execution.

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KEYWORDS

social theory; design; health promotion; behavioral economics; social support; social media; serious games

Introduction

Background

The aim of this scoping review was to review published clinical trials for evidence of social cognitive theory (SCT)-driven design of electronic health (eHealth) interventions. A secondary objective was to review the construct of social support as it applies to Web-based social interactions and recommend the inclusion of tools that increase media social presence to explore its value in the design and measurement of health behavior outcomes [1]. Finally, this paper offers an integrative theoretical

perspective and framework for health researchers and designers to engage users to remain digitally connected for better health outcomes.

Social Theories and Electronic Health Design

Early in the internet era, Bandura envisioned that SCT would function as part of a self-regulatory delivery system for computer-assisted health interventions [2]. Bandura's work demonstrated that learning takes place within a social context. A 2015 systematic review and meta-analysis of SCT-based interventions for patients with cancer for diet and physical activity (PA) found only 18 articles that met the inclusion

criteria of reporting 1 or more SCT constructs in the design [3]. The scarcity of theory-based design studies leaves a wide gap in our understanding of the Web-based experience factors contributing to health behavior change and maintenance [4]. Authors of a recent systematic review developed a taxonomy of 36 social media features and described their use in 134 studies, reporting that the majority reported positive effects including engagement, satisfaction, usefulness, social support, and behavior change (70%) [5]. However, the remainder of the papers reported no behavioral change (28%) or negative outcomes (2%). These findings suggest that social influence tools in digital behavior change interventions may produce unintended effects.

SCT is an integrated model of *emergent interactive agency* where personal factors and environmental events function as interacting dependent variables and operate as reciprocal factors predicting behavior. This theoretical framework has greater saliency today, as more consumers digitally track their health behaviors and are connected to external interactive guidance and social support [6]. In SCT, the constructs of self-observation, judgmental process, and self-reaction comprise a system of self-regulation of motivation and behavioral action. However, too often in the studies of Web-supported interventions reviewed for this paper, social interactions took second place to techniques that offered information, monitoring, and self-management tools [7].

SCTs, such as the health belief model, theory of reasoned action, and theory of planned behavior recognize the role of social support as an important determinant of health behavior. But it is essential that health researchers define the type of social support sought and received by the user to guide their study design and predict how social presence will perform within the digital medium before study implementation. The dimensions of Web-based social support have been classified as instrumental, socioemotional, and informational [8]. The digital environment gives ready access to asynchronous, simultaneous, and bidirectional social support.

A survey of 240 health-related websites rated the quality of social media tools and use of evidence-based theory for Web design [9]. Quality was determined by the presence of behavioral components, interactivity, and user-generated content in the design. Nearly half of the sites offered feedback, which consisted primarily of simple guidelines rather than tailored advice. The primary applications for content sharing were status updates, discussion forums, sharing success stories, sharing photos blogs, and comments. Overall, reviewers gave low marks to the sites as they lacked tools that promote theory-based behavior change.

Social Presence and Personalization Impact Behavior Change

Social presence, the perception of *nonmediation*, conveys the sensation of intimacy and immediacy in digital communication

[10]. Studies comparing real-world face-to-face with digital discussions in health interventions have found that they promote adherence and behavior change [11,12]. As observed in studies of interactions of teens on Web-based social network, teens engage more fully when they cocreate content and develop Web-based self-identities through emojis, video, and other audiovisual materials [13] contributing to the feeling of being copresent with peers within a virtual environment [14]. Adult focus groups of users of a Web-based social network for health behavior change suggested to researchers that the addition of personalization options such as pictures, recipes, and status updates for social interaction and comparison are desirable options [15]. The quality of social presence is unique to each media channel; therefore, choice of medium has a direct effect on the depth of information processing and user motivation to take greater effort to process a message. Iterative health information sharing by social media users has resulted in many benefits including enhanced self-efficacy and healthy lifestyle adoption in multiple studies [16].

When faced with uncertainty, humans have higher information needs and will seek out trusted sources of information. Lee and Kvasny (2013) proposed that information richness and social presence of the Web experience satisfy the needs of an individual to obtain instrumental and expressive support [8]. **Figure 1** displays a theoretical framework of how social media use and Web-based social support address these needs. This model illustrates that uncertainty is a consequence of a person's self-appraisal of efficacy. The reduction of an uncomfortable state of uncertainty motivates the health consumer to seek out experts or Web-based peers.

As communities of caring have proliferated on the Web, so has the ability to access meaningful solutions for health problems. Social connections can be established based on similarities and differences important to the Web user and can be established through member profiles or disease-focused forums. An overview of the social media, social presence, and information richness characteristics of different websites is shown in **Table 1** [8,17-19].

Scoping Review of Social Cognitive Theories in Electronic Health Design

This scoping review will summarize various SCTs and digital methods used within a wide spectrum of digital health interventions. During the planning of this paper, it was clear that early eHealth trials too often neglect to report a theoretical basis for their research design. Thus, the initial keyword search criteria yielded only 4 usable trials. With the 2010 publication of Consolidated Standards of Reporting Trials of Electronic and Mobile Health Applications and onLine TeleHealth (CONSORT-EHEALTH) guidelines, authors began specifying the mode of delivery and type of trial in the title of the paper, along with study details that would facilitate search retrieval [20].

Figure 1. Social media and social support.

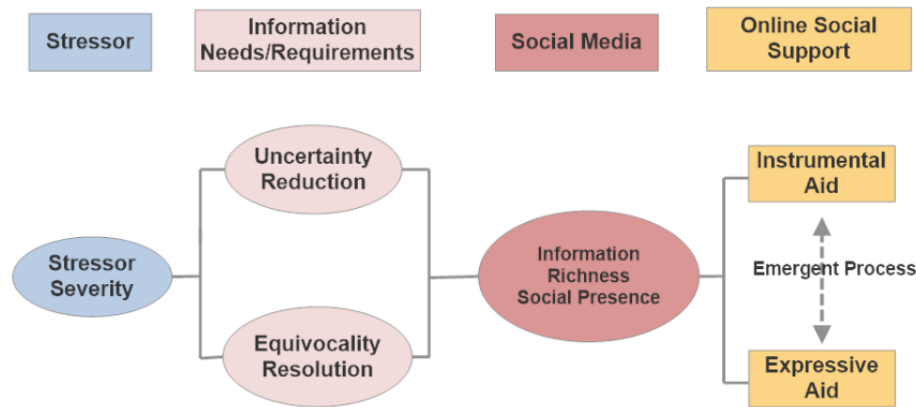


Table 1. Social media characteristics.

Social media form	Information richness	Social presence	Social Support Scale 1-6
Blogger or WordPress editable pages or wikis such as			
Wikipedia	Essays and short reports via blogs	Blogs; narrative or storytelling	1-2
Google Docs			
Audio sharing through Clyp or SoundCloud	Music and voice	Collective experience and content community	4
Videos and collaborative spaces distributed through services			
Pinterest	Music, voice, video, collaboration, and reviews	Collective experience and content community	4
YouTube			
Vimeo			
Viddy			
Combined, multipurpose platforms that offer multiple media options			
Facebook	Essays, short reports, and links to articles	Social network; pictures; videos; messaging; leaders and followers	5
Ning			
LinkedIn			
Skype			
Short-form text messaging and photo sharing			
Twitter	Texting; music, movies, books, maps, voice, high quality photos, and videos	Social network; pictures; immediacy; reach; leaders and followers	5
Instagram			
Snapchat			
Gtalk			
Mobile health (mHealth) apps			
eHealth record	Practice of public health and medicine through mobile devices	Collective experience; content community; information; motivation; support; remote monitoring; diagnostics and decision support	6
Social health			
Web-based health communities			
Fitness apps			
Personally controlled health management systems (PCHMS)			
Gamification (serious health gaming)			
Multiuser Dungeons (MUD)	Virtual social worlds with identities and collaborative content; challenge; competition; avatars	Collective experience; content community; shared emotional states; social network; social influence	6
Re-Mission2			
DietBet			

Methods

Overview

Keywords were chosen to locate papers with the characteristics and tools of Web-enabled health intervention within a randomized controlled trial (RCT) or cohort study based on social cognitive or learning theories that informed study design. The researcher used a coding scheme based on the work of Lee and Kvasny with the addition of serious gaming to summarize the results so that research gaps and opportunities could be identified [8]. Using the guidelines of the Joanna Briggs Institute (JBI) manual for the levels of evidence and grades of recommendations and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), papers meeting the criteria for inclusion were graded and summarized [5,21].

Search Strategy

The University of Connecticut Library databases (PsychInfo, Cumulative Index to Nursing and Allied Health Literature [CINAHL], EBSCO), ProQuest, and PubMed were thoroughly searched using the search terms internet, Web, health, intervention, social presence, expressive aid, instrumental aid, information richness, and design for the years 2006 to 2016.

Intervention Criteria

Any health promotion or guidance designed to influence health behavior was based on SCT [6] or explicitly described and referenced any SCT component (such as *self-efficacy*):

- Comparator: any parallel control group.
- Study design: RCTs or cohort.

A total of 399 studies were identified by key word search alone. Using CrossRef citations for the CONSORT-EHEALTH guidelines, 146 additional studies were identified as of April 2016. A total of 161 studies met the RCTs risk of bias and study quality [22,23]. [Multimedia Appendix 1](#) outlines the PRISMA flowchart of the study selection process.

The trials retrieved were coded by theoretical framework, presence of informational and expressive support in the study design, and use of tailored content. Identification and coding of the theoretical framework was hindered by the need to cross-reference previously published papers identified by the authors as the basis for their protocol or multiple papers from the same study data. If the study design was consistent with the outcomes of that framework, it was retained. The most common model for tailoring the Web intervention was social-cognitive learning theory (N=106). Several studies identified therapeutic frameworks adapted for the Web, such as internet cognitive behavioral therapy (iCBT) [24]. The use of the iChange model for health behavior which used wearable measurement tools is a growing trend to facilitate lifestyle change by giving feedback to the participant [25-27]. Gamification, the use of games used seriously (GUS), and fun theory were successfully used to foster participation in 4 studies, and a recent meta-analysis of trials using games for health behavior change reported significant positive outcomes in 9 out of the 10 studies meeting their criteria [28-31]. The use of fun theory was uniquely used in serious

video gaming and physical therapy where adherence to the daily practice of mundane tasks is fostered by a challenge and excitement [32,33].

A qualitative analysis of this literature was undertaken because of the diversity in methodologies. The highest quality evidence followed the CONSORT-EHEALTH or TREND guidelines, although a few quality trials predated the guidelines, and recent meta-analyses were included in the discussion [20,34,35].

Results

Overview

The literature search retrieved 447 results from PubMed (n=296), University of Connecticut Library databases (PsychInfo, EBSCO, and CINAHL; n=72), and ProQuest (n=79). After removal of duplicates (n=48), 399 titles and abstracts were screened, 215 full-text articles were reviewed, 4 were excluded as additional qualitative papers from a mixed-methods design trial, and 161 articles met the selection criteria ([Multimedia Appendix 1](#)). Upon further inspection, there were 9 papers that were overlapping manuscripts from the same dataset which brought the final total to 152 studies. Studies were coded by the author for theoretical framework, tools (informational aid, expressive aid, and gaming), and content that was tailored to each user ([Multimedia Appendix 2](#) [27,36-196]). From this process, the author evaluated different theoretical frameworks and the use of Web intervention tools and environments to promote desired health outcomes. The JBI levels of evidence and grades of recommendations were used to evaluate the studies [187].

Risk Preference and Goal Setting

Setting personal health goals and evaluating one's ability to attain them is an essential part of chronic disease management. It has been observed in behavioral economics that loss aversion is a powerful motivator, and this trait is important in setting personal goals. It has been observed that obese individuals are more likely to be risk-seeking, rather than risk-averse, when making decisions that offer uncertain options, which is a tendency related to impulsivity. In Prospect Theory, this is known as risk preference [188,189]. One study observed participant risk taking behavior by allowing participants to bet on the outcome of a weight loss challenge on a commercial website, DietBet [190]. The researchers theorized that offering frequent and small incentives on a social gaming site would influence players to lose weight. Members placed a bet and joined a social game where they wagered that they could achieve the goal of losing 4% of their total body weight and reported their progress to other participants. The financial and social influencers were effective in supporting weight loss as measured by self-reported weight, bets placed, frequency of social interactions, and weigh-in reports on Facebook. A month-long study of the effect of financial incentives within a social GUS environment reported that incentives coupled with social influence promoted greater weight loss [190]. In this way, social gaming facilitates the development of intrinsic motivation through the gratification of entertainment, challenge, and competition from game playing and *harnessing the power of others* [191,192]. There have been conflicting reports of the

effectiveness of extrinsic incentives and/or penalties to promote health behaviors, depending on the target user region, gender, race, and income [193,194].

Goal setting is an important factor in achieving self-regulatory health behavior. Bandura and associates assigned obese subjects to goal conditions in which they either tracked eating behavior or set subgoals for reducing portions [195]. Within the goal-setting conditions, subjects adopted either weekly or proximal goals for each of 4 time periods during each day. The results demonstrated that setting a higher standard for goals and the adoption of proximal goals resulted in greater weight loss. As demonstrated in the Pagoto et al (2014) study, predetermined proximal goals in combination with Web-based social support improve adherence, support for others, and self-regulation. Research suggests that breaking down goals into subgoals may influence subsequent goal pursuit by reducing goal pursuit because competing subgoals may be perceived as complementary and become substitutes for one another [196].

A Web-based randomized controlled weight loss intervention combined PA and nutrition interventions over a 12-month period [197]. Strategies were guided by SCT theory and included goal setting, self-monitoring, and social support. Participants in the experimental group achieved positive health behavior change (mean z score=+1.34 [$P<.001$] SD units). An interactive Web-based program was developed to set goals relative to the participant's initial stage of change, revise goals frequently, track behaviors, and deliver graphical feedback. This study demonstrated that interventions can successfully target multiple behaviors simultaneously.

User-Centered Design

Design objectives for building a community of support for health and wellness should include Web-enabled interaction between the environment and individual choices, which comprise essential components of Bandura's model of social determinism [198]. Bandura maintained that not only does the environment impact behavior, but human behavior influences the environment. Therefore, health sites should offer tools that support the affective, cohesive, interactive, and social presence needs of the site visitor to increase program engagement [199,200]. An example of a Web-enabled clinical trial, the Enabling Mothers to Prevent Pediatric Obesity Through Web-Based Education and Reciprocal Determinism (EMPOWER) study, focused on encouraging mothers to make changes in the home environment, develop coping skills, form positive expectations, and build self-efficacy [185,201]. The EMPOWER program was delivered in short audiovisual educational presentations, goal planning exercises, tracking worksheets, and a discussion board. Process evaluation data were collected after each session using telephone counseling and Web-based surveys. As predicted by SCT, the intervention resulted in significant increases in child PA, fruit and vegetable consumption, and sugar-free beverage consumption compared with an informational approach. Another study tested the effects of social presence cues (2 staring eyes) on the activation of health-related goals within an ecommerce site [202]. The analysis yielded significant main effects for social presence ($F_{1,218}=5.89$; $P=.016$; $d=0.32$) and health goal activation

($F_{1,218}=4.11$; $P=.04$; $d=0.27$) on the selection of healthier menu choices compared with the control condition. The combined effects of social presence cues and health-related goal activation produced greater effects on food choices when activated at the same time. Social presence was also associated with the participant perception of success in self-regulatory behavior.

User-centered website design has been successfully used in a chronic disease intervention for patients with type 2 diabetes [203]. In this study, focus group members requested features that included personalized information about their health status, quantified self-tracking tools to monitor progress, and online forums to share their personal experiences. *Personally controlled health management systems* (PCHMSs) have been adopted in many health care organizations to give patients better ways to manage their health. Future studies should identify the best PCHMS tools and evaluate their effectiveness for disease management and prevention. A study on the use of the social and self-reflective features of a PCHMS was designed to support physical and emotional well-being, and frequent use of PCHMS was associated with help-seeking behaviors and increased health care utilization [204]. Although PCHMS tools are common in health care, only 1 trial was located in this search.

In the Self-Help, Exercise and Diet using Information Technology (SHED-IT) study, tailored health communications were specifically designed to address the desired health behavior of adult males and various predictor variables [205,206]. Adherence to the goal setting (beta=-0.3 95% CI -0.6 to -0.1; $P=.01$) and volume of SCT tracking tasks completed (beta=-0.2 95% CI -0.4 to -0.0; $P=.03$) independently predicted weight loss [207]. Message strategies best matched to individual health-related goals increased the impact of functional support. In a meta-analysis of 88 papers on computer health interventions, the use of dynamically tailored interventions gained efficacy over time [208].

Online Health Communities and Social Networking

A small feasibility trial used a social networking site (Facebook) to promote PA among low active teens who reported medium-to-large changes in PA as measured by accelerometry and self-report [209]. An RCT of college students evaluated the efficacy of a Web-based PA intervention that combined information, self-monitoring, and Web-based social networking strategies in comparison with an instruction-only control [210]. Participants were invited to the Internet Support for Healthy Associations Promoting Exercise (INSHAPE) study website to complete Web-based surveys on their perceived social support for PA (informational, esteem, and companionship subscales), and the Facebook Intensity Scale, a measure of engagement with social networking. The researcher observed and recorded Facebook interactions during the intervention, including comments, discussion forum posts, and affective responses to the comments of others (*like button*). The participation rates in this study were higher than in other published studies. The main effects from the analysis were PA time, esteem, and companionship social support. The authors concluded that real and virtual social connections should be used for group assignment and to match people by profile to encourage PA in future studies.

A mixed-methods study of SparkPeople®, a large online weight loss community, was undertaken to determine how social media frequency predicted perception of Web-based social support for weight loss [211]. The first phase of the study surveyed members for their experience with social support within the community using qualitative analysis of responses to open-ended questions (n=193). Survey respondents were frequent users of email, blogs, and forum discussions. The uses and gratifications for Web-based social support that emerged were informational, emotional, instrumental, appraisal, and network support [212]. The quantitative analysis examined the factor structure for social support from the 7 social media use items (n=187). Principal components analysis of social support items proved to be a 1-dimensional *social media* variable. Social media was a significant predictor of encouragement support (odds ratio [OR] 4.8, 95% CI 1.8 to 12.8; $P < .001$), but not for information or shared experiences support. The authors concluded that members sought encouragement and motivational support for other members, and finding these gratifications was a key determinant to behavioral modification persistence.

The subthemes identified in the study by Hwang et al (2010) included accountability, friendly competition, and humor for a weight loss community [212]. These themes were important motivators in a social media campaign that challenged friends and family to do 1-min core strengthening exercises each day and broadcast individual progress on Twitter (*#PlankADay*) and other social media platforms [213]. Starting out as a friendly challenge between associates, the researchers soon recognized that the message had a spreading network effect. Seizing on this opportunity for research, an Institutional Review Board review was requested and approval was given to begin data collection. The observations of this study are consistent with a framing effect hypothesis of positive messages under a low efficacy condition [214]. The *#PlankADay* message attracted the attention of people who desired core strength but did not take the time to work at gaining core strength. Positive messages lead to more effortful processing of the message. As the challenge was framed in a positive way and tweets contained humor, it is weighed more heavily than a negative message.

Web-Based Lifestyle Coaching Supports Self-Efficacy

The 4 major sources of self-efficacy beliefs can be transferred to a Web-enabled system: enactive mastery experiences, modeling, social persuasion, and psychological states [215]. A qualitative study of veterans in the Veterans Administration (VA) health system who were cancer survivors revealed many barriers as well as facilitators to their weight management goals [216]. The focus group identified wellness facilitators to boost self-efficacy such as information about their disease, being held accountable for their behaviors, motivational support from others, workout partners, and the ability to visualize healthy changes. Web-based tools enabled the veterans to believe that they can achieve their health goals. The VA health care system pioneered the use of telemedicine and in 1 study compared the efficacy of home TeleHealth monitoring for diabetes management with usual care plus monthly phone calls [217]. Although both groups showed improvement in blood glucose levels, the TeleHealth program results were superior. The TeleHealth program had the advantage of accountability and

feedback for behaviors, whereas the monthly phone call with the nurse practitioner provides social presence and feedback. The addition of Web-enabled tools provides the social support that is often lacking in the lives of aging veterans.

Motivational interviewing (MI) is a client-centered counseling approach for eliciting behavior change. A collaborative partnership is developed between coach and client, allowing the participant to discuss goals from the previous week, and problem-solving tools to make goal revisions needed. In a review of Web-based interventions for type 2 diabetes, positive outcomes were associated with using barrier identification, problem solving, and self-monitoring techniques [218]. A randomized, controlled Web-based intervention for depression and stress offered problem solving therapy via email [219]. The goal was to reduce stress and anxiety by providing feedback on exercises that taught problem solving in a structured way. Recently, the use of avatars to deliver health coaching over a Web app was tested, but findings suggest that participants do not readily develop social relationships with avatars and this tool contributed little to the effects of the intervention [220,221].

Enactive learning occurs with a participant observing their own progress through self-monitoring tools, which has been shown to fortify the participant's self-efficacy beliefs [222]. Bandura suggested that the self-regulation of behavior must be measured against the difficulty of individual obstacles [6]. Over time, the use of Web-enabled tools to monitor diet intake, PA, and other health metrics will provide a rich database to study the effect of past experience, goal setting, and health outcomes. Data from a Web-enabled weight loss intervention for African Americans suggest that early and frequent use of Web-based self-monitoring tools predicts greater weight loss [223]. Web monitoring facilitates positive self-talk by providing evidence of success.

Social Network Adoption and Participation

The recruitment and retention of network members to support health behavior adoption is another area of research. Social networking is a Web-enabled process that draws people and organizations together. Peers with *experiential similarity* offer support [224]. In an RCT, researchers sought to study the reciprocal learning process (social proof, verbal persuasion, self-monitoring, and frequent feedback) between peers in a Web-based social media intervention [225]. The researchers issued a daily wellness challenge by text or email to 1503 participants, using a small steps approach to both the experimental and control groups. Participants in the intervention group who had access to the well-being challenges were encouraged to recruit others from their social network to join. The measures included the Individual-level Well-Being Assessment and Scoring Method (IWBS), the Interpersonal Support Evaluation List, and intensity of site use [226,227]. After 30 days, the IWBS was significantly greater in the social intervention group than nonsocial participants ($\mu = 9.4$ intervention vs 7.0 control group; $P < .02$). Intensity of use was a positive predictor of well-being.

Implementation of a Theory-Based Framework for Digital Health Intervention

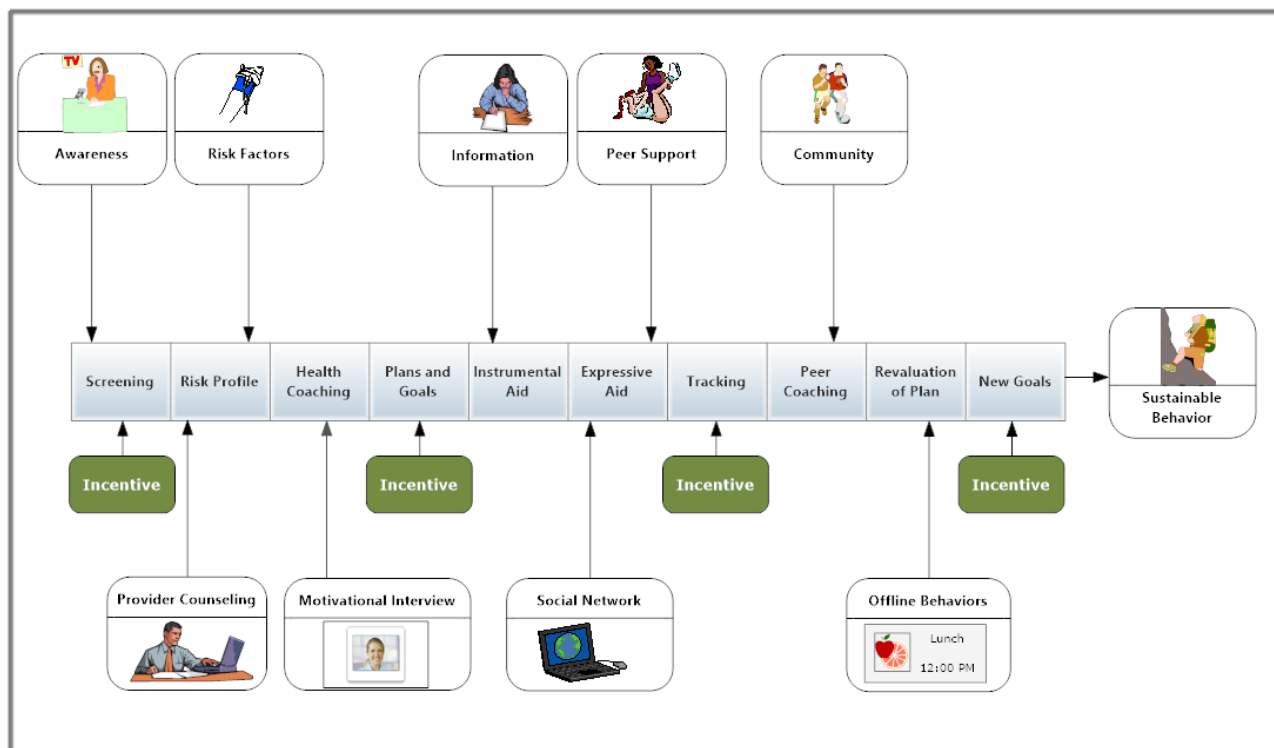
The Digital Health Intervention model (DHIM), shown in Figure 2, integrates theoretical frameworks discussed in this paper and proposes a model of Web-based health promotion based on social cognitive, health behavior, and prospect theories. The DHIM could be applied in various health promotion settings from a worksite wellness to patient-centered medical homes. Researchers could use the results of a health screening questionnaire to populate a risk profile to generate a visual dashboard or navigator. Each contact with the site should have a social presence that recognizes the user as a unique individual and interactions should give the impression that the system is built to help them specifically. As people are slow to adopt new technology when ease of use and perceived utility do not meet user expectations, the technology should be tested for user-friendliness [228]. A confusing interface reduces effectiveness for disease management interventions [229].

Coaching can be delivered virtually through delivery of tailored messages, or through phone and chat synchronous communication with call center personnel. An interactive page with games and peer-to-peer connectivity gives the participant support for making behavioral change and opportunities to practice. Plans and goals become part of the dashboard profile

available for the member and coach to review. For integrated personal health record systems and patient portals, email access for provider communication is important [230]. The user can seek instrumental aid for informational needs in the form of a video and library database. The development of an intentionally designed social network to support the health goals of the user supplies both instrumental and expressive aid through facilitating self-disclosure and emotional support exchanges between peers [231]. But for stigmatized health issues, such as HIV, informational needs and expressive support may best be met in anonymity rather than within a social networking environment [232]. The Web can enable those with mental health to come out of the shadows and seek treatment as demonstrated by the Web-based program, *Considering Professional Help*, designed to encourage veterans to seek mental health care [233].

Many health-related networks are imbedded with tools that allow the user to upload data from glucose meters, diet trackers, and exercise monitors. These health networks have been shown to positively impact the adoption of health behaviors [19,186]. Behavioral self-monitoring by recording, reporting, and revising action plans are significant predictors of goal attainment, but only when the participant believes that the health goal has motivational value [234]. Therefore, the reward value of the goal is an important factor in motivating behavior change [235].

Figure 2. Digital Health Intervention Model. A comprehensive health intervention program integrating social cognitive principles in a web-enabled pathway.



Discussion

Principal Findings

All of the studies reviewed used multimedia informational aids in their health management strategy. Expressive aid was found in 48.6% (54/111) of studies categorized as a strong recommendation. The use of targeted expressive aids was seen

in 37.5% (15/40) of the lower quality trials. Only 4 studies included all study categories of tools (informational, expressive, gaming, and tailored content). Serious gaming interventions study design were all quality rated as Level 1 A. Higher quality interventions were more likely to employ 3 or more categories of behavior change techniques within their study designs. Owing to the diversity of health behaviors and treatment protocols

analyzed in this review, it is not possible to follow-up with a systematic review of common design elements and their effectiveness at this time.

In the studies reviewed, the relative frequency of Web activities to deliver health intervention universally included informational aids within their design, but 1/4 of them did not tailor or personalize content. Almost half of the interventions did not offer tools to obtain expressive aid, and only 5 of the trials employed serious gaming. This pattern suggests that many health researchers believe that eHealth is primarily an evidence-based informational tool for acquisition and learning of specific health-related skills rather than a *dose* of social influence to encourage health behavior adoption [236].

Limitations

Many of the studies rejected in this search process were excluded because the authors failed to identify the *a priori* theoretical framework underlying the design strategy or referenced protocols from previous papers which were not theory driven. The risk of selection and publication bias is greater because of the lack of consensus as to publication guidelines that included theory in design considerations during this period. The Cochrane Database of Reviews recently withdrew the publication of a protocol to assess serious gaming health intervention studies with no explanation [237]. Publication guidelines are needed to improve the reporting of clinical trials using serious gaming for future systematic review and analysis. Few studies addressed how their Web-enabled protocol addressed the Health Insurance Portability and Accountability Act security rules or whether privacy was a concern for participants. The potential for innovative technologies such as virtual reality or artificial intelligence to individualize health care is great, but threats to personal health information security may produce distrust among users and health professionals. A systematic review of the literature on website design and interactivity concluded that security elements

have an important impact on Web-based health information seeking [238]. These design elements are important patient-reported measures associated with research involvement and should be included in the design of future studies [239]. There is a need for theoretically driven, continuous cohort studies to assess the sustainability of user engagement with tailored digital tools for chronic disease management [240].

Recommendations

Researchers should define the theory or theories that guide their choices of interventions as well as the desired behaviors that lead to health outcomes. More research is needed to identify the conditions under which media richness and social presence enhance message processing. Creating an environment where social presence is part of the research design may lead to better study retention and greater understanding of Web-based peer-to-peer support. Researchers should consider the addition of a run-in-time phase to their intervention protocols where participant observations can establish the ecological validity of the environment before the intervention. Interactions with social agents, whether human or artificial, are the ultimate tools of social cognition.

Conclusions

SCTs provide a framework for design, implementation, and evaluation of health intervention programs and has been successfully used in several interventions presented in this paper. Creating Web-based environments where social presence and information richness are used as part of the overall strategy has several theoretical advantages. Web-based health interventions have the potential to act as *sticky* media that sustains the pursuit of desired diet and exercise behaviors long after the initial study phase is over. Using SCT to design digital interventions has been shown to have positive outcomes for weight control, PA, diabetes, mental health, nutrition, and wellness behaviors. The ultimate challenge for health practitioners is to integrate Web-enabled health communication into real-world health care.

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

[[PDF File \(Adobe PDF File\), 89KB](#) - [humanfactors_v6i2e11544_app1.pdf](#)]

Multimedia Appendix 2

Study characteristics. Internet-based intervention characteristics.

[[PDF File \(Adobe PDF File\), 308KB](#) - [humanfactors_v6i2e11544_app2.pdf](#)]

References

1. Short J, Christie B, Eder. Social Psychology of Telecommunications. London: Wiley; 1976.

2. Bandura A. Health promotion from the perspective of social cognitive theory. *Health Psychol* 1998 Jul;13(4):623-649. [doi: [10.1080/08870449808407422](https://doi.org/10.1080/08870449808407422)]
3. Stacey FG, James EL, Chapman K, Courneya KS, Lubans DR. A systematic review and meta-analysis of social cognitive theory-based physical activity and/or nutrition behavior change interventions for cancer survivors. *J Cancer Surviv* 2015 Jun;9(2):305-338 [FREE Full text] [doi: [10.1007/s11764-014-0413-z](https://doi.org/10.1007/s11764-014-0413-z)] [Medline: [25432633](https://pubmed.ncbi.nlm.nih.gov/25432633/)]
4. Anderson-Bill ES, Winett RA, Wojcik JR. Social cognitive determinants of nutrition and physical activity among web-health users enrolling in an online intervention: the influence of social support, self-efficacy, outcome expectations, and self-regulation. *J Med Internet Res* 2011 Mar 17;13(1):e28 [FREE Full text] [doi: [10.2196/jmir.1551](https://doi.org/10.2196/jmir.1551)] [Medline: [21441100](https://pubmed.ncbi.nlm.nih.gov/21441100/)]
5. Elaheebocus S, Weal M, Morrison L, Yardley L. Peer-based social media features in behavior change interventions: systematic review. *J Med Internet Res* 2018 Dec 22;20(2):e20 [FREE Full text] [doi: [10.2196/jmir.8342](https://doi.org/10.2196/jmir.8342)] [Medline: [29472174](https://pubmed.ncbi.nlm.nih.gov/29472174/)]
6. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004 Apr;31(2):143-164. [doi: [10.1177/1090198104263660](https://doi.org/10.1177/1090198104263660)] [Medline: [15090118](https://pubmed.ncbi.nlm.nih.gov/15090118/)]
7. Webb TL, Joseph J, Yardley L, Michie S. Using the internet to promote health behavior change: a systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *J Med Internet Res* 2010 Feb 17;12(1):e4 [FREE Full text] [doi: [10.2196/jmir.1376](https://doi.org/10.2196/jmir.1376)] [Medline: [20164043](https://pubmed.ncbi.nlm.nih.gov/20164043/)]
8. Lee R, Kvasny L. Understanding the role of social media in online health: a global perspective on online social support. *First Monday* 2013;19(1). [doi: [10.5210/fm.v19i1.4048](https://doi.org/10.5210/fm.v19i1.4048)]
9. Vandelanotte C, Kirwan M, Rebar A, Alley S, Short C, Fallon L, et al. Examining the use of evidence-based and social media supported tools in freely accessible physical activity intervention websites. *Int J Behav Nutr Phys Act* 2014 Aug 17;11:105 [FREE Full text] [doi: [10.1186/s12966-014-0105-0](https://doi.org/10.1186/s12966-014-0105-0)] [Medline: [25128330](https://pubmed.ncbi.nlm.nih.gov/25128330/)]
10. Lombard M, Ditton T. At the heart of it all: the concept of presence. *J Comput Mediat Commun* 2006 Jun 23;3(2) [FREE Full text] [doi: [10.1111/j.1083-6101.1997.tb00072.x](https://doi.org/10.1111/j.1083-6101.1997.tb00072.x)]
11. Mohr DC, Cuijpers P, Lehman K. Supportive accountability: a model for providing human support to enhance adherence to eHealth interventions. *J Med Internet Res* 2011 Mar 10;13(1):e30 [FREE Full text] [doi: [10.2196/jmir.1602](https://doi.org/10.2196/jmir.1602)] [Medline: [21393123](https://pubmed.ncbi.nlm.nih.gov/21393123/)]
12. Santarossa S, Kane D, Senn CY, Woodruff SJ. Exploring the role of in-person components for online health behavior change interventions: can a digital person-to-person component suffice? *J Med Internet Res* 2018 Dec 11;20(4):e144 [FREE Full text] [doi: [10.2196/jmir.8480](https://doi.org/10.2196/jmir.8480)] [Medline: [29643048](https://pubmed.ncbi.nlm.nih.gov/29643048/)]
13. Doster L. Millennial teens design and redesign themselves in online social networks. *J Consumer Behav* 2013 May 29;12(4):267-279. [doi: [10.1002/cb.1407](https://doi.org/10.1002/cb.1407)]
14. Biocca F, Harms C, Burgoon JK. Toward a more robust theory and measure of social presence: review and suggested criteria. *Presence-Teleop Virt* 2003 Oct;12(5):456-480. [doi: [10.1162/105474603322761270](https://doi.org/10.1162/105474603322761270)]
15. Kamal N, Fels S, Fergusson M. Online social networks for health behaviour change: designing to increase socialization. *Comput Human Behav* 2014 Dec;41:444-453. [doi: [10.1016/j.chb.2014.03.068](https://doi.org/10.1016/j.chb.2014.03.068)]
16. Giustini D, Ali SM, Fraser M, Kamel Boulos MN. Effective uses of social media in public health and medicine: a systematic review of systematic reviews. *Online J Public Health Inform* 2018;10(2):e215 [FREE Full text] [doi: [10.5210/ojphi.v10i2.8270](https://doi.org/10.5210/ojphi.v10i2.8270)] [Medline: [30349633](https://pubmed.ncbi.nlm.nih.gov/30349633/)]
17. Blumberg MF, Burke LC, Hodent PC, Evans MA, Lane HC, Schell J. Serious games for health: features, challenges, next steps. *Games Health J* 2014 Oct;3(5):270-276. [doi: [10.1089/g4h.2014.0079](https://doi.org/10.1089/g4h.2014.0079)] [Medline: [26192481](https://pubmed.ncbi.nlm.nih.gov/26192481/)]
18. Norman CD. Social media and health promotion. *Glob Health Promot* 2012 Dec;19(4):3-6. [doi: [10.1177/1757975912464593](https://doi.org/10.1177/1757975912464593)] [Medline: [24803437](https://pubmed.ncbi.nlm.nih.gov/24803437/)]
19. Newman MW, Lauterback D, Munson SA, Resnick P, Morris ME. It's not that I don't have problems, i'm just not putting them on facebook: challenges opportunities in using online social networks for health. In: *Proceedings Of ACM 2011 Conference On Computer Supported Cooperative Work*. 2011 Presented at: CSCW '11; March 19-23, 2011; Hangzhou, China p. 341-350.
20. Eysenbach G, CONSORT-EHEALTH Group. CONSORT-EHEALTH: improving and standardizing evaluation reports of Web-based and mobile health interventions. *J Med Internet Res* 2011 Dec 31;13(4):e126 [FREE Full text] [doi: [10.2196/jmir.1923](https://doi.org/10.2196/jmir.1923)] [Medline: [22209829](https://pubmed.ncbi.nlm.nih.gov/22209829/)]
21. Joanna Briggs Institute Reviewers' Manual: 2014 Edition. Adelaide, Australia: The Joanna Briggs Institute; 2015.
22. Tufanaru C, Munn Z, Aromataris E, Campbell JL. Chapter 3: Systematic reviews of effectiveness. In: Aromataris E, Munn Z, editors. *Joanna Briggs Institute Reviewer's Manual*. Adelaide, Australia: The Joanna Briggs Institute; 2017.
23. Peters MD, Godfrey C, McInerney P, Baldini SC, Khalil H, Parker D. Chapter 11: Scoping Reviews. In: Aromataris E, Munn Z, editors. *Joanna Briggs Institute Reviewer's Manual*. Adelaide, Australia: The Joanna Briggs Institute; 2017.
24. Kristjánsdóttir OB, Fors E, Eide E, Finset A, Stensrud T, van Dulmen S, et al. A smartphone-based intervention with diaries and therapist-feedback to reduce catastrophizing and increase functioning in women with chronic widespread pain: randomized controlled trial. *J Med Internet Res* 2013 Jan 07;15(1):e5 [FREE Full text] [doi: [10.2196/jmir.2249](https://doi.org/10.2196/jmir.2249)] [Medline: [23291270](https://pubmed.ncbi.nlm.nih.gov/23291270/)]
25. Patel MS, Asch DA, Volpp KG. Wearable devices as facilitators, not drivers, of health behavior change. *J Am Med Assoc* 2015 Feb 03;313(5):459-460. [doi: [10.1001/jama.2014.14781](https://doi.org/10.1001/jama.2014.14781)] [Medline: [25569175](https://pubmed.ncbi.nlm.nih.gov/25569175/)]

26. Johansson R, Sjöberg E, Sjögren M, Johnsson E, Carlbring P, Andersson T, et al. Tailored vs. standardized internet-based cognitive behavior therapy for depression and comorbid symptoms: a randomized controlled trial. *PLoS One* 2012;7(5):e36905 [FREE Full text] [doi: [10.1371/journal.pone.0036905](https://doi.org/10.1371/journal.pone.0036905)] [Medline: [22615841](https://pubmed.ncbi.nlm.nih.gov/22615841/)]
27. Wijsman CA, Westendorp RG, Verhagen EA, Catt M, Slagboom PE, de Craen AJ, et al. Effects of a web-based intervention on physical activity and metabolism in older adults: randomized controlled trial. *J Med Internet Res* 2013 Nov 06;15(11):e233 [FREE Full text] [doi: [10.2196/jmir.2843](https://doi.org/10.2196/jmir.2843)] [Medline: [24195965](https://pubmed.ncbi.nlm.nih.gov/24195965/)]
28. Deterding S, Dixon D, Khaled R, Nacke L. From game design elements to gamefulness: defining. In: *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*. 2181040: ACM; 2011 Presented at: MindTrek '11; September 28-30, 2011; Tampere, Finland p. 9-15 URL: <https://dl.acm.org/citation.cfm?id=2181040> [doi: [10.1145/2181037.2181040](https://doi.org/10.1145/2181037.2181040)]
29. Maher C, Ferguson M, Vandelanotte C, Plotnikoff R, De Bourdeaudhuij I, Thomas S, et al. A web-based, social networking physical activity intervention for insufficiently active adults delivered via Facebook app: randomized controlled trial. *J Med Internet Res* 2015 Jul 13;17(7):e174 [FREE Full text] [doi: [10.2196/jmir.4086](https://doi.org/10.2196/jmir.4086)] [Medline: [26169067](https://pubmed.ncbi.nlm.nih.gov/26169067/)]
30. Maher CA, Lewis LK, Ferrar K, Marshall S, De Bourdeaudhuij I, Vandelanotte C. Are health behavior change interventions that use online social networks effective? A systematic review. *J Med Internet Res* 2014 Feb 14;16(2):e40 [FREE Full text] [doi: [10.2196/jmir.2952](https://doi.org/10.2196/jmir.2952)] [Medline: [24550083](https://pubmed.ncbi.nlm.nih.gov/24550083/)]
31. Li TM, Chau M, Wong PW, Lai ES, Yip PS. Evaluation of a web-based social network electronic game in enhancing mental health literacy for young people. *J Med Internet Res* 2013 May 15;15(5):e80 [FREE Full text] [doi: [10.2196/jmir.2316](https://doi.org/10.2196/jmir.2316)] [Medline: [23676714](https://pubmed.ncbi.nlm.nih.gov/23676714/)]
32. Baranowski MT, Lieberman PD, Buday R, Peng W, Zimmerli L, Wiederhold B, et al. Videogame mechanics in games for health. *Games Health J* 2013 Aug;2(4):194-204. [doi: [10.1089/g4h.2013.0617](https://doi.org/10.1089/g4h.2013.0617)] [Medline: [26192223](https://pubmed.ncbi.nlm.nih.gov/26192223/)]
33. Dodd KJ, Taylor NF, Graham HK. A randomized clinical trial of strength training in young people with cerebral palsy. *Dev Med Child Neurol* 2003 Oct;45(10):652-657 [FREE Full text] [Medline: [14515935](https://pubmed.ncbi.nlm.nih.gov/14515935/)]
34. Des Jarlais DC, Lyles C, Crepez N, TREND Group. Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. *Am J Public Health* 2004 Mar;94(3):361-366. [Medline: [14998794](https://pubmed.ncbi.nlm.nih.gov/14998794/)]
35. Agarwal S, LeFevre AE, Lee J, L'Engle K, Mehl G, Sinha C, WHO mHealth Technical Evidence Review Group. Guidelines for reporting of health interventions using mobile phones: mobile health (mHealth) evidence reporting and assessment (mERA) checklist. *Br Med J* 2016 Mar 17;352:i1174. [doi: [10.1136/bmj.i1174](https://doi.org/10.1136/bmj.i1174)] [Medline: [26988021](https://pubmed.ncbi.nlm.nih.gov/26988021/)]
36. Agricola E, Pandolfi E, Gonfiantini MV, Gesualdo F, Romano M, Carloni E, et al. A cohort study of a tailored web intervention for preconception care. *BMC Med Inform Decis Mak* 2014 Apr 15;14:33 [FREE Full text] [doi: [10.1186/1472-6947-14-33](https://doi.org/10.1186/1472-6947-14-33)] [Medline: [24731520](https://pubmed.ncbi.nlm.nih.gov/24731520/)]
37. Allam A, Kostova Z, Nakamoto K, Schulz PJ. The effect of social support features and gamification on a Web-based intervention for rheumatoid arthritis patients: randomized controlled trial. *J Med Internet Res* 2015 Jan 09;17(1):e14 [FREE Full text] [doi: [10.2196/jmir.3510](https://doi.org/10.2196/jmir.3510)] [Medline: [25574939](https://pubmed.ncbi.nlm.nih.gov/25574939/)]
38. Andersen LL, Sundstrup E, Boysen M, Jakobsen MD, Mortensen OS, Persson R. Cardiovascular health effects of internet-based encouragements to do daily workplace stair-walks: randomized controlled trial. *J Med Internet Res* 2013 Jun 21;15(6):e127 [FREE Full text] [doi: [10.2196/jmir.2340](https://doi.org/10.2196/jmir.2340)] [Medline: [23793032](https://pubmed.ncbi.nlm.nih.gov/23793032/)]
39. Antypas K, Wangberg SC. An Internet- and mobile-based tailored intervention to enhance maintenance of physical activity after cardiac rehabilitation: short-term results of a randomized controlled trial. *J Med Internet Res* 2014 Mar 11;16(3):e77 [FREE Full text] [doi: [10.2196/jmir.3132](https://doi.org/10.2196/jmir.3132)] [Medline: [24618349](https://pubmed.ncbi.nlm.nih.gov/24618349/)]
40. Bannink R, Broeren S, Joosten-van Zwanenburg E, van As E, van de Looij-Jansen P, Raat H. Effectiveness of a Web-based tailored intervention (E-health4Uth) and consultation to promote adolescents' health: randomized controlled trial. *J Med Internet Res* 2014 May 30;16(5):e143 [FREE Full text] [doi: [10.2196/jmir.3163](https://doi.org/10.2196/jmir.3163)] [Medline: [24878521](https://pubmed.ncbi.nlm.nih.gov/24878521/)]
41. Becker J, Haug S, Sullivan R, Schaub MP. Effectiveness of different web-based interventions to prepare co-smokers of cigarettes and cannabis for double cessation: a three-arm randomized controlled trial. *J Med Internet Res* 2014 Dec 05;16(12):e273 [FREE Full text] [doi: [10.2196/jmir.3246](https://doi.org/10.2196/jmir.3246)] [Medline: [25486674](https://pubmed.ncbi.nlm.nih.gov/25486674/)]
42. Bendtsen P, Bendtsen M, Karlsson N, White IR, McCambridge J. Online alcohol assessment and feedback for hazardous and harmful drinkers: findings from the AMADEUS-2 randomized controlled trial of routine practice in Swedish universities. *J Med Internet Res* 2015 Jul 09;17(7):e170 [FREE Full text] [doi: [10.2196/jmir.4020](https://doi.org/10.2196/jmir.4020)] [Medline: [26159179](https://pubmed.ncbi.nlm.nih.gov/26159179/)]
43. Bendtsen P, McCambridge J, Bendtsen M, Karlsson N, Nilsen P. Effectiveness of a proactive mail-based alcohol internet intervention for university students: dismantling the assessment and feedback components in a randomized controlled trial. *J Med Internet Res* 2012 Oct 31;14(5):e142 [FREE Full text] [doi: [10.2196/jmir.2062](https://doi.org/10.2196/jmir.2062)] [Medline: [23113955](https://pubmed.ncbi.nlm.nih.gov/23113955/)]
44. Bewick BM, West RM, Barkham M, Mulhern B, Marlow R, Traviss G, et al. The effectiveness of a web-based personalized feedback and social norms alcohol intervention on United Kingdom university students: randomized controlled trial. *J Med Internet Res* 2013 Jul 24;15(7):e137 [FREE Full text] [doi: [10.2196/jmir.2581](https://doi.org/10.2196/jmir.2581)] [Medline: [23883616](https://pubmed.ncbi.nlm.nih.gov/23883616/)]
45. Bock B, Heron K, Jennings E, Morrow K, Cobb V, Magee J, et al. A text message delivered smoking cessation intervention: the initial trial of TXT-2-Quit: randomized controlled trial. *JMIR Mhealth Uhealth* 2013 Jul 30;1(2):e17 [FREE Full text] [doi: [10.2196/mhealth.2522](https://doi.org/10.2196/mhealth.2522)] [Medline: [25098502](https://pubmed.ncbi.nlm.nih.gov/25098502/)]

46. Bolier L, Haverman M, Kramer J, Westerhof GJ, Riper H, Walburg JA, et al. An internet-based intervention to promote mental fitness for mildly depressed adults: randomized controlled trial. *J Med Internet Res* 2013 Sep 16;15(9):e200 [FREE Full text] [doi: [10.2196/jmir.2603](https://doi.org/10.2196/jmir.2603)] [Medline: [24041479](https://pubmed.ncbi.nlm.nih.gov/24041479/)]
47. Boots LM, de Vugt ME, Kempen GI, Verhey FR. Effectiveness of the blended care self-management program. *Trials* 2016 May 04;17(1):231 [FREE Full text] [doi: [10.1186/s13063-016-1351-z](https://doi.org/10.1186/s13063-016-1351-z)] [Medline: [27142676](https://pubmed.ncbi.nlm.nih.gov/27142676/)]
48. Boots LM, de Vugt ME, Kempen GI, Verhey FR. Effectiveness of a blended care self-management program for caregivers of people with early-stage dementia (partner in balance): randomized controlled trial. *J Med Internet Res* 2018 Jul 13;20(7):e10017 [FREE Full text] [doi: [10.2196/10017](https://doi.org/10.2196/10017)] [Medline: [30006327](https://pubmed.ncbi.nlm.nih.gov/30006327/)]
49. Børøsund E, Cvancarova M, Moore SM, Ekstedt M, Ruland CM. Comparing effects in regular practice of e-communication and web-based self-management support among breast cancer patients: preliminary results from a randomized controlled trial. *J Med Internet Res* 2014 Dec 18;16(12):e295 [FREE Full text] [doi: [10.2196/jmir.3348](https://doi.org/10.2196/jmir.3348)] [Medline: [25525672](https://pubmed.ncbi.nlm.nih.gov/25525672/)]
50. Bossen D, Veenhof C, Van Beek KE, Spreeuwenberg PM, Dekker J, De Bakker DH. Effectiveness of a web-based physical activity intervention in patients with knee and/or hip osteoarthritis: randomized controlled trial. *J Med Internet Res* 2013 Nov 22;15(11):e257 [FREE Full text] [doi: [10.2196/jmir.2662](https://doi.org/10.2196/jmir.2662)] [Medline: [24269911](https://pubmed.ncbi.nlm.nih.gov/24269911/)]
51. Brendryen H, Lund IO, Johansen AB, Riksheim M, Nesvåg S, Duckert F. Balance--a pragmatic randomized controlled trial of an online intensive self-help alcohol intervention. *Addiction* 2014 Feb;109(2):218-226. [doi: [10.1111/add.12383](https://doi.org/10.1111/add.12383)] [Medline: [24134709](https://pubmed.ncbi.nlm.nih.gov/24134709/)]
52. Brindal E, Freyne J, Saunders I, Berkovsky S, Smith G, Noakes M. Features predicting weight loss in overweight or obese participants in a web-based intervention: randomized trial. *J Med Internet Res* 2012 Dec 12;14(6):e173 [FREE Full text] [doi: [10.2196/jmir.2156](https://doi.org/10.2196/jmir.2156)] [Medline: [23234759](https://pubmed.ncbi.nlm.nih.gov/23234759/)]
53. Bul KC, Kato PM, Van der Oord S, Danckaerts M, Vreeke LJ, Willems A, et al. Behavioral outcome effects of serious gaming as an adjunct to treatment for children with attention-deficit/hyperactivity disorder: a randomized controlled trial. *J Med Internet Res* 2016 Feb 16;18(2):e26 [FREE Full text] [doi: [10.2196/jmir.5173](https://doi.org/10.2196/jmir.5173)] [Medline: [26883052](https://pubmed.ncbi.nlm.nih.gov/26883052/)]
54. Burckhardt R, Manicavasagar V, Batterham PJ, Miller LM, Talbot E, Lum A. A web-based adolescent positive psychology program in schools: randomized controlled trial. *J Med Internet Res* 2015 Jul 28;17(7):e187 [FREE Full text] [doi: [10.2196/jmir.4329](https://doi.org/10.2196/jmir.4329)] [Medline: [26220564](https://pubmed.ncbi.nlm.nih.gov/26220564/)]
55. Camerini L, Schulz PJ. Effects of functional interactivity on patients' knowledge, empowerment, and health outcomes: an experimental model-driven evaluation of a web-based intervention. *J Med Internet Res* 2012 Jul 18;14(4):e105 [FREE Full text] [doi: [10.2196/jmir.1953](https://doi.org/10.2196/jmir.1953)] [Medline: [22810046](https://pubmed.ncbi.nlm.nih.gov/22810046/)]
56. Carter MC, Burley VJ, Nykjaer C, Cade JE. Adherence to a smartphone application for weight loss compared to website and paper diary: pilot randomized controlled trial. *J Med Internet Res* 2013 Apr 15;15(4):e32 [FREE Full text] [doi: [10.2196/jmir.2283](https://doi.org/10.2196/jmir.2283)] [Medline: [23587561](https://pubmed.ncbi.nlm.nih.gov/23587561/)]
57. Choi SH, Waltje AH, Ronis DL, Noonan D, Hong O, Richardson CR, et al. Web-enhanced tobacco tactics with telephone support versus 1-800-QUIT-NOW telephone line intervention for operating engineers: randomized controlled trial. *J Med Internet Res* 2014 Nov 20;16(11):e255 [FREE Full text] [doi: [10.2196/jmir.3375](https://doi.org/10.2196/jmir.3375)] [Medline: [25447467](https://pubmed.ncbi.nlm.nih.gov/25447467/)]
58. Christensen H, Batterham P, Mackinnon A, Griffiths KM, Kalia Hehir K, Kenardy J, et al. Prevention of generalized anxiety disorder using a web intervention, iChill: randomized controlled trial. *J Med Internet Res* 2014 Sep 02;16(9):e199 [FREE Full text] [doi: [10.2196/jmir.3507](https://doi.org/10.2196/jmir.3507)] [Medline: [25270886](https://pubmed.ncbi.nlm.nih.gov/25270886/)]
59. Clarke J, Proudfoot J, Ma H. Mobile phone and web-based cognitive behavior therapy for depressive symptoms and mental health comorbidities in people living with diabetes: results of a feasibility study. *JMIR Ment Health* 2016 May 31;3(2):e23 [FREE Full text] [doi: [10.2196/mental.5131](https://doi.org/10.2196/mental.5131)] [Medline: [27245948](https://pubmed.ncbi.nlm.nih.gov/27245948/)]
60. Collins CE, Morgan PJ, Jones P, Fletcher K, Martin J, Aguiar EJ, et al. A 12-week commercial web-based weight-loss program for overweight and obese adults: randomized controlled trial comparing basic versus enhanced features. *J Med Internet Res* 2012 Apr 25;14(2):e57 [FREE Full text] [doi: [10.2196/jmir.1980](https://doi.org/10.2196/jmir.1980)] [Medline: [22555246](https://pubmed.ncbi.nlm.nih.gov/22555246/)]
61. Collins CE, Morgan PJ, Hutchesson MJ, Callister R. Efficacy of standard versus enhanced features in a web-based commercial weight-loss program for obese adults, part 2: randomized controlled trial. *J Med Internet Res* 2013 Jul 22;15(7):e140 [FREE Full text] [doi: [10.2196/jmir.2626](https://doi.org/10.2196/jmir.2626)] [Medline: [23876832](https://pubmed.ncbi.nlm.nih.gov/23876832/)]
62. Compernelle S, Vandelanotte C, Cardon G, De Bourdeaudhuij I, De Cocker K. Effectiveness of a web-based, computer-tailored, pedometer-based physical activity intervention for adults: a cluster randomized controlled trial. *J Med Internet Res* 2015 Feb 09;17(2):e38 [FREE Full text] [doi: [10.2196/jmir.3402](https://doi.org/10.2196/jmir.3402)] [Medline: [25665498](https://pubmed.ncbi.nlm.nih.gov/25665498/)]
63. Cook TL, De Bourdeaudhuij I, Maes L, Haerens L, Grammatikaki E, Widhalm K, et al. Moderators of the effectiveness of a web-based tailored intervention promoting physical activity in adolescents: the HELENA Activ-O-Meter. *J Sch Health* 2014 Apr;84(4):256-266. [doi: [10.1111/josh.12140](https://doi.org/10.1111/josh.12140)] [Medline: [24617909](https://pubmed.ncbi.nlm.nih.gov/24617909/)]
64. Cremers H, Mercken L, Candel M, de Vries H, Oenema A. A web-based, computer-tailored smoking prevention program to prevent children from starting to smoke after transferring to secondary school: randomized controlled trial. *J Med Internet Res* 2015 Mar 09;17(3):e59 [FREE Full text] [doi: [10.2196/jmir.3794](https://doi.org/10.2196/jmir.3794)] [Medline: [25759248](https://pubmed.ncbi.nlm.nih.gov/25759248/)]
65. Cremers H, Mercken L, Crutzen R, Willems P, de Vries H, Oenema A. Do email and mobile phone prompts stimulate primary school children to reuse an internet-delivered smoking prevention intervention? *J Med Internet Res* 2014 Mar 18;16(3):e86 [FREE Full text] [doi: [10.2196/jmir.3069](https://doi.org/10.2196/jmir.3069)] [Medline: [24642082](https://pubmed.ncbi.nlm.nih.gov/24642082/)]

66. Cristancho-Lacroix V, Wrobel J, Cantegreil-Kallen I, Dub T, Rouquette A, Rigaud A. A web-based psychoeducational program for informal caregivers of patients with Alzheimer's disease: a pilot randomized controlled trial. *J Med Internet Res* 2015 May 12;17(5):e117 [[FREE Full text](#)] [doi: [10.2196/jmir.3717](https://doi.org/10.2196/jmir.3717)] [Medline: [25967983](https://pubmed.ncbi.nlm.nih.gov/25967983/)]
67. Cunningham JA. Comparison of two internet-based interventions for problem drinkers: randomized controlled trial. *J Med Internet Res* 2012 Aug 01;14(4):e107 [[FREE Full text](#)] [doi: [10.2196/jmir.2090](https://doi.org/10.2196/jmir.2090)] [Medline: [22954459](https://pubmed.ncbi.nlm.nih.gov/22954459/)]
68. Damholdt MF, Mehlsen M, O'Toole MS, Andreasen RK, Pedersen AD, Zachariae R. Web-based cognitive training for breast cancer survivors with cognitive complaints-a randomized controlled trial. *Psychooncology* 2016 Dec;25(11):1293-1300 [[FREE Full text](#)] [doi: [10.1002/pon.4058](https://doi.org/10.1002/pon.4058)] [Medline: [26763774](https://pubmed.ncbi.nlm.nih.gov/26763774/)]
69. De Cocker K, Spittaels H, Cardon G, De Bourdeaudhuij I, Vandelanotte C. Web-based, computer-tailored, pedometer-based physical activity advice: development, dissemination through general practice, acceptability, and preliminary efficacy in a randomized controlled trial. *J Med Internet Res* 2012 Apr 24;14(2):e53 [[FREE Full text](#)] [doi: [10.2196/jmir.1959](https://doi.org/10.2196/jmir.1959)] [Medline: [22532102](https://pubmed.ncbi.nlm.nih.gov/22532102/)]
70. Delisle C, Sandin S, Forsum E, Henriksson H, Trolle-Lagerros Y, Larsson C, et al. A web- and mobile phone-based intervention to prevent obesity in 4-year-olds (MINISTOP): a population-based randomized controlled trial. *BMC Public Health* 2015 Feb 07;15:95 [[FREE Full text](#)] [doi: [10.1186/s12889-015-1444-8](https://doi.org/10.1186/s12889-015-1444-8)] [Medline: [25886009](https://pubmed.ncbi.nlm.nih.gov/25886009/)]
71. Nyström CD, Sandin S, Henriksson P, Henriksson H, Trolle-Lagerros Y, Larsson C, et al. Mobile-based intervention intended to stop obesity in preschool-aged children: the MINISTOP randomized controlled trial. *Am J Clin Nutr* 2017 Dec;105(6):1327-1335. [doi: [10.3945/ajcn.116.150995](https://doi.org/10.3945/ajcn.116.150995)] [Medline: [28446496](https://pubmed.ncbi.nlm.nih.gov/28446496/)]
72. de Josselin de Jong S, Candel M, Segaar D, Cremers H, de Vries H. Efficacy of a web-based computer-tailored smoking prevention intervention for Dutch adolescents: randomized controlled trial. *J Med Internet Res* 2014 Mar 21;16(3):e82 [[FREE Full text](#)] [doi: [10.2196/jmir.2469](https://doi.org/10.2196/jmir.2469)] [Medline: [24657434](https://pubmed.ncbi.nlm.nih.gov/24657434/)]
73. Dennison L, Morrison L, Lloyd S, Phillips D, Stuart B, Williams S, et al. Does brief telephone support improve engagement with a web-based weight management intervention? Randomized controlled trial. *J Med Internet Res* 2014 Mar 28;16(3):e95 [[FREE Full text](#)] [doi: [10.2196/jmir.3199](https://doi.org/10.2196/jmir.3199)] [Medline: [24681761](https://pubmed.ncbi.nlm.nih.gov/24681761/)]
74. Devi R, Powell J, Singh S. A web-based program improves physical activity outcomes in a primary care angina population: randomized controlled trial. *J Med Internet Res* 2014 Sep 12;16(9):e186 [[FREE Full text](#)] [doi: [10.2196/jmir.3340](https://doi.org/10.2196/jmir.3340)] [Medline: [25217464](https://pubmed.ncbi.nlm.nih.gov/25217464/)]
75. Direito A, Jiang Y, Whittaker R, Maddison R. Apps for IMproving FITness and increasing physical activity among young people: the AIMFIT pragmatic randomized controlled trial. *J Med Internet Res* 2015 Aug 27;17(8):e210 [[FREE Full text](#)] [doi: [10.2196/jmir.4568](https://doi.org/10.2196/jmir.4568)] [Medline: [26316499](https://pubmed.ncbi.nlm.nih.gov/26316499/)]
76. Dobson R, Whittaker R, Jiang Y, Shepherd M, Maddison R, Carter K, et al. Text message-based diabetes self-management support (SMS4BG): study protocol for a randomised controlled trial. *Trials* 2016 Apr 02;17:179 [[FREE Full text](#)] [doi: [10.1186/s13063-016-1305-5](https://doi.org/10.1186/s13063-016-1305-5)] [Medline: [27039300](https://pubmed.ncbi.nlm.nih.gov/27039300/)]
77. Dobson R, Whittaker R, Jiang Y, Maddison R, Shepherd M, McNamara C, et al. Effectiveness of text message based, diabetes self management support programme (SMS4BG): two arm, parallel randomised controlled trial. *Br Med J* 2018 Dec 17;361:k1959 [[FREE Full text](#)] [doi: [10.1136/bmj.k1959](https://doi.org/10.1136/bmj.k1959)] [Medline: [29773539](https://pubmed.ncbi.nlm.nih.gov/29773539/)]
78. Donker T, Bennett K, Bennett A, Mackinnon A, van Straten A, Cuijpers P, et al. Internet-delivered interpersonal psychotherapy versus internet-delivered cognitive behavioral therapy for adults with depressive symptoms: randomized controlled noninferiority trial. *J Med Internet Res* 2013 May 13;15(5):e82 [[FREE Full text](#)] [doi: [10.2196/jmir.2307](https://doi.org/10.2196/jmir.2307)] [Medline: [23669884](https://pubmed.ncbi.nlm.nih.gov/23669884/)]
79. Drozd F, Raeder S, Kraft P, Bjørkli CA. Multilevel growth curve analyses of treatment effects of a web-based intervention for stress reduction: randomized controlled trial. *J Med Internet Res* 2013 Apr 22;15(4):e84 [[FREE Full text](#)] [doi: [10.2196/jmir.2570](https://doi.org/10.2196/jmir.2570)] [Medline: [23607962](https://pubmed.ncbi.nlm.nih.gov/23607962/)]
80. Duncan M, Vandelanotte C, Kolt GS, Rosenkranz RR, Caperchione CM, George ES, et al. Effectiveness of a web- and mobile phone-based intervention to promote physical activity and healthy eating in middle-aged males: randomized controlled trial of the ManUp study. *J Med Internet Res* 2014 Jun 12;16(6):e136 [[FREE Full text](#)] [doi: [10.2196/jmir.3107](https://doi.org/10.2196/jmir.3107)] [Medline: [24927299](https://pubmed.ncbi.nlm.nih.gov/24927299/)]
81. Ebert DD, Gollwitzer M, Riper H, Cuijpers P, Baumeister H, Berking M. For whom does it work? Moderators of outcome on the effect of a transdiagnostic internet-based maintenance treatment after inpatient psychotherapy: randomized controlled trial. *J Med Internet Res* 2013 Oct 10;15(10):e191 [[FREE Full text](#)] [doi: [10.2196/jmir.2511](https://doi.org/10.2196/jmir.2511)] [Medline: [24113764](https://pubmed.ncbi.nlm.nih.gov/24113764/)]
82. Elfeddali I, Bolman C, Candel MJ, Wiers RW, de Vries H. Preventing smoking relapse via web-based computer-tailored feedback: a randomized controlled trial. *J Med Internet Res* 2012 Aug 20;14(4):e109 [[FREE Full text](#)] [doi: [10.2196/jmir.2057](https://doi.org/10.2196/jmir.2057)] [Medline: [22903145](https://pubmed.ncbi.nlm.nih.gov/22903145/)]
83. Emmons KM, Puleo E, Sprunck-Harrild K, Ford J, Ostroff JS, Hodgson D, et al. Partnership for health-2, a web-based versus print smoking cessation intervention for childhood and young adult cancer survivors: randomized comparative effectiveness study. *J Med Internet Res* 2013 Nov 05;15(11):e218 [[FREE Full text](#)] [doi: [10.2196/jmir.2533](https://doi.org/10.2196/jmir.2533)] [Medline: [24195867](https://pubmed.ncbi.nlm.nih.gov/24195867/)]

84. van Lettow B, de Vries H, Burdorf A, Boon B, van Empelen P. Drinker prototype alteration and cue reminders as strategies in a tailored web-based intervention reducing adults' alcohol consumption: randomized controlled trial. *J Med Internet Res* 2015 Feb 04;17(2):e35 [FREE Full text] [doi: [10.2196/jmir.3551](https://doi.org/10.2196/jmir.3551)] [Medline: [25653199](https://pubmed.ncbi.nlm.nih.gov/25653199/)]
85. Fjeldsoe BS, Miller YD, O'Brien JL, Marshall AL. Iterative development of MobileMums: a physical activity intervention for women with young children. *Int J Behav Nutr Phys Act* 2012 Dec 20;9:151 [FREE Full text] [doi: [10.1186/1479-5868-9-151](https://doi.org/10.1186/1479-5868-9-151)] [Medline: [23256730](https://pubmed.ncbi.nlm.nih.gov/23256730/)]
86. Fjeldsoe BS, Miller YD, Graves N, Barnett AG, Marshall AL. Randomized controlled trial of an improved version of MobileMums, an intervention for increasing physical activity in women with young children. *Ann Behav Med* 2015 Aug;49(4):487-499. [doi: [10.1007/s12160-014-9675-y](https://doi.org/10.1007/s12160-014-9675-y)] [Medline: [25582987](https://pubmed.ncbi.nlm.nih.gov/25582987/)]
87. Frederix I, Hansen D, Coninx K, Vandervoort P, Vandijck D, Hens N, et al. Medium-term effectiveness of a comprehensive internet-based and patient-specific telerehabilitation program with text messaging support for cardiac patients: randomized controlled trial. *J Med Internet Res* 2015 Jul 23;17(7):e185 [FREE Full text] [doi: [10.2196/jmir.4799](https://doi.org/10.2196/jmir.4799)] [Medline: [26206311](https://pubmed.ncbi.nlm.nih.gov/26206311/)]
88. Friederichs S, Bolman C, Oenema A, Guyaux J, Lechner L. Academia. 2012. Integrating Motivational Interviewing in online computer tailoring: should an embodied virtual coach be included? URL: https://www.academia.edu/1848150/Integrating_motivational_interviewing_in_online_computer_tailoring_Should_an_embodied_virtual_coach_be_included [accessed 2019-04-22] [WebCite Cache ID 77obq18e9]
89. Geraedts AS, Kleiboer AM, Twisk J, Wiezer NM, van Mechelen W, Cuijpers P. Long-term results of a web-based guided self-help intervention for employees with depressive symptoms: randomized controlled trial. *J Med Internet Res* 2014 Jul 09;16(7):e168 [FREE Full text] [doi: [10.2196/jmir.3539](https://doi.org/10.2196/jmir.3539)] [Medline: [25008127](https://pubmed.ncbi.nlm.nih.gov/25008127/)]
90. Greaney ML, Sprunck-Harrild K, Bennett GG, Puleo E, Haines J, Viswanath KV, et al. Use of email and telephone prompts to increase self-monitoring in a web-based intervention: randomized controlled trial. *J Med Internet Res* 2012;14(4):e96 [FREE Full text] [doi: [10.2196/jmir.1981](https://doi.org/10.2196/jmir.1981)] [Medline: [22842775](https://pubmed.ncbi.nlm.nih.gov/22842775/)]
91. Greenwood DA, Blozis SA, Young HM, Nesbitt TS, Quinn CC. Overcoming clinical inertia: a randomized clinical trial of a telehealth remote monitoring intervention using paired glucose testing in adults with type 2 diabetes. *J Med Internet Res* 2015 Jul 21;17(7):e178 [FREE Full text] [doi: [10.2196/jmir.4112](https://doi.org/10.2196/jmir.4112)] [Medline: [26199142](https://pubmed.ncbi.nlm.nih.gov/26199142/)]
92. Gustafson D, Wise M, Bhattacharya A, Pulvermacher A, Shanovich K, Phillips B, et al. The effects of combining web-based eHealth with telephone nurse case management for pediatric asthma control: a randomized controlled trial. *J Med Internet Res* 2012 Jul 26;14(4):e101 [FREE Full text] [doi: [10.2196/jmir.1964](https://doi.org/10.2196/jmir.1964)] [Medline: [22835804](https://pubmed.ncbi.nlm.nih.gov/22835804/)]
93. Hansen AB, Becker U, Nielsen AS, Grønbæk M, Tolstrup JS, Thygesen LC. Internet-based brief personalized feedback intervention in a non-treatment-seeking population of adult heavy drinkers: a randomized controlled trial. *J Med Internet Res* 2012 Jul 30;14(4):e98 [FREE Full text] [doi: [10.2196/jmir.1883](https://doi.org/10.2196/jmir.1883)] [Medline: [22846542](https://pubmed.ncbi.nlm.nih.gov/22846542/)]
94. Hardcastle S, Blake N, Hagger MS. The effectiveness of a motivational interviewing primary-care based intervention on physical activity and predictors of change in a disadvantaged community. *J Behav Med* 2012 Jun;35(3):318-333. [doi: [10.1007/s10865-012-9417-1](https://doi.org/10.1007/s10865-012-9417-1)] [Medline: [22476812](https://pubmed.ncbi.nlm.nih.gov/22476812/)]
95. Haug S, Schaub MP, Venzin V, Meyer C, John U. Efficacy of a text message-based smoking cessation intervention for young people: a cluster randomized controlled trial. *J Med Internet Res* 2013 Aug 16;15(8):e171 [FREE Full text] [doi: [10.2196/jmir.2636](https://doi.org/10.2196/jmir.2636)] [Medline: [23956024](https://pubmed.ncbi.nlm.nih.gov/23956024/)]
96. Hausmann LR, Parks A, Youk AO, Kwok CK. Reduction of bodily pain in response to an online positive activities intervention. *J Pain* 2014 May;15(5):560-567. [doi: [10.1016/j.jpain.2014.02.004](https://doi.org/10.1016/j.jpain.2014.02.004)] [Medline: [24568751](https://pubmed.ncbi.nlm.nih.gov/24568751/)]
97. Heber E, Ebert DD, Lehr D, Nobis S, Berking M, Riper H. Efficacy and cost-effectiveness of a web-based and mobile stress-management intervention for employees: design of a randomized controlled trial. *BMC Public Health* 2013 Jul 15;13:655 [FREE Full text] [doi: [10.1186/1471-2458-13-655](https://doi.org/10.1186/1471-2458-13-655)] [Medline: [23855376](https://pubmed.ncbi.nlm.nih.gov/23855376/)]
98. Heber E, Lehr D, Ebert DD, Berking M, Riper H. Web-based and mobile stress management intervention for employees: a randomized controlled trial. *J Med Internet Res* 2016 Jan 27;18(1):e21 [FREE Full text] [doi: [10.2196/jmir.5112](https://doi.org/10.2196/jmir.5112)] [Medline: [26818683](https://pubmed.ncbi.nlm.nih.gov/26818683/)]
99. Høifødt RS, Lillevoll KR, Griffiths KM, Wilsgaard T, Eisemann M, Waterloo K, et al. The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: randomized controlled trial. *J Med Internet Res* 2013 Aug 05;15(8):e153 [FREE Full text] [doi: [10.2196/jmir.2714](https://doi.org/10.2196/jmir.2714)] [Medline: [23916965](https://pubmed.ncbi.nlm.nih.gov/23916965/)]
100. Imanaka M, Ando M, Kitamura T, Kawamura T. Effectiveness of web-based self-disclosure peer-to-peer support for weight loss: randomized controlled trial. *J Med Internet Res* 2013 Jul 09;15(7):e136 [FREE Full text] [doi: [10.2196/jmir.2405](https://doi.org/10.2196/jmir.2405)] [Medline: [23838533](https://pubmed.ncbi.nlm.nih.gov/23838533/)]
101. Irvine AB, Gelatt VA, Seeley JR, Macfarlane P, Gau JM. Web-based intervention to promote physical activity by sedentary older adults: randomized controlled trial. *J Med Internet Res* 2013 Feb 05;15(2):e19 [FREE Full text] [doi: [10.2196/jmir.2158](https://doi.org/10.2196/jmir.2158)] [Medline: [23470322](https://pubmed.ncbi.nlm.nih.gov/23470322/)]
102. Irvine AB, Russell H, Manocchia M, Mino DE, Cox Glassen T, Morgan R, et al. Mobile-web app to self-manage low back pain: randomized controlled trial. *J Med Internet Res* 2015 Jan 02;17(1):e1 [FREE Full text] [doi: [10.2196/jmir.3130](https://doi.org/10.2196/jmir.3130)] [Medline: [25565416](https://pubmed.ncbi.nlm.nih.gov/25565416/)]
103. Jordan ET, Bushar JA, Kendrick JS, Johnson P, Wang J. Encouraging influenza vaccination among Text4baby pregnant women and mothers. *Am J Prev Med* 2015 Oct;49(4):563-572. [doi: [10.1016/j.amepre.2015.04.029](https://doi.org/10.1016/j.amepre.2015.04.029)] [Medline: [26232904](https://pubmed.ncbi.nlm.nih.gov/26232904/)]

104. Karhula T, Vuorinen A, Rääpysjärvi K, Pakanen M, Itkonen P, Tepponen M, et al. Telemonitoring and mobile phone-based health coaching among Finnish diabetic and heart disease patients: randomized controlled trial. *J Med Internet Res* 2015 Jun 17;17(6):e153 [FREE Full text] [doi: [10.2196/jmir.4059](https://doi.org/10.2196/jmir.4059)] [Medline: [26084979](https://pubmed.ncbi.nlm.nih.gov/26084979/)]
105. Kass AE, Trockel M, Safer DL, Sinton MM, Cunning D, Rizk MT, et al. Internet-based preventive intervention for reducing eating disorder risk: a randomized controlled trial comparing guided with unguided self-help. *Behav Res Ther* 2014 Dec;63:90-98 [FREE Full text] [doi: [10.1016/j.brat.2014.09.010](https://doi.org/10.1016/j.brat.2014.09.010)] [Medline: [25461783](https://pubmed.ncbi.nlm.nih.gov/25461783/)]
106. Kelders SM, Bohlmeijer ET, Van Gemert-Pijnen JE. Participants, usage, and use patterns of a web-based intervention for the prevention of depression within a randomized controlled trial. *J Med Internet Res* 2013 Aug 20;15(8):e172 [FREE Full text] [doi: [10.2196/jmir.2258](https://doi.org/10.2196/jmir.2258)] [Medline: [23963284](https://pubmed.ncbi.nlm.nih.gov/23963284/)]
107. Khosropour CM, Johnson BA, Ricca AV, Sullivan PS. Enhancing retention of an Internet-based cohort study of men who have sex with men (MSM) via text messaging: randomized controlled trial. *J Med Internet Res* 2013 Aug 27;15(8):e194 [FREE Full text] [doi: [10.2196/jmir.2756](https://doi.org/10.2196/jmir.2756)] [Medline: [23981905](https://pubmed.ncbi.nlm.nih.gov/23981905/)]
108. Kim J, Oh S, Steinhubl S, Kim S, Bae WK, Han JS, et al. Effectiveness of 6 months of tailored text message reminders for obese male participants in a worksite weight loss program: randomized controlled trial. *JMIR Mhealth Uhealth* 2015 Feb 03;3(1):e14 [FREE Full text] [doi: [10.2196/mhealth.3949](https://doi.org/10.2196/mhealth.3949)] [Medline: [25648325](https://pubmed.ncbi.nlm.nih.gov/25648325/)]
109. Kirwan M, Vandelanotte C, Fenning A, Duncan MJ. Diabetes self-management smartphone application for adults with type 1 diabetes: randomized controlled trial. *J Med Internet Res* 2013 Nov 13;15(11):e235 [FREE Full text] [doi: [10.2196/jmir.2588](https://doi.org/10.2196/jmir.2588)] [Medline: [24225149](https://pubmed.ncbi.nlm.nih.gov/24225149/)]
110. Knaevelsrud C, Brand J, Lange A, Ruwaard J, Wagner B. Web-based psychotherapy for posttraumatic stress disorder in war-traumatized Arab patients: randomized controlled trial. *J Med Internet Res* 2015 Mar 20;17(3):e71 [FREE Full text] [doi: [10.2196/jmir.3582](https://doi.org/10.2196/jmir.3582)] [Medline: [25799024](https://pubmed.ncbi.nlm.nih.gov/25799024/)]
111. Kok RN, van Straten A, Beekman AT, Cuijpers P. Short-term effectiveness of web-based guided self-help for phobic outpatients: randomized controlled trial. *J Med Internet Res* 2014 Sep 29;16(9):e226 [FREE Full text] [doi: [10.2196/jmir.3429](https://doi.org/10.2196/jmir.3429)] [Medline: [25266929](https://pubmed.ncbi.nlm.nih.gov/25266929/)]
112. Kolodziejczyk JK, Norman GJ, Barrera-Ng A, Dillon L, Marshall S, Arredondo E, et al. Feasibility and effectiveness of an automated bilingual text message intervention for weight loss: pilot study. *JMIR Res Protoc* 2013 Nov 06;2(2):e48 [FREE Full text] [doi: [10.2196/resprot.2789](https://doi.org/10.2196/resprot.2789)] [Medline: [24200517](https://pubmed.ncbi.nlm.nih.gov/24200517/)]
113. Kramer J, Conijn B, Oijevear P, Riper H. Effectiveness of a web-based solution-focused brief chat treatment for depressed adolescents and young adults: randomized controlled trial. *J Med Internet Res* 2014 May 29;16(5):e141 [FREE Full text] [doi: [10.2196/jmir.3261](https://doi.org/10.2196/jmir.3261)] [Medline: [24874006](https://pubmed.ncbi.nlm.nih.gov/24874006/)]
114. Krein SL, Kadri R, Hughes M, Kerr EA, Piette JD, Holleman R, et al. Pedometer-based internet-mediated intervention for adults with chronic low back pain: randomized controlled trial. *J Med Internet Res* 2013 Aug 19;15(8):e181 [FREE Full text] [doi: [10.2196/jmir.2605](https://doi.org/10.2196/jmir.2605)] [Medline: [23969029](https://pubmed.ncbi.nlm.nih.gov/23969029/)]
115. Kristjánsdóttir OB, Fors EA, Eide E, Finset A, Stensrud TL, van Dulmen S, et al. A smartphone-based intervention with diaries and therapist feedback to reduce catastrophizing and increase functioning in women with chronic widespread pain. part 2: 11-month follow-up results of a randomized trial. *J Med Internet Res* 2013 Mar 28;15(3):e72 [FREE Full text] [doi: [10.2196/jmir.2442](https://doi.org/10.2196/jmir.2442)] [Medline: [23538392](https://pubmed.ncbi.nlm.nih.gov/23538392/)]
116. Levy N, Moynihan V, Nilo A, Singer K, Bernik LS, Etiebet M, et al. The Mobile Insulin Titration Intervention (MITI) for insulin adjustment in an urban, low-income population: randomized controlled trial. *J Med Internet Res* 2015 Jul 17;17(7):e180 [FREE Full text] [doi: [10.2196/jmir.4716](https://doi.org/10.2196/jmir.4716)] [Medline: [26187303](https://pubmed.ncbi.nlm.nih.gov/26187303/)]
117. Mak WW, Chan AT, Cheung EY, Lin CL, Ngai KC. Enhancing web-based mindfulness training for mental health promotion with the health action process approach: randomized controlled trial. *J Med Internet Res* 2015 Jan 19;17(1):e8 [FREE Full text] [doi: [10.2196/jmir.3746](https://doi.org/10.2196/jmir.3746)] [Medline: [25599904](https://pubmed.ncbi.nlm.nih.gov/25599904/)]
118. Manicavasagar V, Horswood D, Burckhardt R, Lum A, Hadzi-Pavlovic D, Parker G. Feasibility and effectiveness of a web-based positive psychology program for youth mental health: randomized controlled trial. *J Med Internet Res* 2014 Jun 04;16(6):e140 [FREE Full text] [doi: [10.2196/jmir.3176](https://doi.org/10.2196/jmir.3176)] [Medline: [24901900](https://pubmed.ncbi.nlm.nih.gov/24901900/)]
119. Marsaux CF, Celis-Morales C, Fallaize R, Macready AL, Kolossa S, Woolhead C, et al. Effects of a web-based personalized intervention on physical activity in European adults: a randomized controlled trial. *J Med Internet Res* 2015 Oct 14;17(10):e231 [FREE Full text] [doi: [10.2196/jmir.4660](https://doi.org/10.2196/jmir.4660)] [Medline: [26467573](https://pubmed.ncbi.nlm.nih.gov/26467573/)]
120. Marsaux CF, Celis-Morales C, Livingstone KM, Fallaize R, Kolossa S, Hallmann J, et al. Changes in physical activity following a genetic-based internet-delivered personalized intervention: randomized controlled trial (Food4Me). *J Med Internet Res* 2016 Feb 05;18(2):e30 [FREE Full text] [doi: [10.2196/jmir.5198](https://doi.org/10.2196/jmir.5198)] [Medline: [26851191](https://pubmed.ncbi.nlm.nih.gov/26851191/)]
121. Martorella G, Côté J, Racine M, Choinière M. Web-based nursing intervention for self-management of pain after cardiac surgery: pilot randomized controlled trial. *J Med Internet Res* 2012 Dec 14;14(6):e177 [FREE Full text] [doi: [10.2196/jmir.2070](https://doi.org/10.2196/jmir.2070)] [Medline: [23241361](https://pubmed.ncbi.nlm.nih.gov/23241361/)]
122. Mattila E, Orsama A, Ahtinen A, Hopsu L, Leino T, Korhonen I. Personal health technologies in employee health promotion: usage activity, usefulness, and health-related outcomes in a 1-year randomized controlled trial. *JMIR Mhealth Uhealth* 2013 Jul 29;1(2):e16 [FREE Full text] [doi: [10.2196/mhealth.2557](https://doi.org/10.2196/mhealth.2557)] [Medline: [25098385](https://pubmed.ncbi.nlm.nih.gov/25098385/)]

123. McClure JB, Shortreed SM, Bogart A, Derry H, Riggs K, St John J, et al. The effect of program design on engagement with an internet-based smoking intervention: randomized factorial trial. *J Med Internet Res* 2013 Mar 25;15(3):e69 [FREE Full text] [doi: [10.2196/jmir.2508](https://doi.org/10.2196/jmir.2508)] [Medline: [23529377](https://pubmed.ncbi.nlm.nih.gov/23529377/)]
124. Mehring M, Haag M, Linde K, Wagenpfeil S, Schneider A. Effects of a web-based intervention for stress reduction in primary care: a cluster randomized controlled trial. *J Med Internet Res* 2016 Feb 12;18(2):e27 [FREE Full text] [doi: [10.2196/jmir.4246](https://doi.org/10.2196/jmir.4246)] [Medline: [26872703](https://pubmed.ncbi.nlm.nih.gov/26872703/)]
125. Meyer B, Bierbrodt J, Schröder J, Berger T, Beevers CG, Weiss M, et al. Effects of an internet intervention (Deprexis) on severe depression symptoms: randomized controlled trial. *Internet Interv* 2015 Mar;2(1):48-59. [doi: [10.1016/j.invent.2014.12.003](https://doi.org/10.1016/j.invent.2014.12.003)]
126. Milgrom J, Danaher BG, Gemmill AW, Holt C, Holt CJ, Seeley JR, et al. Internet cognitive behavioral therapy for women with postnatal depression: a randomized controlled trial of MumMoodBooster. *J Med Internet Res* 2016 Mar 07;18(3):e54 [FREE Full text] [doi: [10.2196/jmir.4993](https://doi.org/10.2196/jmir.4993)] [Medline: [26952645](https://pubmed.ncbi.nlm.nih.gov/26952645/)]
127. Mira JJ, Navarro I, Botella F, Borrás F, Nuño-Solinís R, Orozco D, et al. A Spanish pillbox app for elderly patients taking multiple medications: randomized controlled trial. *J Med Internet Res* 2014 Apr 04;16(4):e99 [FREE Full text] [doi: [10.2196/jmir.3269](https://doi.org/10.2196/jmir.3269)] [Medline: [24705022](https://pubmed.ncbi.nlm.nih.gov/24705022/)]
128. Mori M, Tajima M, Kimura R, Sasaki N, Somemura H, Ito Y, et al. A web-based training program using cognitive behavioral therapy to alleviate psychological distress among employees: randomized controlled pilot trial. *JMIR Res Protoc* 2014 Dec 02;3(4):e70 [FREE Full text] [doi: [10.2196/resprot.3629](https://doi.org/10.2196/resprot.3629)] [Medline: [25470499](https://pubmed.ncbi.nlm.nih.gov/25470499/)]
129. Morris RR, Schueller SM, Picard RW. Efficacy of a web-based, crowdsourced peer-to-peer cognitive reappraisal platform for depression: randomized controlled trial. *J Med Internet Res* 2015 Mar 30;17(3):e72 [FREE Full text] [doi: [10.2196/jmir.4167](https://doi.org/10.2196/jmir.4167)] [Medline: [25835472](https://pubmed.ncbi.nlm.nih.gov/25835472/)]
130. Mouthaan J, Sijbrandij M, de Vries GJ, Reitsma JB, van de Schoot R, Goslings JC, et al. Internet-based early intervention to prevent posttraumatic stress disorder in injury patients: randomized controlled trial. *J Med Internet Res* 2013 Aug 13;15(8):e165 [FREE Full text] [doi: [10.2196/jmir.2460](https://doi.org/10.2196/jmir.2460)] [Medline: [23942480](https://pubmed.ncbi.nlm.nih.gov/23942480/)]
131. Müller AM, Khoo S, Morris T. Text messaging for exercise promotion in older adults from an upper-middle-income country: randomized controlled trial. *J Med Internet Res* 2016 Jan 07;18(1):e5 [FREE Full text] [doi: [10.2196/jmir.5235](https://doi.org/10.2196/jmir.5235)] [Medline: [26742999](https://pubmed.ncbi.nlm.nih.gov/26742999/)]
132. Newcombe PA, Dunn TL, Casey LM, Sheffield JK, Petsky H, Anderson-James S, et al. Breathe easier online: evaluation of a randomized controlled pilot trial of an internet-based intervention to improve well-being in children and adolescents with a chronic respiratory condition. *J Med Internet Res* 2012 Feb 08;14(1):e23 [FREE Full text] [doi: [10.2196/jmir.1997](https://doi.org/10.2196/jmir.1997)] [Medline: [22356732](https://pubmed.ncbi.nlm.nih.gov/22356732/)]
133. Nobis S, Lehr D, Ebert DD, Berking M, Heber E, Baumeister H, et al. Efficacy and cost-effectiveness of a web-based intervention with mobile phone support to treat depressive symptoms in adults with diabetes mellitus type 1 and type 2: design of a randomised controlled trial. *BMC Psychiatry* 2013 Nov 15;13:306 [FREE Full text] [doi: [10.1186/1471-244X-13-306](https://doi.org/10.1186/1471-244X-13-306)] [Medline: [24238346](https://pubmed.ncbi.nlm.nih.gov/24238346/)]
134. Partridge SR, McGeechan K, Hebden L, Balestracci K, Wong AT, Denney-Wilson E, et al. Effectiveness of a mHealth lifestyle program with telephone support (TXT2BFIT) to prevent unhealthy weight gain in young adults: randomized controlled trial. *JMIR Mhealth Uhealth* 2015 Jun 15;3(2):e66 [FREE Full text] [doi: [10.2196/mhealth.4530](https://doi.org/10.2196/mhealth.4530)] [Medline: [26076688](https://pubmed.ncbi.nlm.nih.gov/26076688/)]
135. Pham Q, Khatib Y, Stansfeld S, Fox S, Green T. Feasibility and efficacy of an mHealth game for managing anxiety: "flowy" randomized controlled pilot trial and design evaluation. *Games Health J* 2016 Feb;5(1):50-67. [doi: [10.1089/g4h.2015.0033](https://doi.org/10.1089/g4h.2015.0033)] [Medline: [26536488](https://pubmed.ncbi.nlm.nih.gov/26536488/)]
136. Piette JD, Striplin D, Marinec N, Chen J, Trivedi RB, Aron DC, et al. A mobile health intervention supporting heart failure patients and their informal caregivers: a randomized comparative effectiveness trial. *J Med Internet Res* 2015 Jun 10;17(6):e142 [FREE Full text] [doi: [10.2196/jmir.4550](https://doi.org/10.2196/jmir.4550)] [Medline: [26063161](https://pubmed.ncbi.nlm.nih.gov/26063161/)]
137. Pimmer C, Mateescu M, Zahn C, Genewein U. Smartphones as multimodal communication devices to facilitate clinical knowledge processes: randomized controlled trial. *J Med Internet Res* 2013 Nov 27;15(11):e263 [FREE Full text] [doi: [10.2196/jmir.2758](https://doi.org/10.2196/jmir.2758)] [Medline: [24284080](https://pubmed.ncbi.nlm.nih.gov/24284080/)]
138. Proudfoot J, Clarke J, Birch M, Whitton AE, Parker G, Manicavasagar V, et al. Impact of a mobile phone and web program on symptom and functional outcomes for people with mild-to-moderate depression, anxiety and stress: a randomised controlled trial. *BMC Psychiatry* 2013 Nov 18;13:312 [FREE Full text] [doi: [10.1186/1471-244X-13-312](https://doi.org/10.1186/1471-244X-13-312)] [Medline: [24237617](https://pubmed.ncbi.nlm.nih.gov/24237617/)]
139. Powell J, Hamborg T, Stallard N, Burls A, McSorley J, Bennett K, et al. Effectiveness of a web-based cognitive-behavioral tool to improve mental well-being in the general population: randomized controlled trial. *J Med Internet Res* 2012 Dec 31;15(1):e2 [FREE Full text] [doi: [10.2196/jmir.2240](https://doi.org/10.2196/jmir.2240)] [Medline: [23302475](https://pubmed.ncbi.nlm.nih.gov/23302475/)]
140. Rabbi M, Pfammatter A, Zhang M, Spring B, Choudhury T. Automated personalized feedback for physical activity and dietary behavior change with mobile phones: a randomized controlled trial on adults. *JMIR Mhealth Uhealth* 2015 May 14;3(2):e42 [FREE Full text] [doi: [10.2196/mhealth.4160](https://doi.org/10.2196/mhealth.4160)] [Medline: [25977197](https://pubmed.ncbi.nlm.nih.gov/25977197/)]

141. Ramadas A, Quek KF, Chan CK, Oldenburg B, Hussein Z. Randomised-controlled trial of a web-based dietary intervention for patients with type 2 diabetes mellitus: study protocol of myDIDeA. *BMC Public Health* 2011 May 21;11:359 [FREE Full text] [doi: [10.1186/1471-2458-11-359](https://doi.org/10.1186/1471-2458-11-359)] [Medline: [21599990](https://pubmed.ncbi.nlm.nih.gov/21599990/)]
142. Ramadas A, Chan CK, Oldenburg B, Hussien Z, Quek KF. A web-based dietary intervention for people with type 2 diabetes: development, implementation, and evaluation. *Int J Behav Med* 2015 Jun;22(3):365-373 [FREE Full text] [doi: [10.1007/s12529-014-9445-z](https://doi.org/10.1007/s12529-014-9445-z)] [Medline: [25274015](https://pubmed.ncbi.nlm.nih.gov/25274015/)]
143. Riva S, Camerini A, Allam A, Schulz PJ. Interactive sections of an internet-based intervention increase empowerment of chronic back pain patients: randomized controlled trial. *J Med Internet Res* 2014 Aug 13;16(8):e180 [FREE Full text] [doi: [10.2196/jmir.3474](https://doi.org/10.2196/jmir.3474)] [Medline: [25119374](https://pubmed.ncbi.nlm.nih.gov/25119374/)]
144. Robinson JK, Gaber R, Hultgren B, Eilers S, Blatt H, Stapleton J, et al. Skin self-examination education for early detection of melanoma: a randomized controlled trial of Internet, workbook, and in-person interventions. *J Med Internet Res* 2014 Jan 13;16(1):e7 [FREE Full text] [doi: [10.2196/jmir.2883](https://doi.org/10.2196/jmir.2883)] [Medline: [24418949](https://pubmed.ncbi.nlm.nih.gov/24418949/)]
145. Robinson JK, Wayne JD, Martini MC, Hultgren BA, Mallett KA, Turrissi R. Early detection of new melanomas by patients with melanoma and their partners using a structured skin self-examination skills training intervention: a randomized clinical trial. *JAMA Dermatol* 2016 Dec 01;152(9):979-985 [FREE Full text] [doi: [10.1001/jamadermatol.2016.1985](https://doi.org/10.1001/jamadermatol.2016.1985)] [Medline: [27367303](https://pubmed.ncbi.nlm.nih.gov/27367303/)]
146. Rooke S, Copeland J, Norberg M, Hine D, McCambridge J. Effectiveness of a self-guided web-based cannabis treatment program: randomized controlled trial. *J Med Internet Res* 2013 Feb 15;15(2):e26 [FREE Full text] [doi: [10.2196/jmir.2256](https://doi.org/10.2196/jmir.2256)] [Medline: [23470329](https://pubmed.ncbi.nlm.nih.gov/23470329/)]
147. Salazar LF, Vivolo-Kantor A, Hardin J, Berkowitz A. A web-based sexual violence bystander intervention for male college students: randomized controlled trial. *J Med Internet Res* 2014 Sep 05;16(9):e203 [FREE Full text] [doi: [10.2196/jmir.3426](https://doi.org/10.2196/jmir.3426)] [Medline: [25198417](https://pubmed.ncbi.nlm.nih.gov/25198417/)]
148. Samaan Z, Schulze KM, Middleton C, Irvine J, Joseph P, Mente A, SAHARA Investigators. South Asian Heart Risk Assessment (SAHARA): randomized controlled trial design and pilot study. *JMIR Res Protoc* 2013 Aug 20;2(2):e33 [FREE Full text] [doi: [10.2196/resprot.2621](https://doi.org/10.2196/resprot.2621)] [Medline: [23965279](https://pubmed.ncbi.nlm.nih.gov/23965279/)]
149. Schaller S, Marinova-Schmidt V, Setzer M, Kondylakis H, Griebel L, Sedlmayr M, et al. Usefulness of a tailored eHealth service for informal caregivers and professionals in the dementia treatment and care setting: the eHealthMonitor dementia portal. *JMIR Res Protoc* 2016 Apr 05;5(2):e47 [FREE Full text] [doi: [10.2196/resprot.4354](https://doi.org/10.2196/resprot.4354)] [Medline: [27050401](https://pubmed.ncbi.nlm.nih.gov/27050401/)]
150. Schaub M, Sullivan R, Stark L. Snow control - an RCT protocol for a web-based self-help therapy to reduce cocaine consumption in problematic cocaine users. *BMC Psychiatry* 2011 Sep 25;11:153 [FREE Full text] [doi: [10.1186/1471-244X-11-153](https://doi.org/10.1186/1471-244X-11-153)] [Medline: [21943294](https://pubmed.ncbi.nlm.nih.gov/21943294/)]
151. Schulz DN, Kremers SP, Vandelanotte C, van Adrichem MJ, Schneider F, Candel MJ, et al. Effects of a web-based tailored multiple-lifestyle intervention for adults: a two-year randomized controlled trial comparing sequential and simultaneous delivery modes. *J Med Internet Res* 2014 Jan 27;16(1):e26 [FREE Full text] [doi: [10.2196/jmir.3094](https://doi.org/10.2196/jmir.3094)] [Medline: [24472854](https://pubmed.ncbi.nlm.nih.gov/24472854/)]
152. Smit ES, de Vries H, Hoving C. Effectiveness of a web-based multiple tailored smoking cessation program: a randomized controlled trial among Dutch adult smokers. *J Med Internet Res* 2012 Jun 11;14(3):e82 [FREE Full text] [doi: [10.2196/jmir.1812](https://doi.org/10.2196/jmir.1812)] [Medline: [22687887](https://pubmed.ncbi.nlm.nih.gov/22687887/)]
153. Solomon M, Wagner SL, Goes J. Effects of a Web-based intervention for adults with chronic conditions on patient activation: online randomized controlled trial. *J Med Internet Res* 2012 Feb 21;14(1):e32 [FREE Full text] [doi: [10.2196/jmir.1924](https://doi.org/10.2196/jmir.1924)] [Medline: [22353433](https://pubmed.ncbi.nlm.nih.gov/22353433/)]
154. Soureti A, Murray P, Cobain M, Chinapaw M, van Mechelen W, Hurling R. Exploratory study of web-based planning and mobile text reminders in an overweight population. *J Med Internet Res* 2011 Dec 20;13(4):e118 [FREE Full text] [doi: [10.2196/jmir.1773](https://doi.org/10.2196/jmir.1773)] [Medline: [22182483](https://pubmed.ncbi.nlm.nih.gov/22182483/)]
155. Springvloet L, Lechner L, de Vries H, Candel MJ, Oenema A. Short- and medium-term efficacy of a web-based computer-tailored nutrition education intervention for adults including cognitive and environmental feedback: randomized controlled trial. *J Med Internet Res* 2015 Jan 19;17(1):e23 [FREE Full text] [doi: [10.2196/jmir.3837](https://doi.org/10.2196/jmir.3837)] [Medline: [25599828](https://pubmed.ncbi.nlm.nih.gov/25599828/)]
156. Steinberg DM, Levine EL, Askew S, Foley P, Bennett GG. Daily text messaging for weight control among racial and ethnic minority women: randomized controlled pilot study. *J Med Internet Res* 2013 Nov 18;15(11):e244 [FREE Full text] [doi: [10.2196/jmir.2844](https://doi.org/10.2196/jmir.2844)] [Medline: [24246427](https://pubmed.ncbi.nlm.nih.gov/24246427/)]
157. Steinberg DM, Levine EL, Lane I, Askew S, Foley PB, Puleo E, et al. Adherence to self-monitoring via interactive voice response technology in an eHealth intervention targeting weight gain prevention among black women: randomized controlled trial. *J Med Internet Res* 2014 Apr 29;16(4):e114 [FREE Full text] [doi: [10.2196/jmir.2996](https://doi.org/10.2196/jmir.2996)] [Medline: [24780934](https://pubmed.ncbi.nlm.nih.gov/24780934/)]
158. Tait RJ, McKetin R, Kay-Lambkin F, Carron-Arthur B, Bennett A, Bennett K, et al. Six-month outcomes of a web-based intervention for users of amphetamine-type stimulants: randomized controlled trial. *J Med Internet Res* 2015 Apr 29;17(4):e105 [FREE Full text] [doi: [10.2196/jmir.3778](https://doi.org/10.2196/jmir.3778)] [Medline: [25925801](https://pubmed.ncbi.nlm.nih.gov/25925801/)]
159. Tapper K, Jiga-Boy G, Maio GR, Haddock G, Lewis M. Development and preliminary evaluation of an internet-based healthy eating program: randomized controlled trial. *J Med Internet Res* 2014 Oct 10;16(10):e231 [FREE Full text] [doi: [10.2196/jmir.3534](https://doi.org/10.2196/jmir.3534)] [Medline: [25305376](https://pubmed.ncbi.nlm.nih.gov/25305376/)]

160. Tensil M, Jonas B, Strüber E. Two fully automated web-based interventions for risky alcohol use: randomized controlled trial. *J Med Internet Res* 2013 Jun 06;15(6):e110 [FREE Full text] [doi: [10.2196/jmir.2489](https://doi.org/10.2196/jmir.2489)] [Medline: [23742808](https://pubmed.ncbi.nlm.nih.gov/23742808/)]
161. ter Huurne ED, de Haan HA, Postel MG, van der Palen J, VanDerNagel JE, DeJong CA. Web-based cognitive behavioral therapy for female patients with eating disorders: randomized controlled trial. *J Med Internet Res* 2015 Jun 18;17(6):e152 [FREE Full text] [doi: [10.2196/jmir.3946](https://doi.org/10.2196/jmir.3946)] [Medline: [26088580](https://pubmed.ncbi.nlm.nih.gov/26088580/)]
162. Torbjørnsen A, Jenum AK, Småstuen MC, Arsand E, Holmen H, Wahl AK, et al. A low-intensity mobile health intervention with and without health counseling for persons with type 2 diabetes, part 1: baseline and short-term results from a randomized controlled trial in the Norwegian part of RENEWING HEALTH. *JMIR Mhealth Uhealth* 2014 Dec 11;2(4):e52 [FREE Full text] [doi: [10.2196/mhealth.3535](https://doi.org/10.2196/mhealth.3535)] [Medline: [25499592](https://pubmed.ncbi.nlm.nih.gov/25499592/)]
163. Trompetter HR, Bohlmeijer ET, Veehof MM, Schreurs KM. Internet-based guided self-help intervention for chronic pain based on Acceptance and Commitment Therapy: a randomized controlled trial. *J Behav Med* 2015 Feb;38(1):66-80. [doi: [10.1007/s10865-014-9579-0](https://doi.org/10.1007/s10865-014-9579-0)] [Medline: [24923259](https://pubmed.ncbi.nlm.nih.gov/24923259/)]
164. Turner-McGrievy G, Tate D. Tweets, apps, and pods: results of the 6-month mobile pounds off digitally (Mobile POD) randomized weight-loss intervention among adults. *J Med Internet Res* 2011 Dec 20;13(4):e120 [FREE Full text] [doi: [10.2196/jmir.1841](https://doi.org/10.2196/jmir.1841)] [Medline: [22186428](https://pubmed.ncbi.nlm.nih.gov/22186428/)]
165. Ünlü Ince B, Cuijpers P, van 't Hof E, van Ballegooijen W, Christensen H, Riper H. Internet-based, culturally sensitive, problem-solving therapy for Turkish migrants with depression: randomized controlled trial. *J Med Internet Res* 2013 Oct 11;15(10):e227 [FREE Full text] [doi: [10.2196/jmir.2853](https://doi.org/10.2196/jmir.2853)] [Medline: [24121307](https://pubmed.ncbi.nlm.nih.gov/24121307/)]
166. van Ballegooijen W, Riper H, Klein B, Ebert DD, Kramer J, Meulenbeek P, et al. An internet-based guided self-help intervention for panic symptoms: randomized controlled trial. *J Med Internet Res* 2013 Jul 29;15(7):e154 [FREE Full text] [doi: [10.2196/jmir.2362](https://doi.org/10.2196/jmir.2362)] [Medline: [23896222](https://pubmed.ncbi.nlm.nih.gov/23896222/)]
167. van der Weegen S, Verwey R, Spreeuwenberg M, Tange H, van der Weijden T, de Witte L. It's liFe! Mobile and web-based monitoring and feedback tool embedded in primary care increases physical activity: a cluster randomized controlled trial. *J Med Internet Res* 2015 Jul 24;17(7):e184 [FREE Full text] [doi: [10.2196/jmir.4579](https://doi.org/10.2196/jmir.4579)] [Medline: [26209025](https://pubmed.ncbi.nlm.nih.gov/26209025/)]
168. van der Wulp NY, Hoving C, Eijmael K, Candel MJ, van Dalen W, De Vries H. Reducing alcohol use during pregnancy via health counseling by midwives and internet-based computer-tailored feedback: a cluster randomized trial. *J Med Internet Res* 2014 Dec 05;16(12):e274 [FREE Full text] [doi: [10.2196/jmir.3493](https://doi.org/10.2196/jmir.3493)] [Medline: [25486675](https://pubmed.ncbi.nlm.nih.gov/25486675/)]
169. van der Zanden R, Kramer J, Gerrits R, Cuijpers P. Effectiveness of an online group course for depression in adolescents and young adults: a randomized trial. *J Med Internet Res* 2012 Jun 07;14(3):e86 [FREE Full text] [doi: [10.2196/jmir.2033](https://doi.org/10.2196/jmir.2033)] [Medline: [22677437](https://pubmed.ncbi.nlm.nih.gov/22677437/)]
170. van Gaalen JL, Beerthuisen T, van der Meer V, van Reisen P, Redelijkheid GW, Snoeck-Stroband JB, SMASHING Study Group. Long-term outcomes of internet-based self-management support in adults with asthma: randomized controlled trial. *J Med Internet Res* 2013 Sep 12;15(9):e188 [FREE Full text] [doi: [10.2196/jmir.2640](https://doi.org/10.2196/jmir.2640)] [Medline: [24028826](https://pubmed.ncbi.nlm.nih.gov/24028826/)]
171. van Genugten L, van Empelen P, Oenema A. Intervention use and action planning in a web-based computer-tailored weight management program for overweight adults: randomized controlled trial. *JMIR Res Protoc* 2014 Jul 23;3(3):e31 [FREE Full text] [doi: [10.2196/resprot.2599](https://doi.org/10.2196/resprot.2599)] [Medline: [25057122](https://pubmed.ncbi.nlm.nih.gov/25057122/)]
172. Vandelanotte C, Duncan MJ, Plotnikoff RC, Mummery WK. Do participants' preferences for mode of delivery (text, video, or both) influence the effectiveness of a web-based physical activity intervention? *J Med Internet Res* 2012 Feb 29;14(1):e37 [FREE Full text] [doi: [10.2196/jmir.1998](https://doi.org/10.2196/jmir.1998)] [Medline: [22377834](https://pubmed.ncbi.nlm.nih.gov/22377834/)]
173. Volker D, Zijlstra-Vlasveld MC, Anema JR, Beekman AT, Brouwers EP, Emons WH, et al. Effectiveness of a blended web-based intervention on return to work for sick-listed employees with common mental disorders: results of a cluster randomized controlled trial. *J Med Internet Res* 2015 May 13;17(5):e116 [FREE Full text] [doi: [10.2196/jmir.4097](https://doi.org/10.2196/jmir.4097)] [Medline: [25972279](https://pubmed.ncbi.nlm.nih.gov/25972279/)]
174. Voogt C, Kuntsche E, Kleinjan M, Poelen E, Engels R. Using ecological momentary assessment to test the effectiveness of a web-based brief alcohol intervention over time among heavy-drinking students: randomized controlled trial. *J Med Internet Res* 2014 Jan 08;16(1):e5 [FREE Full text] [doi: [10.2196/jmir.2817](https://doi.org/10.2196/jmir.2817)] [Medline: [24401555](https://pubmed.ncbi.nlm.nih.gov/24401555/)]
175. Vroege DP, Wijsman CA, Broekhuizen K, de Craen AJ, van Heemst D, van der Ouderaa FJ, et al. Dose-response effects of a web-based physical activity program on body composition and metabolic health in inactive older adults: additional analyses of a randomized controlled trial. *J Med Internet Res* 2014 Dec 04;16(12):e265 [FREE Full text] [doi: [10.2196/jmir.3643](https://doi.org/10.2196/jmir.3643)] [Medline: [25486673](https://pubmed.ncbi.nlm.nih.gov/25486673/)]
176. Vuorinen A, Leppänen J, Kaijanranta H, Kulju M, Heliö T, van Gils M, et al. Use of home telemonitoring to support multidisciplinary care of heart failure patients in Finland: randomized controlled trial. *J Med Internet Res* 2014 Dec 11;16(12):e282 [FREE Full text] [doi: [10.2196/jmir.3651](https://doi.org/10.2196/jmir.3651)] [Medline: [25498992](https://pubmed.ncbi.nlm.nih.gov/25498992/)]
177. Walthouwer MJ, Oenema A, Lechner L, de Vries H. Use and effectiveness of a video- and text-driven web-based computer-tailored intervention: randomized controlled trial. *J Med Internet Res* 2015 Sep 25;17(9):e222 [FREE Full text] [doi: [10.2196/jmir.4496](https://doi.org/10.2196/jmir.4496)] [Medline: [26408488](https://pubmed.ncbi.nlm.nih.gov/26408488/)]
178. Wang Z, Wang J, Maercker A. Chinese My Trauma Recovery, a web-based intervention for traumatized persons in two parallel samples: randomized controlled trial. *J Med Internet Res* 2013 Sep 30;15(9):e213 [FREE Full text] [doi: [10.2196/jmir.2690](https://doi.org/10.2196/jmir.2690)] [Medline: [24080137](https://pubmed.ncbi.nlm.nih.gov/24080137/)]

179. Watson A, Bickmore T, Cange A, Kulshreshtha A, Kvedar J. An internet-based virtual coach to promote physical activity adherence in overweight adults: randomized controlled trial. *J Med Internet Res* 2012 Jan 26;14(1):e1 [FREE Full text] [doi: [10.2196/jmir.1629](https://doi.org/10.2196/jmir.1629)] [Medline: [22281837](https://pubmed.ncbi.nlm.nih.gov/22281837/)]
180. Watson S, Woodside JV, Ware LJ, Hunter SJ, McGrath A, Cardwell CR, et al. Effect of a web-based behavior change program on weight loss and cardiovascular risk factors in overweight and obese adults at high risk of developing cardiovascular disease: randomized controlled trial. *J Med Internet Res* 2015 Jul 16;17(7):e177 [FREE Full text] [doi: [10.2196/jmir.3828](https://doi.org/10.2196/jmir.3828)] [Medline: [26183659](https://pubmed.ncbi.nlm.nih.gov/26183659/)]
181. Wayne N, Perez DF, Kaplan DM, Ritvo P. Health coaching reduces HbA1c in type 2 diabetic patients from a lower-socioeconomic status community: a randomized controlled trial. *J Med Internet Res* 2015 Oct 05;17(10):e224 [FREE Full text] [doi: [10.2196/jmir.4871](https://doi.org/10.2196/jmir.4871)] [Medline: [26441467](https://pubmed.ncbi.nlm.nih.gov/26441467/)]
182. Weymann N, Dirmaier J, von Wolff A, Kriston L, Härter M. Effectiveness of a Web-based tailored interactive health communication application for patients with type 2 diabetes or chronic low back pain: randomized controlled trial. *J Med Internet Res* 2015 Mar 03;17(3):e53 [FREE Full text] [doi: [10.2196/jmir.3904](https://doi.org/10.2196/jmir.3904)] [Medline: [25736340](https://pubmed.ncbi.nlm.nih.gov/25736340/)]
183. Whittaker R, Merry S, Stasiak K, McDowell H, Doherty I, Shepherd M, et al. MEMO--a mobile phone depression prevention intervention for adolescents: development process and postprogram findings on acceptability from a randomized controlled trial. *J Med Internet Res* 2012 Jan 24;14(1):e13 [FREE Full text] [doi: [10.2196/jmir.1857](https://doi.org/10.2196/jmir.1857)] [Medline: [22278284](https://pubmed.ncbi.nlm.nih.gov/22278284/)]
184. Ybarra M, Ba ci Bosi AT, Korchmaros J, Emri S. A text messaging-based smoking cessation program for adult smokers: randomized controlled trial. *J Med Internet Res* 2012 Dec 27;14(6):e172 [FREE Full text] [doi: [10.2196/jmir.2231](https://doi.org/10.2196/jmir.2231)] [Medline: [23271159](https://pubmed.ncbi.nlm.nih.gov/23271159/)]
185. Knowlden AP, Sharma M. Process evaluation of the Enabling Mothers to Prevent Pediatric Obesity Through Web-Based Learning and Reciprocal Determinism (EMPOWER) randomized control trial. *Health Promot Pract* 2014 Sep;15(5):685-694. [doi: [10.1177/1524839914523431](https://doi.org/10.1177/1524839914523431)] [Medline: [24648285](https://pubmed.ncbi.nlm.nih.gov/24648285/)]
186. Laranjo L, Arguel A, Neves AL, Gallagher AM, Kaplan R, Mortimer N, et al. The influence of social networking sites on health behavior change: a systematic review and meta-analysis. *J Am Med Inform Assoc* 2015 Jan;22(1):243-256 [FREE Full text] [doi: [10.1136/amiajnl-2014-002841](https://doi.org/10.1136/amiajnl-2014-002841)] [Medline: [25005606](https://pubmed.ncbi.nlm.nih.gov/25005606/)]
187. The Joanna Briggs Institute. 2015. The Joanna Briggs Institute Levels of Evidence and Grades of Recommendation Working Party 2014 URL: <http://joannabriggs.org/jbi-approach.html> [accessed 2019-04-21] [WebCite Cache ID 77oUvnyDQ]
188. Jarmolowicz DP, Cherry JB, Reed DD, Bruce JM, Crespi JM, Lusk JL, et al. Robust relation between temporal discounting rates and body mass. *Appetite* 2014 Jul;78:63-67 [FREE Full text] [doi: [10.1016/j.appet.2014.02.013](https://doi.org/10.1016/j.appet.2014.02.013)] [Medline: [24650831](https://pubmed.ncbi.nlm.nih.gov/24650831/)]
189. Kahneman D, Tversky A. Prospect theory: an analysis of decision under risk. *Econometrica* 1979 Mar;47(2):263. [doi: [10.2307/1914185](https://doi.org/10.2307/1914185)]
190. Leahey T, Rosen J. DietBet: a web-based program that uses social gaming and financial incentives to promote weight loss. *JMIR Serious Games* 2014 Feb 07;2(1):e2 [FREE Full text] [doi: [10.2196/games.2987](https://doi.org/10.2196/games.2987)] [Medline: [25658966](https://pubmed.ncbi.nlm.nih.gov/25658966/)]
191. Lee J, Lee M, Choi IH. Social network games uncovered: motivations and their attitudinal and behavioral outcomes. *Cyberpsychol Behav Soc Netw* 2012 Dec;15(12):643-648. [doi: [10.1089/cyber.2012.0093](https://doi.org/10.1089/cyber.2012.0093)] [Medline: [23020746](https://pubmed.ncbi.nlm.nih.gov/23020746/)]
192. Seifert CM, Chapman LS, Hart JK, Perez P. Enhancing intrinsic motivation in health promotion and wellness. *Am J Health Promot* 2012;26(3):TAHP1-TAH12. [doi: [10.4278/ajhp.26.3.tahp](https://doi.org/10.4278/ajhp.26.3.tahp)] [Medline: [22208425](https://pubmed.ncbi.nlm.nih.gov/22208425/)]
193. Batorsky B, Taylor E, Huang C, Liu H, Mattke S. Understanding the relationship between incentive design and participation in U.S. workplace wellness programs. *Am J Health Promot* 2016;30(3):198-203. [doi: [10.4278/ajhp.150210-QUAN-718](https://doi.org/10.4278/ajhp.150210-QUAN-718)] [Medline: [26734957](https://pubmed.ncbi.nlm.nih.gov/26734957/)]
194. Haff N, Patel MS, Lim R, Zhu J, Troxel AB, Asch DA, et al. The role of behavioral economic incentive design and demographic characteristics in financial incentive-based approaches to changing health behaviors: a meta-analysis. *Am J Health Promot* 2015;29(5):314-323. [doi: [10.4278/ajhp.140714-LIT-333](https://doi.org/10.4278/ajhp.140714-LIT-333)] [Medline: [25928816](https://pubmed.ncbi.nlm.nih.gov/25928816/)]
195. Bandura A, Simon KM. The role of proximal intentions in self-regulation of refractory behavior. *Cogn Ther Res* 1977 Sep;1(3):177-193. [doi: [10.1007/bf01186792](https://doi.org/10.1007/bf01186792)]
196. Fishbach A, Dhar R, Zhang Y. Subgoals as substitutes or complements: the role of goal accessibility. *J Pers Soc Psychol* 2006 Aug;91(2):232-242. [doi: [10.1037/0022-3514.91.2.232](https://doi.org/10.1037/0022-3514.91.2.232)] [Medline: [16881761](https://pubmed.ncbi.nlm.nih.gov/16881761/)]
197. Carlson JA, Sallis JF, Ramirez ER, Patrick K, Norman GJ. Physical activity and dietary behavior change in Internet-based weight loss interventions: comparing two multiple-behavior change indices. *Prev Med* 2012 Jan;54(1):50-54 [FREE Full text] [doi: [10.1016/j.ypmed.2011.10.018](https://doi.org/10.1016/j.ypmed.2011.10.018)] [Medline: [22085706](https://pubmed.ncbi.nlm.nih.gov/22085706/)]
198. Bandura A. Temporal dynamics and decomposition of reciprocal determinism: a reply to Phillips and Orton. *Psychol Rev* 1983;90(2):166-170. [doi: [10.1037/0033-295x.90.2.166](https://doi.org/10.1037/0033-295x.90.2.166)]
199. Cui G, Lockee B, Meng C. Building modern online social presence: a review of social presence theory and its instructional design implications for future trends. *Educ Inf Technol* 2012 Mar 11;18(4):661-685. [doi: [10.1007/s10639-012-9192-1](https://doi.org/10.1007/s10639-012-9192-1)]
200. Rourke L, Anderson T. Exploring social communication in computer conferencing. *JILR* 2002;13(3):259.
201. Knowlden AP, Sharma M, Cottrell RR, Wilson BR, Johnson ML. Impact evaluation of Enabling Mothers to Prevent Pediatric Obesity through Web-Based Education and Reciprocal Determinism (EMPOWER) randomized control trial. *Health Educ Behav* 2015 Apr;42(2):171-184. [doi: [10.1177/1090198114547816](https://doi.org/10.1177/1090198114547816)] [Medline: [25161168](https://pubmed.ncbi.nlm.nih.gov/25161168/)]

202. Bittner JV, Kulesz MM. Health promotion messages: the role of social presence for food choices. *Appetite* 2015 Apr;87:336-343. [doi: [10.1016/j.appet.2015.01.001](https://doi.org/10.1016/j.appet.2015.01.001)] [Medline: [25579221](https://pubmed.ncbi.nlm.nih.gov/25579221/)]
203. Yu CH, Parsons JA, Hall S, Newton D, Jovicic A, Lottridge D, et al. User-centered design of a web-based self-management site for individuals with type 2 diabetes - providing a sense of control and community. *BMC Med Inform Decis Mak* 2014 Jul 23;14:60 [FREE Full text] [doi: [10.1186/1472-6947-14-60](https://doi.org/10.1186/1472-6947-14-60)] [Medline: [25056379](https://pubmed.ncbi.nlm.nih.gov/25056379/)]
204. Lau AY, Proudfoot J, Andrews A, Liaw S, Crimmins J, Arguel A, et al. Which bundles of features in a web-based personally controlled health management system are associated with consumer help-seeking behaviors for physical and emotional well-being? *J Med Internet Res* 2013 May 06;15(5):e79 [FREE Full text] [doi: [10.2196/jmir.2414](https://doi.org/10.2196/jmir.2414)] [Medline: [23649790](https://pubmed.ncbi.nlm.nih.gov/23649790/)]
205. Rimer BK, Kreuter MW. Advancing tailored health communication: a persuasion and message effects perspective. *J Communication* 2006 Aug;56(s1):S184-S201. [doi: [10.1111/j.1460-2466.2006.00289.x](https://doi.org/10.1111/j.1460-2466.2006.00289.x)]
206. Young MD, Collins CE, Callister R, Plotnikoff RC, Doran CM, Morgan PJ. The SHED-IT weight loss maintenance trial protocol: a randomised controlled trial of a weight loss maintenance program for overweight and obese men. *Contemp Clin Trials* 2014 Jan;37(1):84-97. [doi: [10.1016/j.cct.2013.11.004](https://doi.org/10.1016/j.cct.2013.11.004)] [Medline: [24246820](https://pubmed.ncbi.nlm.nih.gov/24246820/)]
207. Morgan PJ, Scott HA, Young MD, Plotnikoff RC, Collins CE, Callister R. Associations between program outcomes and adherence to social cognitive theory tasks: process evaluation of the SHED-IT community weight loss trial for men. *Int J Behav Nutr Phys Act* 2014 Jul 11;11:89 [FREE Full text] [doi: [10.1186/s12966-014-0089-9](https://doi.org/10.1186/s12966-014-0089-9)] [Medline: [25011421](https://pubmed.ncbi.nlm.nih.gov/25011421/)]
208. Krebs P, Prochaska JO, Rossi JS. A meta-analysis of computer-tailored interventions for health behavior change. *Prev Med* 2010;51(3-4):214-221 [FREE Full text] [doi: [10.1016/j.ypmed.2010.06.004](https://doi.org/10.1016/j.ypmed.2010.06.004)] [Medline: [20558196](https://pubmed.ncbi.nlm.nih.gov/20558196/)]
209. Wójcicki TR, Grigsby-Toussaint D, Hillman CH, Huhman M, McAuley E. Promoting physical activity in low-active adolescents via Facebook: a pilot randomized controlled trial to test feasibility. *JMIR Res Protoc* 2014 Oct 30;3(4):e56 [FREE Full text] [doi: [10.2196/resprot.3013](https://doi.org/10.2196/resprot.3013)] [Medline: [25357008](https://pubmed.ncbi.nlm.nih.gov/25357008/)]
210. Cavallo DN, Tate DF, Ries AV, Brown JD, DeVellis RF, Ammerman AS. A social media-based physical activity intervention: a randomized controlled trial. *Am J Prev Med* 2012 Nov;43(5):527-532 [FREE Full text] [doi: [10.1016/j.amepre.2012.07.019](https://doi.org/10.1016/j.amepre.2012.07.019)] [Medline: [23079176](https://pubmed.ncbi.nlm.nih.gov/23079176/)]
211. Hwang KO, Etchegaray JM, Sciamanna CN, Bernstam EV, Thomas EJ. Structural social support predicts functional social support in an online weight loss programme. *Health Expect* 2014 Jun;17(3):345-352 [FREE Full text] [doi: [10.1111/j.1369-7625.2011.00759.x](https://doi.org/10.1111/j.1369-7625.2011.00759.x)] [Medline: [22212418](https://pubmed.ncbi.nlm.nih.gov/22212418/)]
212. Hwang KO, Ottenbacher AJ, Green AP, Cannon-Diehl MR, Richardson O, Bernstam EV, et al. Social support in an internet weight loss community. *Int J Med Inform* 2010 Jan;79(1):5-13 [FREE Full text] [doi: [10.1016/j.ijmedinf.2009.10.003](https://doi.org/10.1016/j.ijmedinf.2009.10.003)] [Medline: [19945338](https://pubmed.ncbi.nlm.nih.gov/19945338/)]
213. Pagoto SL, Schneider KL, Oleski J, Smith B, Bauman M. The adoption and spread of a core-strengthening exercise through an online social network. *J Phys Act Health* 2014 Mar;11(3):648-653. [doi: [10.1123/jpah.2012-0040](https://doi.org/10.1123/jpah.2012-0040)] [Medline: [23416874](https://pubmed.ncbi.nlm.nih.gov/23416874/)]
214. Block LG, Keller PA. When to accentuate the negative: the effects of perceived efficacy and message framing on intentions to perform a health-related behavior. *J Mark Res* 1995 May;32(2):192. [doi: [10.2307/3152047](https://doi.org/10.2307/3152047)]
215. Wood R, Bandura A. Social cognitive theory of organizational management. *Acad Manage Rev* 1989 Jul;14(3):361-384. [doi: [10.5465/amr.1989.4279067](https://doi.org/10.5465/amr.1989.4279067)]
216. Beehler GP, Rodrigues AE, Kay MA, Kiviniemi MT, Steinbrenner L. Perceptions of barriers and facilitators to health behavior change among veteran cancer survivors. *Mil Med* 2014 Sep;179(9):998-1005. [doi: [10.7205/MILMED-D-14-00027](https://doi.org/10.7205/MILMED-D-14-00027)] [Medline: [25181718](https://pubmed.ncbi.nlm.nih.gov/25181718/)]
217. Stone RA, Rao RH, Sevick MA, Cheng C, Hough LJ, Macpherson DS, et al. Active care management supported by home telemonitoring in veterans with type 2 diabetes: the DiaTel randomized controlled trial. *Diabetes Care* 2010 Mar;33(3):478-484 [FREE Full text] [doi: [10.2337/dc09-1012](https://doi.org/10.2337/dc09-1012)] [Medline: [20009091](https://pubmed.ncbi.nlm.nih.gov/20009091/)]
218. van Vugt M, de Wit M, Cleijne WH, Snoek FJ. Use of behavioral change techniques in web-based self-management programs for type 2 diabetes patients: systematic review. *J Med Internet Res* 2013 Dec 13;15(12):e279 [FREE Full text] [doi: [10.2196/jmir.2800](https://doi.org/10.2196/jmir.2800)] [Medline: [24334230](https://pubmed.ncbi.nlm.nih.gov/24334230/)]
219. van Straten A, Cuijpers P, Smits N. Effectiveness of a web-based self-help intervention for symptoms of depression, anxiety, and stress: randomized controlled trial. *J Med Internet Res* 2008 Mar 25;10(1):e7 [FREE Full text] [doi: [10.2196/jmir.954](https://doi.org/10.2196/jmir.954)] [Medline: [18364344](https://pubmed.ncbi.nlm.nih.gov/18364344/)]
220. Friederichs SA, Oenema A, Bolman C, Guyaux J, van Keulen HM, Lechner L. I Move: systematic development of a web-based computer tailored physical activity intervention, based on motivational interviewing and self-determination theory. *BMC Public Health* 2014 Feb 28;14:212 [FREE Full text] [doi: [10.1186/1471-2458-14-212](https://doi.org/10.1186/1471-2458-14-212)] [Medline: [24580802](https://pubmed.ncbi.nlm.nih.gov/24580802/)]
221. Friederichs S, Bolman C, Oenema A, Guyaux J, Lechner L. Motivational interviewing in a web-based physical activity intervention with an avatar: randomized controlled trial. *J Med Internet Res* 2014 Feb 13;16(2):e48 [FREE Full text] [doi: [10.2196/jmir.2974](https://doi.org/10.2196/jmir.2974)] [Medline: [24550153](https://pubmed.ncbi.nlm.nih.gov/24550153/)]
222. LaRose R, Eastin MS. A social cognitive theory of internet uses and gratifications: toward a new model of media attendance. *J Broadcast Electron Media* 2004 Oct;48(3):358-377. [doi: [10.1207/s15506878jobem4803_2](https://doi.org/10.1207/s15506878jobem4803_2)]
223. Krukowski RA, Harvey-Berino J, Bursac Z, Ashikaga T, West DS. Patterns of success: online self-monitoring in a web-based behavioral weight control program. *Health Psychol* 2013 Feb;32(2):164-170 [FREE Full text] [doi: [10.1037/a0028135](https://doi.org/10.1037/a0028135)] [Medline: [22545978](https://pubmed.ncbi.nlm.nih.gov/22545978/)]

224. Uchino BN. Social Support And Physical Health: Understanding The Health Consequences Of Relationships. New Haven: Yale University Press; 2004.
225. Cobb NK, Poirier J. Effectiveness of a multimodal online well-being intervention: a randomized controlled trial. *Am J Prev Med* 2014 Jan;46(1):41-48 [FREE Full text] [doi: [10.1016/j.amepre.2013.08.018](https://doi.org/10.1016/j.amepre.2013.08.018)] [Medline: [24355670](https://pubmed.ncbi.nlm.nih.gov/24355670/)]
226. Cohen S, Mermelstein R, Kamarck TH. Measuring the functional components of social support. 1985 Presented at: NATO Advanced Research Workshop on Social Support; September 19-23, 1983; Chateau de Bonas, France. [doi: [10.1007/978-94-009-5115-0](https://doi.org/10.1007/978-94-009-5115-0)]
227. Evers KE, Prochaska JO, Castle PH, Johnson JL, Prochaska JM, Harrison PL, et al. Development of an individual well-being scores assessment. *Psychol Well-Being Theory Res Pract* 2012;2(1):2. [doi: [10.1186/2211-1522-2-2](https://doi.org/10.1186/2211-1522-2-2)]
228. Atkin DJ, Hunt DS, Lin CA. Diffusion theory in the new media environment: toward an integrated technology adoption model. *Mass Commun Soc* 2015 Aug 07;18(5):623-650. [doi: [10.1080/15205436.2015.1066014](https://doi.org/10.1080/15205436.2015.1066014)]
229. Kruse CS, Argueta DA, Lopez L, Nair A. Patient and provider attitudes toward the use of patient portals for the management of chronic disease: a systematic review. *J Med Internet Res* 2015 Feb 20;17(2):e40 [FREE Full text] [doi: [10.2196/jmir.3703](https://doi.org/10.2196/jmir.3703)] [Medline: [25707035](https://pubmed.ncbi.nlm.nih.gov/25707035/)]
230. Detmer D, Bloomrosen M, Raymond B, Tang P. Integrated personal health records: transformative tools for consumer-centric care. *BMC Med Inform Decis Mak* 2008 Oct 06;8:45 [FREE Full text] [doi: [10.1186/1472-6947-8-45](https://doi.org/10.1186/1472-6947-8-45)] [Medline: [18837999](https://pubmed.ncbi.nlm.nih.gov/18837999/)]
231. Wang Y, Kraut RE, Levine JM. Eliciting and receiving online support: using computer-aided content analysis to examine the dynamics of online social support. *J Med Internet Res* 2015 Apr 20;17(4):e99 [FREE Full text] [doi: [10.2196/jmir.3558](https://doi.org/10.2196/jmir.3558)] [Medline: [25896033](https://pubmed.ncbi.nlm.nih.gov/25896033/)]
232. Payton FC, Kvasny L. Online HIV awareness and technology affordance benefits for black female collegians - maybe not: the case of stigma. *J Am Med Inform Assoc* 2016 Dec;23(6):1121-1126. [doi: [10.1093/jamia/ocw017](https://doi.org/10.1093/jamia/ocw017)] [Medline: [27094988](https://pubmed.ncbi.nlm.nih.gov/27094988/)]
233. Whealin JM, Kuhn E, Pietrzak RH. Applying behavior change theory to technology promoting veteran mental health care seeking. *Psychol Serv* 2014 Nov;11(4):486-494. [doi: [10.1037/a0037232](https://doi.org/10.1037/a0037232)] [Medline: [25384001](https://pubmed.ncbi.nlm.nih.gov/25384001/)]
234. Plaete J, De Bourdeaudhuij I, Verloigne M, Crombez G. The use and evaluation of self-regulation techniques can predict health goal attainment in adults: an explorative study. *PeerJ* 2016;4:e1666 [FREE Full text] [doi: [10.7717/peerj.1666](https://doi.org/10.7717/peerj.1666)] [Medline: [26966648](https://pubmed.ncbi.nlm.nih.gov/26966648/)]
235. Eccles JS, Wigfield A. Motivational beliefs, values, and goals. *Annu Rev Psychol* 2002;53:109-132. [doi: [10.1146/annurev.psych.53.100901.135153](https://doi.org/10.1146/annurev.psych.53.100901.135153)] [Medline: [11752481](https://pubmed.ncbi.nlm.nih.gov/11752481/)]
236. Rolls K, Hansen M, Jackson D, Elliott D. How health care professionals use social media to create virtual communities: an integrative review. *J Med Internet Res* 2016 Dec 16;18(6):e166 [FREE Full text] [doi: [10.2196/jmir.5312](https://doi.org/10.2196/jmir.5312)] [Medline: [27328967](https://pubmed.ncbi.nlm.nih.gov/27328967/)]
237. Gentry S, L'Estrade Ehrstrom B, Gauthier A, Alvarez J, Wortley D, van Rijswijk J, et al. Serious Gaming and Gamification interventions for health professional education. *Cochrane Database Syst Rev* 2018;6 [FREE Full text] [doi: [10.1002/14651858.CD012209.pub2](https://doi.org/10.1002/14651858.CD012209.pub2).] [Medline: [CD012209](https://pubmed.ncbi.nlm.nih.gov/CD012209/)]
238. Sbaifi L, Rowley J. Trust and credibility in web-based health information: a review and agenda for future research. *J Med Internet Res* 2017 Dec 19;19(6):e218 [FREE Full text] [doi: [10.2196/jmir.7579](https://doi.org/10.2196/jmir.7579)] [Medline: [28630033](https://pubmed.ncbi.nlm.nih.gov/28630033/)]
239. Weldring T, Smith SM. Patient-reported outcomes (PROs) and patient-reported outcome measures (PROMs). *Health Serv Insights* 2013;6:61-68 [FREE Full text] [doi: [10.4137/HSL.S11093](https://doi.org/10.4137/HSL.S11093)] [Medline: [25114561](https://pubmed.ncbi.nlm.nih.gov/25114561/)]
240. Michie S, Thomas J, Johnston M, Aonghusa PM, Shawe-Taylor J, Kelly MP, et al. The Human Behaviour-Change Project: harnessing the power of artificial intelligence and machine learning for evidence synthesis and interpretation. *Implement Sci* 2017 Dec 18;12(1):121 [FREE Full text] [doi: [10.1186/s13012-017-0641-5](https://doi.org/10.1186/s13012-017-0641-5)] [Medline: [29047393](https://pubmed.ncbi.nlm.nih.gov/29047393/)]

Abbreviations

CINAHL: Cumulative Index to Nursing and Allied Health Literature

CONSORT-EHEALTH: Consolidated Standards of Reporting Trials of Electronic and Mobile HEalth Applications and onLine TeleHealth

DHIM: Digital Health Intervention Model

eHealth: electronic health

EMPOWER: Enabling Mothers to Prevent Pediatric Obesity Through Web-Based Education and Reciprocal Determinism

GUS: games used seriously

iCBT: internet cognitive behavioral therapy

INSHAPE: Internet Support for Healthy Associations Promoting Exercise

IWBS: Individual-level Well-Being Assessment and Scoring Method

JI: Joanna Briggs Institute

mHealth: mobile health

MI: motivational interviewing

PA: physical activity

PCHMS: Personally Controlled Health Management Systems

PRISMA-ScR: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews

RCT: randomized controlled trial

SCT: social cognitive theory

SHED-IT: Self-Help, Exercise and Diet using Information Technology

VA: Veterans Administration

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