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CONSUMERS' PERCEPTIONS OF A VIRTUAL HEALTH CHECK: AN EMPIRICAL INVESTIGATION

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Abstract

After years of the development of information systems (IS) designed primarily for healthcare managers and professionals, there is an increasing interest in reaching consumers and patients directly through consumer health information technology (IT). Consumer-centric health information systems enable individuals to manage their health better and maintain a healthier lifestyle. However, the foremost challenge in developing systems for health behavior change is that there is modest knowledge of how individuals interact with these systems and how they process and act on information. In addition, technologies cannot have the capacity to help facilitate self-monitoring and self-management or improve consumers' health outcomes if the consumers do not adopt them. The objective of this study is to investigate consumers' perceptions of a virtual health check. Specifically, we propose and test factors affecting perceived persuasiveness of the system and whether perceived persuasiveness predicts intention to adopt virtual health coaching. A theoretically driven research model is constructed, and a structural equation modeling (SEM) approach, namely partial least squares (PLS), is used to test the model against the data gathered from 130 subjects. The results of the study lend support to the proposed model. Studying the adoption, use, and impact of innovative consumer health IT is worthwhile, as it will guide future implementations.

Keywords: adoption, behavior change support systems, consumer health IT, partial least squares, persuasive systems design, virtual health check

1 Introduction

After years of the development of information systems (IS) designed primarily for healthcare managers and professionals, there is an increasing interest in reaching consumers and patients directly through consumer health information technology (IT). Consumer health IT applications are designed to interact directly with the consumer. According to Payton and colleagues (2011, p. vi), there has been "a shift in the role of the patient from passive recipient to active consumer of health information and active user of healthcare devices, logging, and monitoring systems." Indeed, by providing consumers with access and tools relating to their own health information, we can begin to influence how they manage their health and well-being. Ultimately, consumer health IT applications and systems enable individuals to manage their health better and maintain a healthier lifestyle. Examples of consumer health IT include various technologies such as web- and mobile-based applications, social health technologies, and portable devices like accelerometers and sensors. Oinas-Kukkonen (2010, 2012) has proposed a related generic concept: behavior change support systems (BCSSs). BCSSs highlight autogenous and voluntary approaches in which people use information technologies to change their own attitudes or behaviors by building upon their own motivation or goal (Oinas-Kukkonen, 2010). Behavior change support systems harness either technology-mediated persuasion or technology-human persuasion. Technology-human persuasion is fully automatized, whereas technology-mediated persuasion means that people are influencing others through, e.g., discussion forums, instant messages, blogs, virtual environments, or social network systems.

At the beginning of the 21st century, Eysenbach (2000) stated that the primary challenge in developing comprehensive systems for consumers is that there is modest knowledge about how individuals interact with consumer health informatics and how they process and act on information. In a more recent report by Jimison and colleagues (2008), the most frequent barrier to consumer use of interactive health IT across studies was the lack of perceived benefit; the lack of convenience was another important obstacle. Furthermore, subjects were less likely to use systems if they did not fit seamlessly into their regular daily routines. Other major hindrances to the use of interactive consumer health IT were burdensome data entry and a lack of trust of the information provided. Lastly, technical issues often averted consistent system use. Clearly, technologies cannot have the capacity to help facilitate self-monitoring and self-management or improve consumers' health outcomes if the consumers do not accept them (Kim and Chang, 2007; Rahimpour et al., 2008; Or and Karsh, 2009). Or et al. (2011, p. 51) state that "the significant lack of theoretically driven empirical models is a concern because it leaves designers and decision makers without clear guidance of what to do to promote patient acceptance of CHIT [Consumer Health Information Technology]."

The objective of this study is to investigate consumers' perceptions of a virtual health check (VHC) system. Specifically, we aim to examine factors affecting the perceived persuasiveness of the system and whether perceived persuasiveness predicts intention to adopt virtual health coaching. A theoretically driven research model is constructed, and a structural equation modeling (SEM) approach, namely partial least squares (PLS), is used to test the model against the data gathered from 130 subjects. The remainder of the paper is organized as follows. Section 2 presents the theoretical background and the research model. Section 3 discusses the research methodology. Results from the data analysis are presented in Section 4. Section 5 gives the discussion of the results, while Section 6 concludes the paper.

2 Theoretical Background and Research Model

The interaction between people and IT is an area of inquiry that accentuates the multidisciplinary nature of the IS field. Human behavior impacts the whole life cycle of IT, including its design, development, deployment, adoption, and use. Moreover, IT influences people's behavior. In this study, we are interested in an IT artifact designed to influence users' behavior. Thus, we have decided

to build the research model on the persuasive systems design (PSD) model (Oinas-Kukkonen and Harjumaa, 2009). The proffered research model is depicted in Figure 1.

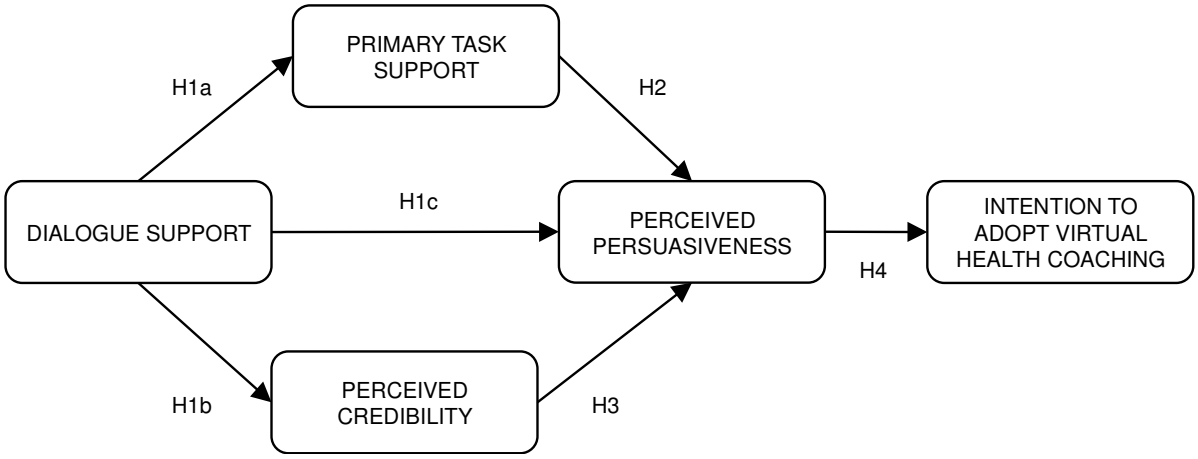

Figure 1. Research model.

The hypotheses are presented with arrows. The relationships between the constructs are assumed to be positive. In their review of technology acceptance research, Venkatesh and colleagues (2003; 2008) conclude that attitudinal constructs are significant only when performance and effort expectancies are not incorporated in the model. In the case of the proposed research model, perceived persuasiveness can be seen as an attitudinal construct.

According to Benbasat (2010, p. 18), HCI research has mainly focused on "interface designs for information systems implemented for improving the effectiveness or efficiency of users during tasks ranging from decision-making to purchasing on the Internet." Benbasat (2010) calls these types of systems *neutral*, i.e., the systems have no agenda on their own. Another class of system is one that attempts to *persuade the user to choose a particular course of action* (Benbasat, 2010; Chatterjee and Price, 2009; Fogg, 2003; Oinas-Kukkonen and Harjumaa, 2009). This type of persuasive system is designed with a specific agenda or intent. Benbasat (2010) argues that the design implications for these systems are "interesting in that the designs should differ based on whether the goal is assisting in an objective way, to persuade or to deceive." Oinas-Kukkonen and Harjumaa (2009) have conceptualized a framework for designing and evaluating persuasive systems, known as the *persuasive systems design* (PSD) *model*. In the PSD model, the persuasive system dimensions are primary task support (supporting the user's primary task and goals), computer-human dialogue support (supporting the interaction between the user and the system), perceived credibility, and social support (the system motivates users by leveraging social features). These distinct categories, apart from social support ,[1] will form the basis for the model development. The PSD model in full is presented elsewhere (see Oinas-Kukkonen and Harjumaa, 2009).

2.1 Dialogue Support

Al-Natour and Benbasat (2009) maintain that IT artifacts are social actors. Accordingly, people consider their interactions with IT artifacts as interpersonal in nature. Also, people tend to react to IT artifacts as if they were interacting in social situations (Nass et al., 1994; Al-Natour and Benbasat, 2009; Lee, 2009). Indeed, supporting the dialogue between the IT artifact and the individual users is essential. Dialogue support defines the key principles involved in keeping the user active and motivated when it comes to using the system, and ideally, helping the users to reach their intended behavior. Thus, dialogue support has a strong connection to primary task support. In dialogue support,

[1] In its current form, the Virtual Health Check does not facilitate social support.

system-to-user prompts, praise, and reminders play an important role (Fogg and Nass, 1997; Oinas-Kukkonen and Harjumaa, 2009). Dialogue support may be further enhanced by providing users with virtual rewards upon accomplishing certain tasks/goals. Providing appropriate feedback and suggestions to the user is also important. Finally, dialogue support promotes users' positive affect or feelings, which will likely influence their confidence in the source (credibility). The following hypotheses are formulated:

H1a: Dialogue support has a positive impact on primary task support.

H1b: Dialogue support positively influences perceived credibility.

H1c: Dialogue support positively affects perceived persuasiveness.

2.2 Primary Task Support

Primary task support encompasses the means to aid the individual in performing his or her primary task (Oinas-Kukkonen and Harjumaa, 2009). Gefen and Straub (2000) make a clear distinction between intrinsic and extrinsic IT tasks. In their view, intrinsic IT tasks are those where the IT itself provides the primary "ends," i.e., the product or service for which the IT is ultimately being used. In extrinsic IT tasks, IT is not the central component of the process or the goal, but is instrumental in achieving it (i.e., IT acts as the interface through which one accomplishes a goal) (Gefen and Straub, 2000). It may be argued that, within the context of primary task support, extrinsic tasks are more focal than intrinsic tasks. In our view, the aim of primary task support is to enhance the self-efficacy of the user and to reduce the cognitive burden and disorientation involved in using the system (cf. Nadkarni and Gupta, 2007; Webster and Ahuja, 2006). According to Johnston and Warkentin (2010, p. 3), self-efficacy is "the degree to which an individual believes in his or her ability to enact the recommended response." In addition, primary task support increases positive affect (Derrick et al., 2011). Positive affect in turn augments the persuasiveness of the source (Angst and Agarwal, 2009; Derrick et al., 2011). We put forward the following hypothesis:

H2: Primary task support positively affects perceived persuasiveness.

2.3 Perceived Credibility

Credibility and trust are important, related constructs. According to Everard and Galletta (2005), the apparent difference between trust and credibility is that "trust is an attribute of an observer (to have trust), whereas credibility is an attribute of another person or an object of interest (to be credible)" (p. 60). In these researchers' view, trust is a manifestation of credibility that could be considered to be trustworthiness. Labels such as accepting the advice, trusting the information, and believing the output are seen as conveying computer credibility (Everard and Galletta, 2005, p. 59). Prior research on online trust has favored dividing the trust component into various subcomponents (Hassanein and Head, 2007). These subcomponents include, for example, knowledge-based trust, institution-based trust, and cognition-based trust (see Gefen et al. 2003; McKnight et al. 2002). According to Sillence et al. (2006), various factors are likely to govern the extent to which individuals feel they can trust (health) advice online: (i) credible and aesthetic visual design, (ii) branding of the site or presence of familiar images or trusted logos, (iii) the quality of information (perceived expertise), and (iv) personalization. According to Hassanein and Head (2007), in studies that are not primarily zeroing in on the trust issues, trust has been treated as a single construct. Since the present research objective does not involve a detailed understanding or analysis of trust signals, trust issues are integrated under the perceived credibility construct. Obviously, credibility is a rather subjective issue. People make initial assessments of system credibility based on a firsthand inspection. Van Vugt and colleagues (2006, p. 877) suggest that an encounter with a (new) system is generally a visual one, and during system interaction, constant visual information immediately elicits aesthetic judgments. This principle is called surface credibility (Oinas-Kukkonen and Harjumaa, 2009). Perceived credibility might be bolstered by providing endorsements from respected and renowned sources (e.g., a recommendation

by an authoritative organization, an award for excellence in usability, or a privacy seal to ensure confidentiality). For perceived credibility, we offer the following hypothesis:

H3: Perceived credibility positively affects perceived persuasiveness.

2.4 Perceived Persuasiveness

In the classic situation in which persuasion is possible, the recipient receives a persuasive message from the source in a particular context (Briñol and Petty, 2009). Effective persuasion happens when the target of change (e.g., attitudes, beliefs) is modified in the desired direction (Petty and Cacioppo, 1986; Briñol and Petty 2009). In the classical models of attitude change, messages are presented, received, processed, and if successful, recipients' attitudes shift toward the advocated position (Crano and Prislin, 2006; Petty and Cacioppo, 1986; Wood, 2000). The altered attitude may have an impact on subsequent behavior under appropriate conditions (Crano and Prislin, 2006). Models such as the elaboration likelihood model (ELM; Petty and Cacioppo, 1986) and the heuristic/systematic model (HSM; Chen and Chaiken, 1999) are embodiments of the dual-process model (affective vs. cognitive processing; elaboration vs. cues), incorporating the process of message reception, attitude change, and ultimately, behavior change (Crano and Prislin, 2006). According to Crano and Prislin (2006) a central aspect that must be taken into account when reflecting on persuasion involves the fundamental construct of attitude. They state (p. 347) that "Today, most accept the view that an attitude represents an evaluative integration of cognitions and affects experienced in relation to an object." In the present study, perceived persuasiveness is operationally defined as an individual's favorable impressions of the system. The following hypothesis is rendered:

H4: Perceived persuasiveness has a positive impact on intention to adopt virtual health coaching.

3 Research Methodology

3.1 Study Context: Virtual Health Check and Coaching

The Virtual Health Check and Coaching (VHCC) system has been developed by the Finnish Medical Society Duodecim. VHCC is based on the best available information regarding health-enhancing lifestyles and the impact of lifestyle on quality of life and life expectancy, as well as the possibilities of changing to healthier habits.

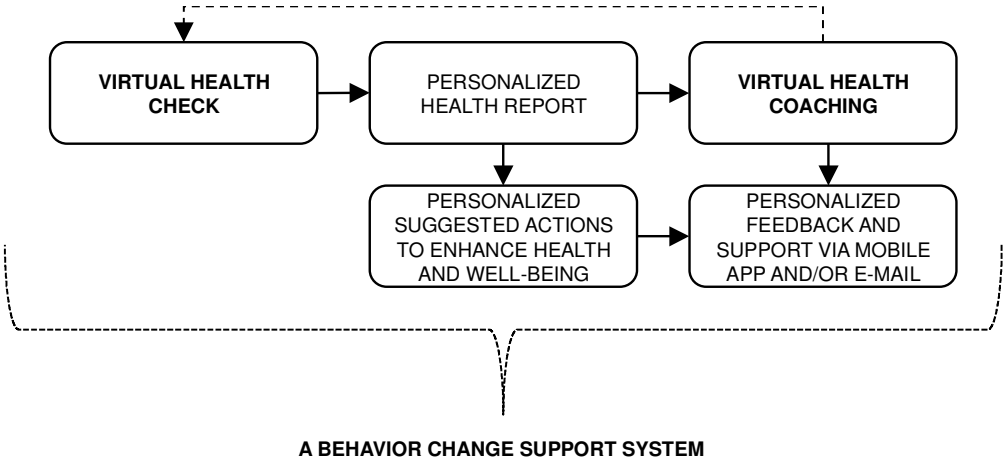

Figure 2. Virtual Health Check and Coaching (an instantiation of a BCSS).

The estimates for life expectancy and disease risks are based on several studies conducted by the National Institute of Health and Welfare and the Social Insurance Institution of Finland. Due to a lack of reliable information, it is not possible to consider the effects of certain health-related factors in the estimation. Examples of these are high usage of salt, hard fats from meat products, drug abuse, and

risk-prone extreme hobbies. Moreover, except for diabetes, chronic diseases are not taken into account in the virtual health check. After completion of the virtual health check, the individual starts to use the virtual health coaching. The virtual health coaching provides personalized exercises, suggestions, and feedback on a regular basis via e-mail and/or an installable mobile application (see Figure 2). The program cannot be used to diagnose a disease or to predict falling ill with a particular disease. Rather, the advice given by the program is meant to support individuals' health and well-being. Users who have specific concerns about their health and/or well-being are encouraged to consult a doctor.

3.2 Data Collection and Respondent Characteristics

In November 2011, an online survey was conducted for the users of the Virtual Health Check. Participants were recruited through an e-mail invitation to the survey. Data were collected over a period of seven days using an online survey software tool (Webropol). The survey instrument (see Appendix A) consisted of demographic questions and five-point Likert scale items (ranging from strongly disagree to strongly agree). Overall, 130 complete responses were obtained. There were no missing values. The respondent characteristics are presented in Table 1.

Demographics	Value	Frequency	Percent (%)
Gender	Female	73	56.2
	Male	57	43.8
Age (Mean 45.0; standard deviation 10.7; range 19–17)	19–29	8	6.2
	30–39	34	26.2
	40–49	45	34.6
	50–59	33	25.4
	60–69	7	5.4
	Over 70	3	2.3
Education (classification adapted from Finnish National Board of Education)	Basic education	5	3.8
	Upper secondary education	20	15.4
	Specialist vocational qualification	13	10.0
	Polytechnic bachelor's degree	29	22.3
	Polytechnic master's degree	8	6.2
	University bachelor's degree	7	5.4
	University master's degree (or higher)	44	33.8
	Other	4	3.1
Occupational status	Working	106	81.5
	Retired	10	7.7
	Student	8	6.2
	Unemployed	5	3.8
	At home with children	1	0.8

Table 1. Respondent characteristics (N=130).

The majority of the respondents were "white collar" workers, as most of them were working (81.5%) and held a university degree (39.2%). Only 6.2% of the respondents were under 30 years old, and 7.7% of the sample was over sixty. Thus, the sample mainly represents highly educated employees aged between 30 and 59 years. In general, this group can be considered one of the prime target populations for consumer health IT.

4 Data Analysis and Results

We analyzed our research model using PLS. More specifically, we utilized WarpPLS 3.0 (Scriptwarp Systems, Texas) software for data analysis. WarpPLS is a component-based path modeling software application based on the PLS method. It is comparable to, for example, PLS-Graph and SmartPLS, as it is based on the same method and offers similar features. PLS is more appropriate when the purpose of the model is to predict, rather than to test established theory (Chin et al., 2003). In addition, PLS is

reasonably robust to deviations from a multivariate distribution (Gefen et al., 2000b). The statistical objective of PLS is similar to that of linear regression, i.e., to demonstrate high R-squared and significant t-values, thereby rejecting the null hypothesis of no effect (Gefen et al., 2000b). It is often suggested that the minimal sample size in PLS analysis should be at least 10 times the number of items in the most complex construct. Our sample size exceeds this requirement. PLS model testing is carried out in two steps: (i) the assessment of the reliability and validity of the *measurement model*, and (ii) the assessment of the *structural model*. The measurement model includes the relationships between the constructs and the indicators used to measure them. The convergent and discriminant validity of the research instrument is examined in order to verify that the constructs' measures are valid and reliable before attempting to draw conclusions regarding relationships among constructs (structural model).

4.1 Measurement Model

Descriptive statistics for the research constructs are presented in Tables 2 and 3. The properties of the scales are assessed in terms of item loadings, discriminant validity, and internal consistency. Item loadings and internal consistencies greater than .70 are considered acceptable (Fornell and Larcker, 1981). All constructs were modeled as reflective and measured using multiple indicators. The constructs in the model display good internal consistency, as evidenced by their composite reliability scores, which range from .90 to .98. Item loadings ranged from .78 to .98 (see Appendix A).

Construct	Number of items	Mean (S.D.)	Composite reliability	Cronbach's alpha
Dialogue support	3	3.71 (0.83)	0.90	0.83
Primary task support	3	3.70 (0.74)	0.91	0.86
Credibility support	4	4.01 (0.79)	0.96	0.95
Perceived persuasiveness	5	3.87 (0.83)	0.94	0.92
Intention to adopt	3	3.84 (1.07)	0.98	0.97

Table 2. Construct means and reliability scores.

Construct	AVE	DIAL	PRIM	CRED	PRSV	INTE
Dialogue support (DIAL)	0.76	0.87				
Primary task support (PRIM)	0.78	0.76	0.88			
Credibility support (CRED)	0.86	0.64	0.55	0.93		
Perceived persuasiveness (PRSV)	0.76	0.74	0.68	0.75	0.87	
Intention to adopt (INTE)	0.94	0.47	0.41	0.42	0.54	0.97
Note. The shaded numbers on the diagonal are the square root of the AVE (Average Variance Extracted) between the constructs and their measures. Off-diagonal figures represent the inter-construct correlations. With regard to discriminant validity, diagonal elements should be greater than off-diagonal elements.						

Table 3. Latent variable correlations.

Inspection of the latent variable correlations and square root of the average variance extracted (AVE) in Table 3 shows that all of the five constructs share more variance with their indicators than with other constructs. In addition, AVE values of all the constructs were well above the suggested minimum of .50 (Fornell and Larcker, 1981), thus demonstrating adequate internal consistency.

4.2 Structural Model

For the evaluation of the structural model, the jackknifing resampling procedure was applied to test the significance of the paths' coefficients. Kock (2011) suggests that for small samples, jackknifing is the recommended resampling approach. Bootstrapping is recommended only for sample sizes greater than 100 (Kock, 2011). Our sample size is 130. However, in order to examine the two subgroups (female and male) individually, we decided to employ jackknifing (see Kock, 2011).

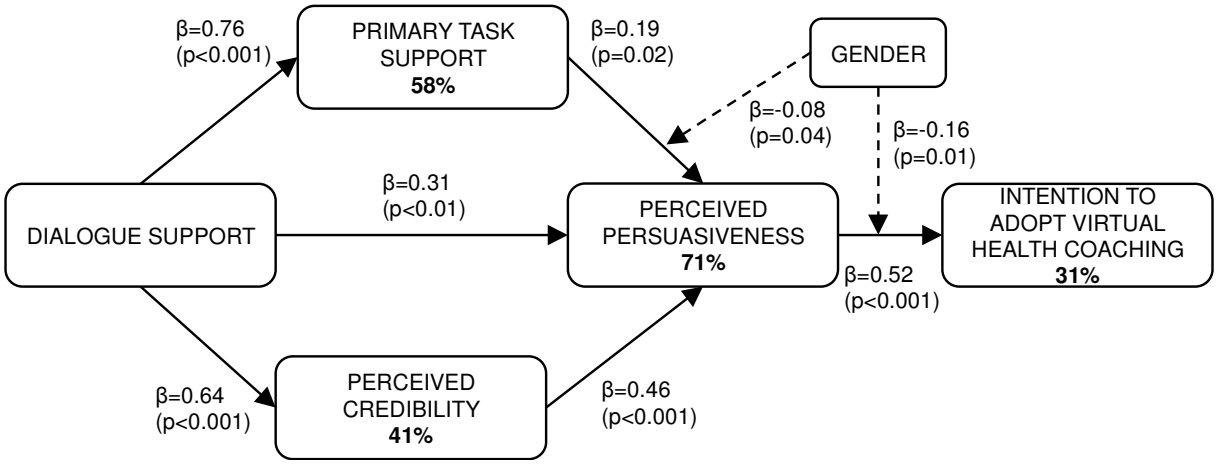

Figure 3. Research model showing results of PLS analysis (full sample, N=130).

For consistency, we tested the full sample (N=130) using the jackknifing procedure. Moreover, PLS regression was used as the analysis algorithm. As can be observed from Figure 3, the results of the PLS analysis provide substantial support for the model. Four out of six hypotheses were supported at p<.001. In conjunction, primary task support, dialogue support, and perceived credibility explain a substantial amount (71 percent) of the variance in perceived persuasiveness. Fifty-eight percent of the variance in primary task support and 41 percent of the variance in perceived credibility is accounted for by dialogue support. Finally, perceived persuasiveness explains 31 percent of the variance in the intention to adopt virtual health coaching. When conducting post-hoc analysis, we found that gender acts as a moderating link between primary task support and perceived persuasiveness, as well as between perceived persuasiveness and intention to adopt virtual health coaching. Age or education did not yield significant effects on the model. In order to examine the gender differences more thoroughly, we split the data into two subgroups (see Table 4).

Path	β (Weights)			R^2		
	Female subgroup (N=73)	Male subgroup (N=57)	Full sample (N=130)	Female subgroup (N=73)	Male subgroup (N=57)	Full sample (N=130)
DIAL→PRIM	0.74***	0.82***	0.76***	55%	66%	58%
DIAL→CRED	0.71***	0.52***	0.64***	51%	27%	41%
DIAL→PRSV	0.43**	0.18 n.s.	0.31**	69%	75%	71%
PRIM→PRSV	0.14 n.s.	0.28*	0.19*			
CRED→PRSV	0.34***	0.54***	0.46***			
PRSV→INTE	0.39***	0.67***	0.52***	15%	45%	31%
*** p<0.001; ** p<0.01; * p<0.05; n.s. not significant						

Table 4. Paths, coefficients, and R-squared values for the full sample and subgroups.

The largest difference between the subgroups occurs in the path between perceived persuasiveness and intention to adopt virtual health coaching (PRSV→INTE). For the female subgroup, the R-squared was 15%, whereas for the male subgroup it was 45%. Furthermore, there was a noticeable difference between the subgroups in the path between dialogue support and credibility support (DIAL→CRED). For the male subgroup, dialogue support explained 27% of the variance in the credibility support, while for the female subgroup the respective score was 51%. Significant gender differences have been previously found, for example, in perceptions of website design and website satisfaction (Cyr and Bonnanni, 2005) and online trust (Sánchez-Franco et al., 2009). For a recent summary of gender differences in the IT realm, see Riedl et al. (2010, p. 400).

Effect sizes (f^2) determine whether the effects indicated by path coefficients are small (.02), medium (.15), or large (.35) (Cohen, 1988). Effect sizes below .02 are considered to be too weak to be relevant.

Total effects (Effect size f^2)	DIAL	PRIM	CRED	PRSV	INTE
DIAL					
PRIM	0.76 (0.58)				
CRED	0.64 (0.41)				
PRSV	0.75 (0.55)	0.19 (0.13)	0.46 (0.35)		
INTE	0.39 (0.18)	0.10 (0.04)	0.24 (0.10)	0.52 (0.28)	

Table 5. Total effects and effect sizes (full sample).

All effect sizes for total effects are well above the .02 level, thus providing support for their practical relevance. Dialogue support yields the largest *total effect* on perceived persuasiveness (0.75; $f^2 = .55$). In turn, perceived persuasiveness has the largest impact on intention to adopt (0.52; $f^2 = .28$).

5 Discussion

In the present study, we constructed a model predicting perceived persuasiveness of a virtual health check and coaching system. Moreover, we examined whether perceived persuasiveness has an impact on intention to adopt the system. Overall, the results lend support to the hypotheses concerning factors that affect perceived persuasiveness and adoption intention. Dialogue support plays a large role in the proposed model, as it has significant effects (see Table 5) on primary task support, credibility support, and perceived persuasiveness. Through dialogue support, users receive appropriate feedback, which keeps them motivated in their endeavors. Current technological advances allow novel solutions for dialogue support, such as embodied conversational agents (Derrick et al., 2011), establishing and maintaining long-term human-computer relationships (Bickmore and Picard, 2005), or even persuasive robotic assistants (Looije et al., 2010). Primary task support focuses on aiding users in carrying out their primary activities with and within the system. Interestingly, for the female subgroup, primary task support did not have a significant relationship with perceived persuasiveness. This finding calls for further research with a larger sample. Perceived credibility encompasses believability, credibility, trust, and reliability. As hypothesized, it had a significant relationship with perceived persuasiveness. Clearly, if the users do not perceive the system to be credible, they are more likely to abandon it (Angst and Agarwal, 2009; Sillence et al., 2006).

As was anticipated, primary task support, dialogue support, and perceived credibility conjointly account for a substantial amount (71 percent) of the variance in perceived persuasiveness. Successively, perceived persuasiveness had a moderate but significant impact on intention to adopt the system. Overall, the presented model paves the way for further theory development regarding factors contributing to perceived persuasiveness and adoption of behavior change support systems (Oinas-Kukkonen, 2012). The next step to refine the theoretical model would be, for instance, to incorporate the construct of social influence and examine its interplay with the other constructs. In addition, examining the interaction of the constructs over a prolonged time across various settings would be germane. Eventually, it will be important to look beyond perceptions and intentions, and scrutinize whether a system is actually successful in changing the intended behaviors of its users. From a practical perspective, it is beneficial to recognize the most influential constructs leading to the perceived persuasiveness, and in turn, adoption of the system. This type of knowledge will aid in guiding the design and development processes of behavior change support systems. It must be noted that there are limitations to this study. This research represents an initial empirical test of a theoretical model, and should be subject to further testing with various participants and contexts. In addition, we used subjects from one country only (Finland), so the results may not generalize to other settings.

6 Conclusion

This paper proffered and tested a theory-based model predicting factors contributing to perceived persuasiveness of a behavior change support system. We believe that researchers and designers in the

e-health domain may benefit from this type of approach. Arguably, the exorbitant costs of healthcare demand innovative solutions for various stakeholders in this field. However, we do not claim that the mere use of IT—no matter how persuasive—is a sufficient approach in health behavior change endeavors. Even so, understanding and using persuasive systems design may prove to be valuable in such efforts. This research expands the current body of knowledge in the junction of Information Systems research and e-Health by developing an adoption model specific to persuasive behavior change support systems. It is necessary to further develop and test constructs applicable to consumers' intention to adopt behavior change support systems. A mixed method approach would be advantageous in related study designs. From a more practical viewpoint, we argue that studying the adoption, use, and impact of behavior change support systems is a feasible method that will guide future implementations. As a concluding remark, results from these types of studies are helpful in identifying the most influential adoption factors and proposing solutions that are able to engage the consumers in using the behavior change support systems for a prolonged time.

Acknowledgments

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APPENDIX A: MEASUREMENT INSTRUMENT

Construct	Item	Loading
Primary task support (PRIM)	1. VHC[a] helped me to evaluate the effect of my lifestyle on my health.	0.90
	2. VHC helped me to set my goals regarding my lifestyle.	0.91
	3. VHC aided me in realizing the potential need for change in my lifestyle habits.	0.84
Dialogue support (DIAL)	1. The feedback provided by VHC triggered a change in me.	0.78
	2. VHC provided me with appropriate feedback regarding my health.	0.90
	3. VHC provided me with personally relevant health-related feedback.	0.92
Credibility support (CRED)	1. Overall, I consider VHC to be believable.	0.92
	2. Overall, I consider VHC to be truthful.	0.90
	3. Overall, I consider VHC to be reliable.	0.94
	4. Overall, I consider VHC to be professional (showing expertise).	0.94
Perceived persuasiveness (PRSV)	1. In my opinion, VHC is interesting.	0.81
	2. In my opinion, VHC is convincing.	0.89
	3. In my opinion, VHC is beneficial.	0.89
	4. In my opinion, VHC is successful.	0.89
	5. In my opinion, VHC is practical.	0.86
Intention to adopt (INTE)	1. I would consider using virtual health coaching.	0.96
	2. I would be willing to try virtual health coaching.	0.97
	3. I would be willing to engage with virtual health coaching from now on.	0.98

[a] Virtual Health Check

Notes. Items in PRIM, DIAL, and INTE were five-point Likert scale items ranging from "strongly disagree" (1) to "strongly agree" (5). Items in CRED and PRSV used five-point semantic differential scales with positive and negative endpoint anchoring. In the data analysis, the positive endpoint for each item was mapped to "strongly agree" and the negative endpoint to "strongly disagree." All other values were mapped accordingly.