

Chronic Patients' Emotions Toward Self-Managing Care IT: The Role of Health Centrality and Dependence on IT

Azadeh Savoli, IESEG School of Management, France

Mamta Bhatt, IESEG School of Management, France

ABSTRACT

Patients' emotions toward health IT can play an important role in explaining their usage of it. One form of health IT is self-managing care IT, such as activity trackers that can be used by chronic patients to adopt a healthy lifestyle. The goal of this study is to understand the factors that influence the arousal of emotions in chronic patients while using these tools. Past studies, in general, tend to emphasize how IT shapes emotions, underplaying the role of the individual user's identity and, specifically, how central health is to the user's self in shaping emotions. In this research, the authors argue that patients' health identity centrality (i.e., the extent to which they consider health as central to their sense of self) can play an important role in forming their dependence on health IT by affecting their use of it directly and shaping their emotions around it.

KEYWORDS

Chronic Patients, Dependence on IT, Emotions, Health Identity Centrality, Health IT, Patient-Centric Systems

INTRODUCTION

Chronic conditions, e.g., diabetes, asthma, and cardiovascular diseases, are mainly associated with unhealthy lifestyle behaviors (Fortin et al., 2014) and are one of the major causes of death and disability worldwide. To manage these diseases, patients sometimes use health applications known as self-managing (SM) apps, such as activity trackers, calorie counters, and breathing monitors. These apps generate feedback about patients' SM performance, which can encourage patients to be active or adopt a healthy diet, and, as such, can engage them in adopting a healthy lifestyle (Chiauzzi et al., 2015).

Past research emphasizes the role of emotions in driving IT use (Cenfetelli, 2004; De Guinea & Markus, 2009; Stein et al., 2015). Positive emotions can lead to more usage; in contrast, negative emotions can adversely influence one's intentions to use an IT system and lead to resistance and discontinued usage (Maier et al., 2015). The role of emotions is also salient in the healthcare context. Encouraging positive emotions in patients and relieving their negative emotions toward health IT may engage them in using such technologies. Given the importance of emotions in shaping IT use, it is important to understand the antecedents that shape patients' emotional responses toward self-managing IT (SM IT).

Drawing on appraisal theories (e.g., Lazarus, 1991), extant IT literature argues that emotions toward an IT arise in response to appraisal of the IT (i.e., individuals' evaluations of the significance and consequences of an IT). For example, when a user finds that the new IT system is making their

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job more interesting, emotions such as happiness may be triggered. In contrast, if a user thinks that the new system can usurp their job, they might experience fear. Such appraisals can include dimensions such as self-importance, controllability, certainty, and goal conduciveness (Ellsworth & Scherer, 2003). IT research on the appraisal process focuses mainly on users' assessments of the expected consequence of the IT as either an opportunity or threat (i.e., the degree to which the IT can facilitate or hinder goal achievements) (e.g., Beaudry & Pinsonneault, 2010; Stein et al., 2015). That is, the research tends to look at dimensions such as goal conduciveness and controllability. Although assessing an IT in terms of its possible consequences is an important determinant of the emotions toward IT, a fundamental appraisal dimension is the significance of the IT for one's self (i.e., self-importance) (Siemer et al., 2007). Even though appraisal theories acknowledge the self-importance dimension, attention to this dimension remains limited. The self-importance dimension may be especially relevant in explaining the emotions toward health IT since health is an important concern for individuals suffering from chronic diseases.

The present study aims to address the above gap by arguing that appraisal of the importance of SM IT for the self may be key in explaining users' emotions toward it. Since health IT's design purpose is to improve patients' health status, the importance of the tool for the self is highly related to how important health is for the user. Therefore, this study draws on identity theories (e.g., Ashforth & Schinoff, 2016; Settles, 2004) to examine the role of patients' health identity centrality in shaping their emotions toward technology and eventual IT use. Identity centrality, defined as the importance that one ascribes to different self-aspects, has a bearing on one's actions, attitudes, and behaviors (e.g., Aquino et al., 2009; Murnieks et al., 2014). Drawing on this research, health identity centrality can be defined as the extent to which individuals consider health as integral or central to their sense of self. This paper argues that health identity centrality may be a factor shaping one's emotions toward SM IT, which will eventually shape their use of it. Thus, this research attempts to address the following question: *How does health identity centrality shape emotions toward SM IT in chronic patients while using these tools?*

To answer the above question, the paper examines quantitative data collected from 237 chronic patients who have used the activity tracker, Fitbit. The findings reveal that health identity centrality shapes emotions toward IT and chronic disease patients' dependence on the technology. Further, dependence on IT shapes IT usage directly as well as users' emotions toward it.

Theoretical Background

Emotions Toward IT, Outcomes, and Antecedents

According to appraisal theories (e.g., Lazarus, 1991), emotions are "mental states of readiness that arise from the appraisal of events and one's own thoughts" (Bagozzi et al., 1999, p. 184). Emotions generate subjective feelings, which then generate action tendencies. They are induced by a specific stimulus, i.e., something that a person reacts or responds to (Russell, 2003), such as e-health services.

Recent work by behavioral economists and psychologists indicates that under certain circumstances, emotions can have more explanatory power than cognition (Ariely & Loewenstein, 2006). The IT literature also finds that positive emotions can influence the acceptance and use of technology (e.g., Anderson & Agarwal, 2011). In contrast, negative emotions can adversely influence the intentions to use a system and usage behavior (Hibbeln et al., 2017). In addition, research on health IT shows the impact of patients' emotions toward IT. For example, Savoli and Barki (2017) show how chronic patients' emotional responses to an SM portal influenced their effective use of the portal.

Appraisal theories propose some central dimensions for the appraisal process (Ellsworth & Scherer, 2003), such as self-importance ("How important is this to me?"), controllability ("Can this be controlled?"), certainty ("Do I understand what is going on?"), and goal conduciveness ("Is something impeding my progress toward the goal?"). That is, individuals consciously or unconsciously assess the stimuli along these dimensions and, based on their evaluation, experience different emotions. Further,

emotions are not solely produced by the characteristics of a stimulus since different individuals can have different emotional reactions to the same stimulus (Bagozzi et al., 1999).

Most of the Information Systems (IS) literature focuses on the role of appraisal of the IT stimulus, along dimensions such as goal conduciveness and controllability, in shaping emotions. For example, Beaudry and Pinsonneault (2010) argue that the assessment of an IT stimulus as a threat or opportunity and the level of control users have over its potential consequences can trigger different emotions. Other studies—mostly in human-computer interaction research—focus on the design characteristics of IT (e.g., color, shape) to explain users' emotions toward it (e.g., Tractinsky et al., 2006).

While IS literature examines the appraisal of an IT stimulus based on the goal conduciveness and controllability dimensions, a focus on the role of self-importance in explaining emotions toward IT remains rare. According to the self-importance dimension, events or stimuli are appraised according to their perceived significance in terms of personal values and goals, or well-being. Building upon appraisal theory, and specifically the dimension of self-importance, this study argues that the extent of the importance of the stimulus for the self may play a key role in shaping emotional reactions to health IT. In particular, this study suggests that one may assess the meaningfulness of a specific stimulus in the health IT context by the extent to which health is central to one's self (i.e., health identity centrality).

Health Identity Centrality

Identity refers to an entity's efforts to define itself; the question "Who am I?" captures the core of identity (Ashforth & Schinoff, 2016). Past research on psychology defines identity centrality as "the importance or psychological attachment that individuals place on their identities" (Settles, 2004, p. 487). As Aquino et al. (2009, p. 124) suggest, identity centrality comes close to the concept of strength of identification and refers to the "the degree to which a person adopts a particular identity as a basis for his or her self-definition." Identities that are central are higher in priority (Settles, 2004); people are more committed to such identities (Carter, 2015) and ascribe greater importance to them (Murnieks et al., 2014). In contrast, less central identities are less important (Harmon-Kizer et al., 2013).

Drawing from the above, this study defines health identity centrality as the importance one ascribes to being healthy. Higher health identity centrality would mean that being healthy is key to one's sense of self. To elaborate, health identity would involve "behavioral prescriptions" that inform individuals about what it means to be healthy (e.g., Murnieks et al., 2014, p. 3). Thus, individuals may have notions about what it means to be healthy (e.g., Stryker & Burke, 2000); for example, it may mean eating healthy, exercising regularly, etc. For those with a strong health identity centrality, these notions may be key to how they view themselves, and thus they may spend a lot of time in managing their health.

Identity centrality has a bearing on several outcomes. For instance, moral identity centrality leads to moral actions that are responsive to the needs of others (Aquino et al., 2009). Similarly, entrepreneurial identity centrality influences how much time is spent on entrepreneurial activities (Murnieks et al., 2014). Further, research in marketing suggests that identity centrality has an effect on the connection one has with a brand (Harmon-Kizer et al., 2013). In addition, more important identities are likely associated with more powerful feelings (Murnieks et al., 2014; Stets & Burke, 2000). Identity centrality is important in predicting outcomes in the health context too. For example, in the case of people with HIV, HIV identity centrality—or the extent to which individuals consider HIV status as a key aspect of their self—has been found to have an implication for the stress they experience (Earnshaw et al., 2015). All in all, identity centrality has been associated with greater importance attached to a particular identity and more commitment toward expressing it (Harmon-Kizer et al., 2013). Hence, one may expect that health identity centrality may be related to health-related behavior and patients' interaction with health IT.

Conceptual Framework

This study (see Figure 1) proposes that health identity centrality associates with dependence on SM IT, which bears upon positive and negative emotions toward SM IT. While health identity centrality pertains to how central health is to users' identity, dependence on IT reflects the relationship between the IT and the individual user. In addition, the framework controls for age and gender for use, positive and negative emotions, and dependence. The constructs and their definitions are explained in Table 1.

Figure 1. Conceptual Framework

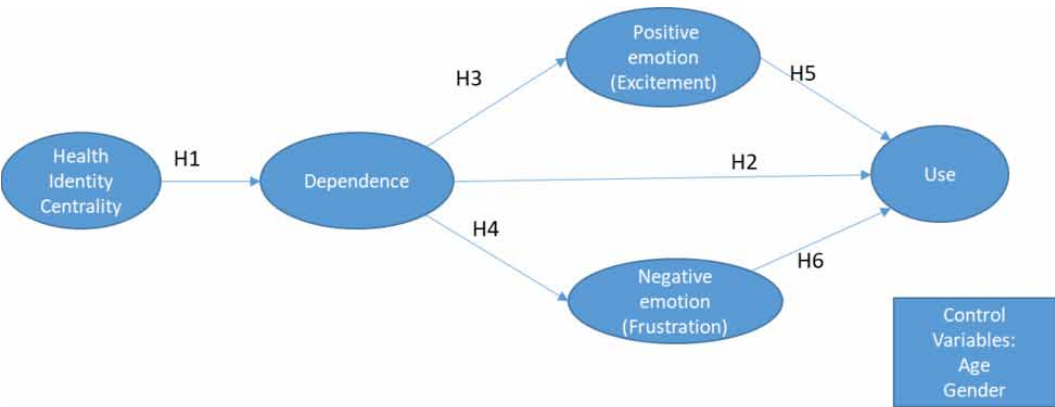


Table 1. Constructs and definitions

Construct	Definition	Reference
Health Identity Centrality	Extent to which being healthy is key to one's sense of self	Aquino et al. (2009)
Dependence on IT	Individual's reliance on technology and difficulty functioning without it	Kark et al. (2003)
Emotions about IT	Affective states induced by or attributed to a specific IT stimulus	Zhang (2013)
IT Use	The extent to which one actively interacts with IT	Beaudry and Pinsonneault (2010)

Health Identity Centrality and Dependence on IT

This study argues that health identity centrality will lead to dependence on SM IT. Dependence refers to reliance on technology and a difficulty or discomfort functioning without it (Carter & Grover, 2015; Kark et al., 2003). Dependence on SM tools means that users' rely on them for inspiration to exercise and hence might face difficulty or discomfort in proceeding without them (Kark et al., 2003).

Past research shows that chronic patients have different health beliefs and hence vary in the extent to which they view their health as central to their self (Cerkoney & Hart, 1980). Stronger health identity centrality should associate with health-related goals and behaviors (e.g., Murnieks et al., 2014). Thus, such people tend to engage in activities that enhance their health, e.g., exercising and monitoring their health. Since SM IT essentially helps people to lead a more healthy life, those with high health identity centrality may find such tools more important for their self (e.g., Ellsworth

& Scherer, 2003). As such, they may rely on them to manage their health routines and monitor their behaviors, and they might have a greater dependence on the SM IT.

Further, identity is associated with one's needs, and the more central an identity is, the stronger are the associated needs, and hence the higher is the dependence on something that fulfils those needs (Farmer & Aguinis, 2005). In the context of this study, this may mean that the more central health is to chronic patients' sense of self, the stronger is their need to manage their health and the more important the SM IT is to them; hence, their dependence on the IT is higher. Also, when identity is central, people are more committed to expressing and maintaining it (Harmon-Kizer et al., 2013). If health is central to an individual, one may try to engage in activities that further reinforce this identity. In doing so, one may potentially be motivated to develop a dependence or reliance toward the SM tools, such that when these bonds become weak, they experience discomfort (e.g., Pan et al., 2017). In addition, individuals look for validation of their identity (Ashforth & Schinoff, 2016). As such, recognition and approval received from the tool may become important, and thus stopping its use may lead to a sense of loss and distress and a difficulty functioning without it (e.g., Shamir, 1991). Following from the above, this research proposes:

Hypothesis One: The stronger the health identity centrality of chronic patients, the stronger their dependence on the SM care IT will be.

Dependence on IT and IT Use

Past research in different fields recognizes that dependence has a bearing on one's behavior in a relationship. For instance, dependence on another entity is considered one of the key factors that affects relational behavior (Hewett & Bearden, 2001). When people depend on others, they may spend more effort in maintaining those relationships (Skinner et al., 1992), and they may have an inertia that favors relationship continuance (Stanley et al., 2006). Drawing from these arguments, one may contend that dependence on the SM care IT would be accompanied by individuals' efforts to maintain that relationship and using the IT. Hence:

Hypothesis Two: The stronger the dependence of chronic patients on the SM care IT, the higher its use will be.

Dependence on IT and Emotions Toward IT

Dependence essentially signifies a close relationship (Berscheid et al., 2004). Thus, when people rely on technology, they have a sense of connection with the technology (Carter & Grover, 2015). Individuals in close relationships also have a strong impact on each other, and strong dependence can "amplify the positive and negative aspects of relationship events" (Holmes & Levinger, 1994; Moore et al., 2020, p. 2). This is so because those in close and dependent relationships pay greater attention to both the positive and negative aspects of relationship (Moore et al., 2020). Drawing from the above, one may expect that strong dependence on the SM care IT may amplify the positive and negative emotions one experiences with respect to it. That is, this paper proposes that individuals' dependence on technology leads to stronger positive and negative emotions:

Hypothesis Three: The stronger the dependence of chronic patients on the SM care IT, the higher their positive emotions toward IT will be.

Hypothesis Four: The stronger the dependence of chronic patients on the SM care IT, the higher their negative emotions toward IT will be.

Emotions Toward IT and IT Use

Research in IS indicates that emotions are associated with IT use. For example, Beaudry and Pinsonneault (2005) show that emotions influence IT use through their influence on adaptation behaviors. Further, Stein et al. (2015) argue that interacting with technology elicits emotion(s) and, in turn, people engage in different coping strategies, which then become revealed in particular use patterns. In line with past literature and defining IT use as “the extent to which one actively interacts with IT” (Beaudry & Pinsonneault, 2010, p. 699), the authors propose that the stronger the positive emotions toward IT, the more the patients will use it. In contrast, the stronger the negative emotions about IT, the less the patients will use it. Hence:

Hypothesis Five: The stronger the positive emotions of chronic patients toward SM care IT, the higher their usage of it will be.

Hypothesis Six: The stronger the negative emotions of chronic patients toward SM care IT, the lower their usage of it will be.

Methodology

Sample and Data Collection

The study sample is drawn from the adult population in the United States and Canada, who were using an activity tracker (Fitbit) at the time of the study or who stopped using it recently, and also were suffering from a chronic disease. The authors used an electronic survey administered by Qualtrics. To determine respondents' eligibility to participate, they were asked to answer screening questions at the beginning of the survey.

Qualtrics first sent 30 sample responses to identify any data quality issues. After the authors evaluated these responses, the main data was collected. The authors received a total of 237 completed answers. The sample included respondents aged between 18 and 83. More than 90% of them had completed at least high school. Most respondents were suffering from chronic diseases, such as asthma, diabetes, and high blood pressure. Moreover, they used the tool mostly to self-track their steps, calories burned, and sleep. Table 2 presents the respondents' profiles.

Measures

The survey measures were based on established measures to the extent that such measures were available. To operationalize health identity centrality, this study drew from Sellers (2013). To operationalize dependence, the authors adapted the Dependence Scale (Etter et al., 2003) to the Fitbit context. Further, positive and negative emotions were measured using single items that asked respondents about their level of excitement (i.e., positive emotion) and frustration (i.e., negative emotion) while interacting with the self-tracker. The authors developed and pretested their questionnaire with five chronic patients using Fitbit, which resulted in minor wording changes. The Appendix includes the complete list of measurement items for the constructs.

Data Analysis And Results

SPSS software and AMOS version 24 were used for the data preparation and preliminary analysis (e.g., test for the validity of the constructs). Further, to test the hypotheses, the authors used covariance-based structural equation modeling (SEM) with Mplus software version 8.0. SEM consists of a set of multivariate techniques that are confirmatory in testing whether models fit the data (Byrne, 2013). It has advantages over traditional multivariate techniques (Shiau & Chau, 2016) since it permits a) the estimation of latent variables from observed variables, b) an explicit assessment of measurement error, and c) model testing, in which a structure can be imposed and assessed as to the fit of the data.

Table 2. Respondents' profiles

Gender Male	N = 49 (21%)	Features used Tracking Steps (92%) Tracking Calories burned (84.4%) Tracking Floors climbed (52.7%) Sleep tracking (73%) Heart rate tracking (62.4%)
Female	N = 188 (79%)	
Age	M = 43 Min = 18 Max = 83	
Education	N = 5 (2.1%)	
Less than high school	N = 44 (18.6%)	
High school	N = 92 (38.8%)	
College degree	N = 78 (32.9%)	
Bachelor's degree	N = 13 (5.5%)	
Master's degree	N = 5 (2.1%)	
Doctoral degree		
Work	N = 127 (53.6%)	
Full or part-time paid work	N = 22 (9.3%)	
Housework or family care	N = 42 (17.7%)	
Retired	N = 10 (4.2%)	
Unemployed	N = 2 (0.8%)	
Volunteer work	N = 17 (7.2%)	
Student	N = 17 (7.2%)	
On disability or sick leave		

Common Method Bias

As the data included self-reported measures, there was the possibility of common method bias (CMB), which can be a source of measurement error (Podsakoff et al., 2003) and can threaten the validity of the research (Podsakoff et al., 2003; Shiau et al., 2020). In order to reduce method biases, the anonymity of the respondents was ensured, and the scale was improved by reducing item ambiguity and avoiding the use of bipolar scales (Podsakoff et al., 2003).

Moreover, to test for CMB, the authors used the common latent factor method (Podsakoff et al., 2003; Williams & Anderson, 1994). To do so, a common latent factor (CLF) was created, and all measurement items were constrained to be part of the CLF factor in order to capture the common variance among all observed variables in the model. The variance of the CLF was constrained to be one. Further, the authors used multiple Chi square different tests to compare Chi square and degree of freedom of the zero constrained model to the unconstrained model. This analysis resulted in a Chi Square difference of 150,000, with a 345 difference in degrees of freedom and a p-value (χ^2) of 1.00. This shows that the difference between the two models was not significant, and, therefore, it can be concluded that no common method bias was detected.

Construct Validity and Reliability

The authors assessed the reliability of the measurement items of the latent constructs using composite reliability (CR) (Fornell & Larcker, 1981). The Fornell and Larcker criterion suggests that each construct should have a CR greater than or equal to 0.7 in order to exhibit acceptable reliability. The CR is reported in the first column of Table 3. As can be seen, both latent constructs met this criterion.

Factor analysis showed that items load strongly on their corresponding constructs with low cross-loadings with the other constructs. To exhibit acceptable convergent validity, each construct should have an average variance extracted (AVE) greater than or equal to 0.5, meaning that, on average, each construct should explain at least half of the variance of its indicators. As Table 3 shows, both latent constructs met this criterion. Moreover, to test discriminant validity, the authors compared the correlations between constructs with the square root of the AVE by each construct. As seen in Table 3, no construct correlation is higher than the square root of any construct's AVE (Hu & Bentler, 1999).

Table 3. Correlations

	CR	AVE	1	2
1. Health Centrality	0,906	0,706	0,840	
2. Dependence	0,935	0,783	0,293	0,885

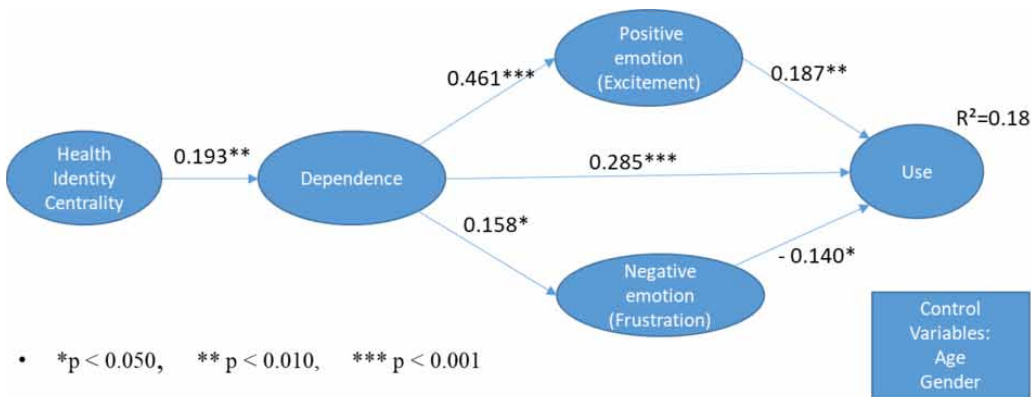
Measurement Model

The confirmatory factor analysis (CFA) performed with AMOS 24 shows an acceptable model fit, with a CFI of 0.995 and a TLI of 0.993. Both values are above the recommended minimum of 0.90 (Gefen et al., 2011; Gefen et al., 2000; Hu & Bentler, 1995). Also, the measurement model yielded a SRMR of 0.044 ($< .08$, indicating the model is a good fit); a GFI of 0.973 and AGFI of 0.949 (> 0.9 , indicating the model is a good fit (Gefen et al., 2011)); and an RMSEA of 0.033 ($< .06$, and the p-value is 0.88, not rejecting the null hypothesis that RMSEA is smaller than or equal to 0.06, therefore indicating the model to be a close fit), with 90% CI (0.01–0.052) (Hu & Bentler, 1999).

Structural Model

The authors examined the structural model using MPLUS version 8. The fit indexes are within the accepted thresholds, with a CFI of 0.955; a GFI of 0.961 and an AGFI of 0.936; a TLI of 0.944; an SRMR of 0.066; and an RMSEA of 0.059, with 90% CI (0.049, 0.069). Figure 2 includes the standardized path coefficients.

Figure 2. Results



The R-squared for activity tracker usage is about 18%. The results of this analysis provided support for all the research hypotheses (See Table 4). All path coefficients are significant at a level of $p < 0.005$. Table 5 shows the effect of the control variables.

Discussion

The results indicate that all the research hypotheses were supported. Thus, one can suggest that emotions triggered during the interaction with SM systems are antecedents of subsequent IT use. Further, the results also show a positive link between dependence and IT usage. Past research in psychology suggests that when people depend on others, they tend to spend effort in maintaining those

Table 4. Summary of hypotheses

	B	P-value	Result
H1: H.C@D	0.193	0.006	Supported
H2: D @ Use	0.285	0.000	Supported
H3: D @P.E	0.461	0.000	Supported
H4: D @N.E	0.158	0.019	Supported
H5: P.E@ Use	0.187	0.007	Supported
H6: N.E@ Use	0.140	0.020	Supported

Abbreviations: D, Dependence; P.E, Positive Emotion; N.E, Negative Emotion; H.C, Health Centrality

Table 5. Control variables

	B	P-value
Age@ D	-0.023	0.741
Age@ Use	0.122	0.053
Age@ P.E	-0.166	0.007
Age@ N.E	0.063	0.335
Gender @ D	-0.011	0.875
Gender@ Use	-0.042	0.498
Gender@ P.E	-0.031	0.617
Gender@ N.E	0.012	0.854

Abbreviations: D, Dependence; P.E, Positive Emotion; N.E, Negative Emotion

relationships (Skinner et al., 1992). This study shows that a user's relationship with an SM system can follow the same dynamic as the relationship with an individual person. This is also consistent with previous research showing that patients can perceive health IT systems as an extension to their healthcare providers, including seeing human characteristics, such as protection and support, in them (Savoli et al., 2020).

In addition, in line with the hypotheses, dependence had a positive relationship with both positive and negative emotions. This is an interesting finding that also shows that the relationship between users and health IT systems can be similar to the relationships between individuals. Consistent with psychology research, strong dependence with an individual may amplify the positive and negative emotions one experiences with respect to that individual (Moore et al., 2020).

Finally, the findings suggest that health centrality has a positive link with dependence on SM IT. Consistent with past research (Ashforth & Schinoff, 2016), individuals look for the validation of their identity. Therefore, if health is central to an individual's sense of self, they may rely on a health IT that further reinforces this identity, which can also make it difficult to function without the tool. The overall relationships between health identity centrality and emotions toward the SM system result from the indirect positive links through dependence. This result is consistent with appraisal theories and indicates that the appraisal of self-importance can predict emotions toward the stimulus (Siemer et al., 2007).

Contributions and Theoretical Implications

This study contributes to the extant research in several ways. First, the study extends the existing research that is mainly focused on how IT characteristics (e.g., its design) shape emotions toward IT. Extant research draws on appraisal theories and focuses primarily on the goal conduciveness and controllability dimensions of the appraisal process (e.g., Beaudry & Pinsonneault, 2010). Extending this body of literature, this study shows the role of the self-importance dimension in determining emotions. In particular, the study emphasizes the importance of health centrality in shaping dependence on IT, which eventually influences emotions. In doing so, the paper also raises attention toward examining the role of the user's identity in shaping IT use. Chronic patients deal with their disease on a day-to-day basis, and the SM IT helps them monitor and manage their illness. As this paper shows, to be able to continue using such health IT, it is not only important that patients appreciate the tool but also that health is key to their sense of self.

Further, the finding about the relationship between dependence and emotion suggests that when chronic patients are reliant on SM IT, both the positive and negative aspects may be consequential for them. In addition, the findings reveal that the impact of dependence on positive emotion is much stronger than on negative emotion. This finding is interesting as, in the past, dependence on technology has often been considered as problematic (Turel & Serenko, 2012). One could say that perhaps in the context of health IT, dependence, in fact, has positive implications. These results can be generalized to other health IT, such as patient portals, to help control chronic diseases.

Practical Implications

The study emphasizes the importance of health identity centrality in shaping dependence and subsequently emotions toward SM tools. To foster the usage of such tools, healthcare providers might try to find ways to make health central for patients through training and awareness programs. Further, designers could endeavor to facilitate a stronger health identity centrality by increasing patients' awareness about health via inclusion of push notifications and communications about health (e.g., trivia and facts about health goals). Past research reveals that people use tools for both social and process use (Song et al., 2021). Thus, features that facilitate social interaction around health may help chronic patients develop a stronger health identity and dependence on IT. Moreover, including features that require patients to reflect on their disease status (e.g., daily entry of their symptoms) can foster awareness about one's health and consequently health centrality. Also, including gamification elements may facilitate a stronger dependence on the technology. Finally, extant research shows that intelligent healthcare can enhance people's lives (Shiau et al., 2021). As such, the use of artificial intelligence in designing more personalized health IT tools may enhance awareness around one's health. Specifically, more advanced techniques (e.g., machine learning) can facilitate such tools to learn from chronic patients' SM behavior, increase their awareness about health, and provide them with a more tailored care pathway.

Limitations and Directions for Future Research

First, the study uses self-reported measures of use, which may be different from the respondents' actual use. Thus, future studies could potentially use actual use data (e.g., Song et al., 2021). Being cross-sectional, this study cannot shed light on how health identity centrality shapes dependence, and eventually emotions, over time. Future studies could explore health identity and its impact on emotions longitudinally. Next, this study's R square is 0.18, which is not very high compared to other studies (e.g., Venkatesh et al., 2012). This implies that there could be other factors, such as technology characteristics and attitudes toward IT, that may also influence the dependent variables. Future research could incorporate these variables along with health identity centrality in examining emotions and eventual IT use. Finally, this research studies one type of health technology that is personal and wearable; similarly, it includes only chronic patients. Future studies could examine other types of technologies (e.g., tele-health or patient portals) and explore the implications of health centrality in other types of users (e.g., those who do not have chronic illness).

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APPENDIX A.

Table 6.

Construct	Item code	Item	Mean	SD	Min	Max
Dependence	D1	Please rate your dependence on Fitbit.	5.25	1.47	1	7
	D2	After a few hours without Fitbit, I feel an irresistible urge to wear it.	5.38	1.41	1	7
	D3	The idea of not wearing Fitbit causes me stress.	5.24	1.48	1	7
	D4	Before going out, I always make sure that I have Fitbit with me.	5.44	1.47	1	7
Health Identity Centrality	HC1	In general, being healthy is an important part of my self-image.	5.59	1.27	1.00	7.00
	HC2	Being healthy is an important reflection of who I am.	5.35	1.35	1.00	7.00
	HC3	Being healthy is important to my sense of what kind of person I am.	5.33	1.39	1.00	7.00
	HC4	Overall, being healthy is important to how I feel about myself.	5.78	1.21	1.00	7.00
Usage	U1	How often do you check your self-tracker during the day?	3.65	0.81	1	5
Positive emotion (excitement)	GE8	The extent to which you experience excitement when you check (receive feedback from) your self-tracker.	3.52	1.08	1.00	5.00
Negative emotion (frustration)	GE6	The extent to which you experience frustration when you check (receive feedback from) your self-tracker.	2.29	1.22	1.00	5.00

Azadeh Savoli is assistant professor of Management of Information Systems at IESEG School of Management, France. She holds a Ph.D. degree in Business Administration (Information Technologies) from HEC Montréal. Her research interests include the usage and impacts of health IT systems, and human–computer interaction. Findings from her work have appeared in the MIS Quarterly, Systèmes d'information et Management, the proceedings of the International Conference on Information Systems, the Americas Conference on Information Systems, the European Conference on Information Systems, and the Administrative Sciences Association of Canada.

Mamta Bhatt is an assistant professor of Management at IESEG School of Management, France. She has a PhD in Organization Studies from Boston College, Boston. Her research interests include individual and organizational identity, identification with different foci (e.g., organization, leader, IT, artificial intelligence) and non-traditional work arrangements (e.g., contingent work, virtual work, telecommuting). Her research has appeared in journals such as Journal of Management Studies, Journal of Business Ethics, and the proceedings of the Americas Conference on Information Systems.