



Patient empowerment: A cross-disease exploration of antecedents and consequences



Jana-Kristin Prigge^{a,1}, Beatrix Dietz^{b,2}, Christian Homburg^{a,*}, Wayne D. Hoyer^{c,3}, Jennifer L. Burton^{d,4}

^a University of Mannheim, Institute for Market-Oriented Management, 68131 Mannheim, Germany

^b Berlin School of Economics and Law, Badensche Straße 52, 10825 Berlin, Germany

^c Department of Marketing, The University of Texas at Austin, 1 University Station, B6700, Austin, Texas 78712, United States

^d High Point University, Phillips School of Business, 833 Montlieu Avenue Drawer 42, High Point, NC 27268, United States

ARTICLE INFO

Article history:

First received on October 3, 2010 and was under

review for 10½ months

Available online 7 June 2015

Area Editor: Luk Warlop

Keywords:

Patient empowerment

Therapy compliance

Patient behavior

Healthcare marketing

ABSTRACT

Emphasized by the World Health Organization as one of its key topics, patient empowerment (PE)—i.e., the set of self-determined behaviors based on patients' individual needs for developing autonomy and competence with their disease—is today regarded as a key component of a patient-centered approach to healthcare. Unfortunately, research lacks a clear understanding of the drivers of PE, its relationship to therapy compliance, and its role in different types of diseases. Using a large sample of 1622 patients suffering from chronic diseases, this study addresses these critical research gaps and provides three major contributions. First, by exploring the influence of PE antecedents (i.e., patients' health involvement, self-efficacy, and acceptance of physician authority), it provides specific recommendations on how to effectively manage PE (defined in terms of three dimensions: information search, knowledge development, and decision participation). Second, it demonstrates the importance of PE and its antecedents for affecting patients' therapy compliance and shows that, depending on the PE dimension, therapy compliance is either enhanced or reduced. By highlighting the ambiguous role of PE in therapy compliance, the study offers specific suggestions for healthcare stakeholders on how to maximize patients' compliance to recommended therapies. Third, the study provides important insights into the role of PE across different types of chronic diseases, offering practical recommendations on how to deal with patients depending on their particular disease.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

Identified by the World Health Organization as a high priority topic to be pursued globally (Delnoij & Hafner, 2013), patient empowerment (PE)—referring to the set of self-determined behaviors based on patients' individual needs for developing autonomy and competence with their disease—has increasingly become a key component of a patient-centered approach to healthcare. However, healthcare stakeholders, such as physicians, pharmaceutical companies, and public policy makers, are still uncertain about what drives PE and how to deal with it (Day, 2000). Understanding the major drivers of PE as well as its consequences could not only help improve the effectiveness of treatments for patients by increasing their therapy compliance. It could also considerably increase the success of drugs from pharmaceutical companies (Stremersch & van Dyck, 2009; Wosinska, 2005) and

help insurance companies as well as publically funded healthcare systems reduce costs from therapy non-compliance and the treatment of subsequent evitable sequelae (Veitch, 2010).

These benefits of PE, however, may vary heavily depending on the type of disease from which patients are suffering (Stremersch, 2008; Tattersall, 2011). Specifically, chronic diseases (i.e., diseases that are lasting for a longer period of time, such as three months or more (Galea, 2014; U.S. National Health Council, 2014) may cause patients to engage in their illness especially strongly, particularly compared to acute diseases (i.e., diseases that can be cured relatively quickly). Therefore, a better understanding of the role of PE across different types of chronic diseases may help healthcare stakeholders manage PE more specifically and effectively, thus enhancing its potential benefits.

Unfortunately, research on PE is scarce and provides almost no guidance on these issues. Exceptions in this area have mainly focused on describing the nature of PE (Aujoulat, d'Hoore, & Deccache, 2007; Ouschan, Sweeney, & Johnson, 2000, 2006). However, a clear and accepted conceptualization of the construct is still lacking. Prior studies (e.g., Gibson, 1991; Ouschan et al., 2000) have mainly relied on synthesizing prior definitions and conceptualizations, rather than providing a solid foundation based on existing theories (such as self-determination theory), despite the fact this has been repeatedly called for (e.g., Aujoulat et al., 2007; Zoffmann & Lauritzen, 2006). Further,

* Corresponding author. Tel.: +49 621 181 1555; fax: +49 621 181 1556.

E-mail addresses: jana.prigge@bwl.uni-mannheim.de (J.-K. Prigge),

beatrix.dietz@hwr-berlin.de (B. Dietz), homburg@bwl.uni-mannheim.de (C. Homburg), wayne.hoyer@mcombs.utexas.edu (W.D. Hoyer), jburton@highpoint.edu (J.L. Burton).

¹ Tel.: +49 621 181 1269; fax: +49 621 181 1556.

² Tel.: +49 30 30877 1472.

³ Tel.: +1 512 471 1128.

⁴ Tel.: +1 336 841 9625.

prior definitions have not been clear on whether PE reflects attitudes, perceptions, or behaviors (e.g., Dunst & Trivette, 1996; Menon, 1999). In the absence of such clarity, also systematic identification of PE's antecedents is not feasible as by nature, attitudes, perceptions, and behaviors are subject to different types of drivers.

A few other researchers have begun discussing the potential advantages and disadvantages of PE, such as patient (non-)compliance (Broadstock & Michie, 2000; Camacho, de Jong, & Stremersch, 2014; Williams, Rodin, Ryan, Grolnick, & Deci, 1998), but there is little agreement on the univocal results. Moreover, knowledge about the major drivers of PE and its role in different contexts, such as different types of diseases, is still lacking. As a result, the major “challenge at the moment is [still] the lack of empirical evidence to support the benefits and best practices that should guide patient empowerment” (Camacho, Landsman, & Stremersch, 2010, p. 111).

Using a large and unique sample of 1622 patients suffering from a chronic disease (breast cancer, HIV/AIDS, diabetes, obesity, or obesity with diabetes) we address these critical research gaps on PE. To do so, we clearly root our PE conceptualization in Self-Determination Theory (SDT) and define PE as a set of behaviors across three dimensions (i.e., information search, knowledge development, and decision participation). This allows us to validly extend existing theory and to systematically identify drivers of consumer behavior, i.e., PE behavior. Consequently, our study provides three major contributions to the discipline. First, present the first study that, based on SDT, investigates major PE antecedents and explores how patients' perceptions of themselves, their health, and their physician (i.e., patients' health involvement, self-efficacy, and acceptance of physician authority) drive PE. Results show that the three PE dimensions are indeed strongly driven by patients' health involvement, self-efficacy, and acceptance of physician authority, but to varying degrees and by diverging directions (i.e., positively and negatively), allowing us to provide specific recommendations on how to manage PE more effectively.

Second, we demonstrate the importance of PE and its antecedents for influencing patients' therapy compliance. Depending on the PE dimension, we find that therapy compliance is either enhanced or reduced. Thus, we contribute to the discipline by highlighting the ambiguous role of PE in therapy compliance as well as by offering detailed recommendations for healthcare stakeholders on how to maximize patients' compliance to recommended therapies.

Third, this study is the first to provide insights into the role of PE across different types of chronic diseases, which allow us to provide specific recommendations to healthcare stakeholders on how to deal with patients depending on their particular disease. For instance, we find that stimulating PE is most important for improving therapy compliance of patients suffering from less severe diseases, such as obesity with diabetes, thus informing healthcare stakeholders to particularly encourage PE across these patients.

2. Development of the conceptual framework

2.1. Theoretical background of PE

We base our framework on Self-Determination Theory (SDT) (Deci & Ryan, 1985a, 1985b) which proposes how specific needs of individuals drive their self-intended (self-determined) behaviors. SDT states that human beings have basic psychological needs, such as the need for autonomy, which is the desire to experience one's behavior as self-endorsed or volitional, and the need for competence, which is the desire to experience satisfaction with exercising and extending one's capabilities and mastering challenging tasks. Individuals strive to satisfy these needs to increase their well-being and thus engage in certain behaviors that they perceive as self-determined (Deci & Ryan, 2000), such as information search or participation in decision making. These self-determined behaviors

trigger subsequent behaviors, which individuals try to keep consistent with their previous actions and their underlying needs (Bem & Allen, 1974), such as complying with recommendations. Thus, individuals' desires for autonomy and competence may cause individuals' self-determined behaviors both directly and indirectly.

SDT further suggests that individuals' psychological needs vary depending on how individuals perceive themselves (e.g., in terms of self-efficacy) or others (e.g., physicians in terms of acceptance of physician authority) (Bandura, 1986; Deci & Ryan, 2000; Ryan & Deci, 2000). Accordingly, by influencing individuals' needs for autonomy and competence, these perceptions can cause behaviors geared toward satisfying these needs (Deci & Ryan, 1985a).

2.2. Development of PE model

Because SDT assumes that individuals develop inherent needs for autonomy and competence for managing challenging situations (e.g., Deci & Ryan, 2000), we argue that when suffering from a chronic disease, patients may develop inherent needs for autonomy and competence with respect to treatments intended to fight their disease and may engage in corresponding behaviors to satisfy these needs. We refer to these behaviors as PE. Specifically, PE is defined as a set of self-determined behaviors based on patients' individual needs for autonomy and competence, undertaken with the goal of actively dealing with their disease. In line with Ouschan et al. (2000, 2006), we suggest that PE consists of three dimensions: patients' information search and knowledge development (both addressing the need for competence) and patients' decision participation with regard to suggested treatments (addressing the need for autonomy). Specifically, *information search* is the degree to which patients systematically and actively collect disease- and treatment-related information from various information sources (e.g., personal meetings in self-help groups, books, the Internet, brochures) (Johnson, 2011). *Knowledge development* is the degree to which patients actively and easily organize and try to understand the information acquired about their disease, with the goal of achieving disease-related expertise to keep up with the physician (Funnell et al., 1991). *Decision participation* is the degree to which patients actively work with the physician to develop a treatment strategy and make treatment decisions (Camacho et al., 2014; Singh, Cuttler, & Silvers, 2004).

On the basis of SDT (Deci & Ryan, 1985b), we assume that PE is caused by three major antecedents that relate to patients' perceptions of their health, themselves, and their physician: health involvement, self-efficacy, and acceptance of physician authority. Specifically, *health involvement* denotes the importance patients attribute to their health in general and to the acts of maintaining this health (Zaichkowsky, 1985). *Self-efficacy* refers to patients' estimate of their capability and effectiveness in performing well in a specific task (Bandura, 1989). Finally, *acceptance of physician authority* is the degree to which patients deem a physician a person of respect and, owing to his or her status, right in what he or she says (Rigby, 1986). While we expect patients' acceptance of physician authority to reduce PE through decreasing their needs for competence and autonomy, we posit that health involvement and self-efficacy enhance PE through increasing those needs (see Fig. 1).

Because individuals generally tend to align previous and current actions (Bem & Allen, 1974), we assume that empowered patients show subsequent behavior that is consistent with their previous PE behavior. We refer to this subsequent behavior as *therapy compliance*, reflecting the extent to which the patient adheres to treatment recommendations and prescriptions targeted to his or her particular disease (Hausman, 2004). We expect that all three PE dimensions enhance therapy compliance. To account for the specific nature of the patients and their chronic disease, we add variables referring to patient demographics (age, gender, education level) and type of disease to our model.

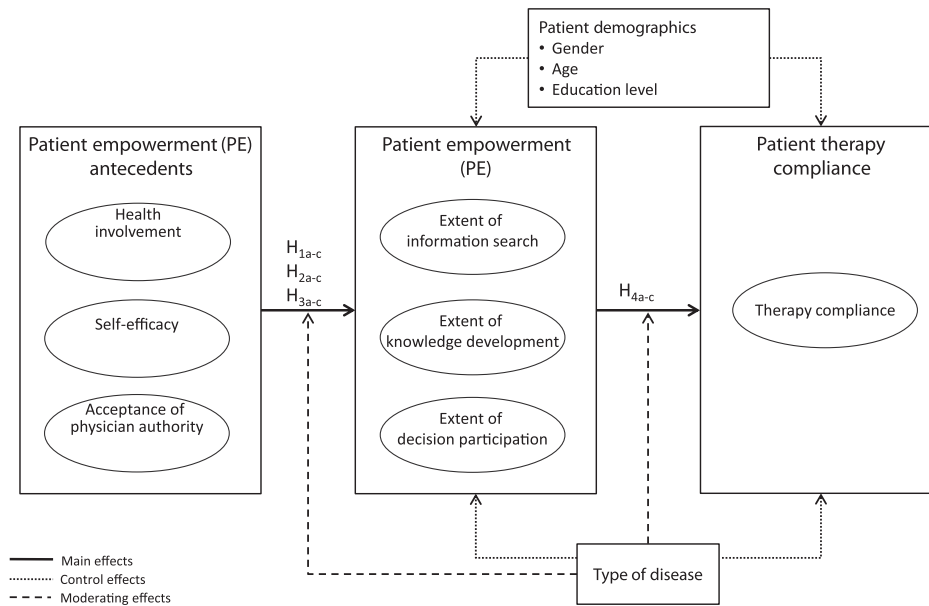


Fig. 1. Conceptual framework.

3. Hypotheses development

3.1. The impact of PE antecedents

Poor health causes patients to act more autonomously and enhance their disease-related competence to preserve their health (Mittal, 1989; Rifon & Mavis, 1992). The importance they assign to their health motivates them to take “an active and engaged disposition [to] seek and process relevant information ... and [to become] competent to participate in medical decisions” (Singh et al., 2004, p. 1061).

Related to this, research in a consumer context shows that individuals highly involved in a product category search intensively for related information (Chaudhuri, 2000; Mittal, 1989; Zaichkowsky, 1985), thereby satisfying their need for competence on that category. In a health prevention context, Moorman and Matulich (1993) show that individuals strongly concerned about their health are likely to collect more information on how to maintain it (e.g., how to keep a good diet or reduce stress). Transferring these findings to the context of chronic diseases, we assume that chronically ill patients highly involved in their health engage strongly in information search to fight their disease.

Further, highly engaged consumer often develop internal structures and capabilities that allow them to process cognitively challenging information (Petty & Cacioppo, 1986), thereby becoming an expert in their field of interest (Alba & Hutchinson, 1987). In line with this, Singh et al. (2004) suggest that patients heavily involved in emerging treatments (e.g., genetic technology-based treatments) are particularly willing to enhance their knowledge about that treatment. Hence, we assume that patients highly involved in their health engage strongly in developing knowledge about their chronic disease.

Evidence shows that highly involved consumers are more willing to participate in product design and development decisions, particularly in the context of consumer co-creation (Atakan, Bagozzi, & Yoon, 2014; Etgar, 2008). The trend toward participation has also appeared in a medical context in terms of patients who increasingly engage in decisions about their medical treatment to satisfy their need for acting autonomously on their health (Delnoij & Hafner, 2013; Guadagnoli & Ward, 1998). Overall, in line with SDT and prior consumer research, we posit:

H1. Patients' health involvement positively affects their (a) information search, (b) knowledge development, and (c) decision participation.

SDT suggests that the more patients believe they are capable of successfully performing a certain task (such as improving their health), the greater is their desire to autonomously and competently fulfill this task. As a consequence, individuals may pursue this task to a greater extent by exhibiting intense self-determined behavior (Bandura, 1986; Ozer & Bandura, 1990).

Organization research shows that self-efficacious people are highly task focused and, thus, more motivated to seek information that will help them reach their goals (Jones, 1983). This effect has also been demonstrated in the context of online search behavior (Kuo, Chu, Hsu, & Hsieh, 2004). In line with these findings and SDT, we assume that highly self-efficacious patients are more likely to engage in information search on their chronic diseases to satisfy their increased need for related competence.

Moreover, individuals who strongly believe in their task-solving abilities are particularly able to organize and process existing information (Bandura, 1989) and, in line with SDT, wish to become more competent in their issue of interest. To address this need, highly self-efficacious patients are more likely to strongly engage in developing knowledge about their chronic disease.

In addition, because “[s]elf-beliefs of efficacy have diverse psychological effects that can facilitate or impair complex decision making” (Bandura & Jourden, 1991, p. 942), highly self-efficacious people may more strongly wish to participate in decision making to satisfy their need for autonomy (Deci & Ryan, 2000). For example, highly self-efficacious managers tend to more actively engage in decision making during crises (Hadley, Pittinsky, Sommer, & Zhu, 2011). Thus:

H2. Patients' self-efficacy positively affects their (a) information search, (b) knowledge development, and (c) decision participation.

SDT also accounts for differences in individuals' tendency to orient themselves to others in terms of relying on or following them (Deci & Ryan, 2000; Williams, 2002). In the current context, patients orient themselves to physicians in terms of accepting their authority. Consistent with SDT, a low acceptance of a physician's authority may cause an increased desire for competence and autonomy, thus jolting patients' “blind trust” in the physician's ability to make the right treatment choices (Leisen & Hyman, 2004). This desire is further associated with a high degree of self-determination, intensifying health-related behaviors such as PE (Williams & Deci, 1996).

In particular, because many patients no longer view physicians as the single source of information (Camacho et al., 2010; Singh et al., 2004), they may also not regard them as the only authority on health information. In line with SDT, because a low acceptance of physician authority increases patients' need for competence and thus for additional information, they may be more likely to search for health-related information themselves and not rely solely on physician-provided information.

Further, if patients do not fully accept their physicians' authority and thus do not want to rely solely on their opinions, one option to satisfy their inherent need for competence is to develop their own expertise on their chronic disease (Williams, 2002). That is, patients experience an increased need to develop physician-equivalent knowledge by more actively processing available information.

Finally, a low belief in an expert's advice can lead individuals to more strongly engage in decision making themselves (De Cremer & Tyler, 2007). Thus, patients who show a reduced acceptance of physician authority may have an increased need for autonomy (Williams, 1988), which they can satisfy by participating in the decisions on the treatments to fight their chronic diseases. Hence:

H3. Patients' acceptance of physician authority negatively affects their (a) information search, (b) knowledge development, and (c) decision participation.

3.2. The impact of PE on therapy compliance

Theory suggests that patients who satisfy their needs for autonomy and competence through self-intended behavior in terms of PE may engage in subsequent behaviors they perceive as consistent with their previous actions (Bem & Allen, 1974). In particular, studies report positive relationships between patients' knowledge of good nutrition and beneficial dietary habits (Boeckner, Kohn, & Rockwell, 1990) and between the understanding of breast self-examination techniques and the frequency of breast self-examinations (Fletcher, Morgan, O'Malley, Earp, & Degnan, 1989). Similarly, other studies have found that patients who understand the importance and reasoning behind a recommended treatment are more willing to follow that treatment (Dellande, Gilly, & Graham, 2004; Moorman & Matulich, 1993). Thus, behaviors geared toward fostering disease-related understanding, such as information search or knowledge development, may increase patients' willingness to adhere to the recommended therapy.

The benefits of participating in decisions on treatments, however, have caused controversy in the literature. While some researchers believe that decision participation impairs therapy compliance (Camacho et al., 2014), other studies assume that it enhances patients' therapy compliance (Broadstock & Michie, 2000; Lenert, 2009). Consistent with the latter view, consumer research has demonstrated that individuals increasingly value shared decision making on their treatment (Deshpande, Menon, Perri, & Zinkhan, 2004) and also try to behave in a consistent manner to benefit their health (Menon, Deshpande, Zinkhan, & Perri, 2004). In addition, individuals acting in a self-regulated manner display a stronger willingness to adhere to guidelines (Senécal, Nouwen, & White, 2000; Williams et al., 1998). Thus, in line with these findings and SDT, patients' participation in decision making on their treatments may also result in a stronger tendency to comply with it. Overall, we posit the following:

H4. Patients' (a) information search, (b) knowledge development, and (c) decision participation positively affects their therapy compliance.

4. Methodology

4.1. Questionnaire design, data collection, and sample information

Our sample includes a large number ($n = 1622$) of patients suffering from serious conditions, i.e., from chronic diseases such as breast cancer,

HIV/AIDS, diabetes, obesity, or obesity with diabetes (see Table 1). To the best of our knowledge, this sample can be regarded as unique, as it allows for comparing health-related behaviors across numerous serious conditions, whereas other studies investigating individuals' behavior under serious conditions (e.g., Botti, Orfali, & Iyengar, 2009; Pavia & Mason, 2004; Wong & King, 2008) have so far relied on rather small samples with only one serious disease.

To collect our data, we first obtained a list of 853 registered physicians and 112 self-help groups of a Mid-European country from a commercial provider. We asked them about their patients' demographics (age, type of insurance) and to distribute our questionnaire among their patients. Non-supporters named reservations to approach their suffering patients with a questionnaire as a major reason for turning down our request. Overall, 114 physicians and 47 self-help groups indicated willingness to cooperate and we mailed them a total of 10,675 questionnaires. Of these, 85 physicians and 36 self-help groups eventually provided support and distributed our questionnaires. Major reasons of the remaining physicians and self-help groups for not cooperating were the type of questions asked, the questionnaire's length, and misunderstandings of the types of diseases as major reasons. Hence, the number of questionnaires effectively given to patients with chronic diseases (initial sample) was 8022. Of these, we received a preliminary sample of 1784 cases (22.2%), 162 of which we had to eliminate (primarily due to a high number of missing values), leaving a final sample of 1622 usable questionnaires (Table 1, part A). This number represents a final response rate of 20.2% and is thus well in line with studies conducted in a similar context (Leisen & Hyman, 2004; Ouschan et al., 2006).

Comparing the initial and final sample with regard to age and type of insurance revealed no significant differences. Also, the Armstrong and Overton's (1977) test showed no significant differences and thus no indication of non-response bias. To further validate this finding we followed Lynn's (2003) approach and asked our cooperation partners to re-contact patients who had originally refused to participate and to ask them to answer a condensed version of the questionnaire. This shortened version included 19 selected items of major constructs (therapy compliance, PE constructs) and patient demographics, as well as a control question on the reasons for originally turning down the request for participation; 147 prior non-respondents answered this version. Comparing their answers with those of our final sample revealed no significant differences in the major constructs and demographics. These respondents also reported "no time to answer the questions" and "ashamed to answer the questions" as reasons for rejecting the initial request, which we interpreted as acceptable (i.e., not related to PE). Overall, our tests provide evidence that non-response bias is not a serious problem with the data.

Our final sample included breast cancer patients ($n = 370$), HIV/AIDS patients ($n = 445$), obesity patients ($n = 80$), diabetes patients ($n = 518$), and patients with obesity who, due to their weight, had developed diabetes ($n = 209$), labeled as "obesity w/diabetes." The group of breast cancer patients contains a representative distribution of the different disease stadiums following WHO findings. These patients usually receive treatments such as surgery, chemotherapy, radiotherapy, and/or medical treatments. In the HIV/AIDS group, the distribution of patients that were solely HIV positive vs. those that already suffered from AIDS also corresponded to WHO findings, with a large majority of patients being solely HIV positive. Patients suffering from HIV or AIDS are usually treated by combined medical therapies. Obesity patients were those with a BMI (body mass index) above 30. Their major treatments included different types of diets as well as sport and fitness exercises. The distinction between the group of patients suffering from diabetes and obesity w/diabetes requires additional explanation: the "diabetes" group contains patients suffering from type 1 diabetes (i.e., insulin deficiency). Insulin deficiency is caused by a complete destruction of insulin-producing beta cells in the pancreas due to an autoimmune process, usually begins at a young age, and is primarily treated

Table 1
Data collection procedure and sample composition.

A) Data collection procedure for sample used for hypotheses testing						
A1. Number of <i>physicians and self-help groups</i> provided by a commercial provider:						
Number of physicians						853
Number of self-help groups						112
A2. Number of potential cooperation partners:						
Number of suitable physicians						114
Number of suitable self-help groups						47
Number of questionnaires sent to potential cooperation partners						10,675
A3. Number of <i>de facto</i> cooperation partners:						
Number of cooperating physicians						85
Number of cooperating self-help groups						36
A4. Size of <i>initial</i> sample of <i>patients</i> :						
(= number of questionnaires effectively distributed to patients)						8022
A5. Size of <i>preliminary</i> sample of <i>patients</i> :						
(= number of questionnaires returned by patients)						1784 (Preliminary response rate: 22.2%)
A6. Size of <i>final</i> sample of <i>patients</i> :						
(= number of usable questionnaires returned by patients)						1622 (Final response rate: 20.2%)*
B) Composition of final sample						
	Full sample (n = 1,622)	Breast cancer (n = 370)	HIV/AIDS (n = 445)	Diabetes (n = 518)	Obesity w/diabetes (n = 209)	Obesity (n = 80)
<i>B1. Age (in years)</i>						
18–29	2%	0%	5%	2%	0%	10%
30–39	13%	5%	31%	6%	2%	11%
40–49	21%	22%	40%	9%	9%	25%
50–59	21%	34%	16%	17%	21%	12%
60–69	28%	31%	7%	39%	43%	24%
70–99	15%	8%	1%	27%	25%	18%
<i>B2. Gender</i>						
Male	49%	0%	85%	55%	50%	38%
Female	51%	100%	15%	45%	50%	62%
<i>B3. Education level (in years)</i>						
<8 (no graduation)	2%	2%	3%	2%	5%	2%
8–10 (secondary school, 1 st level)	70%	75%	56%	76%	75%	71%
11–13 (secondary school, 2 nd level)	11%	8%	19%	8%	6%	8%
>13 (Bachelor degree or more)	17%	15%	22%	14%	14%	19%

*When calculating the response rate, we used n = 8022 as a basis because this was the number of questionnaires distributed among patients. When comparing our final sample with the number of questionnaires sent to the cooperation partners, the response rate is 15.2%.

by replacing the missing insulin. The “obesity w/diabetes” group refers to patients who have developed type 2 diabetes only as a consequence of their obesity, involving either a lack of insulin, insulin resistance, or hyperinsulinism (thus, our sample does not include non-obese people with type 2 diabetes). Treatments range from adaptations to nutrition and lifestyle to use of supplementary drugs, such as Metformin.

On average, respondents were 55 years of age; 51% were women and 49% men. Age and gender differed depending on patient group (see Table 1, part B).

4.2. Scale development

Although most scales are based on previous studies and adapted to our context we largely pretested and refined all constructs to ensure construct validity. First, we asked 15 experts from marketing and the pharmaceutical area how well the scale items reflected the constructs. Second, we conducted seven personal interviews and three focus groups using think-aloud and probing techniques with patients (Bolton, 1993). Third, we handed out 175 test questionnaires to patients, 40 of which were returned. We refined or dropped items on the basis of this pre-test.

To keep the complexity of our model at a handy level, we used rather parsimonious scales (see the Appendix A). The constructs related to PE, PE antecedents, and therapeutic behavior are reflective in nature as they are all caused by an underlying construct (Jarvis, MacKenzie, & Podsakoff, 2003) and measured with a five-point Likert scale, anchored by 1 (“strongly disagree”) and 5 (“strongly agree”).

With regard to PE, we measured *information search* by four items adapted from Alba and Hutchinson (1987) and Moorman (1990). The three items used to measure *knowledge development* are based on Flynn and Goldsmith (1999) and the three items to assess *decision participation* on Hausman (2004). We measured each of the PE antecedents with three items based on scale suggestions from Jayanti and Burns (1998) and Zaichkowsky (1985) (*health involvement*), Schwarzer and Jerusalem (1995) (*self-efficacy*) and own scale developments based on exploratory interviews and pre-tests (*acceptance of physician authority*) due to a lack of an existing scale. The three items to capture *therapy compliance* are based on Hausman (2004). Control variables were assessed (gender, age, education level, and type of disease) on single-item scales, with gender and type of disease operationalized as dummy variables.

We employed multifactorial confirmatory factor analysis to assess our measurement model, which shows a good fit with the underlying data ($\chi^2/df = 3.67$, TLI/NNFI = .95, CFI = .96, RMSEA = .04, SRMR = .04) (Bagozzi & Yi, 1988). We further assessed convergent and discriminant validity for all reflective constructs. To test for convergent validity, we calculated psychometric properties on both the construct and item levels. On the construct level (see Table 2), we calculated composite reliability, Cronbach's alpha, and the average variance extracted and found good properties for our constructs. On the item level (see the Appendix A), we assessed the values for item reliabilities and item factor loadings, which also largely met the recommendations in the literature (Bagozzi & Yi, 1988). Testing our constructs against Fornell and Larcker's (1981) proposed criterion (see the squared correlations and

Table 2
Construct measures and squared correlations.

Construct	Number of items	Mean	SD	CA	CR	AVE	1	2	3	4	5	6	7
Health involvement	3	4.19	.78	.72	.73	.48	–						
Self-efficacy	3	3.60	.90	.81	.81	.59	.05 (.21**)	–					
Acceptance of physician authority	3	3.76	1.08	.84	.86	.67	.07 (.26**)	.01 (.11**)	–				
Information search	4	3.38	1.15	.89	.89	.67	.14 (.37**)	.04 (.19**)	.00 (.05*)	–			
Knowledge development	3	3.05	1.02	.79	.79	.56	.01 (.12**)	.10 (.31**)	.01 (–.12**)	.19 (.44**)	–		
Decision participation	3	3.28	1.19	.81	.82	.60	.00 (.01)	.04 (.20**)	.05 (–.22**)	.08 (.29**)	.25 (.50**)	–	
Therapy compliance	3	4.77	.50	.87	.87	.69	.09 (.31**)	.02 (.16**)	.03 (.17**)	.02 (.13**)	.01 (.08**)	.00 (–.02)	–

Notes: ** $p < .01$; * $p < .05$; SD = Standard deviation, CA = Cronbach's alpha, CR = Composite reliability, AVE = Average variance extracted.

the average variances extracted in Table 2) indicated no problems with discriminant validity.

5. Results of hypotheses testing

We relied on structural equation modeling (SEM) based on Mplus (Muthén & Muthén, 2007) to test our hypotheses (Table 3). The results in Table 2 indicate strong correlations between the PE dimensions, so we account for that by including these relationships as non-directed correlations into our model. We achieved good model fit with the observed data ($\chi^2/df = 3.99$, TLI/NNFI = .94, CFI = .96, RMSEA = .04, SRMR = .05). H1 posited that health involvement would positively affect patients' information search (H1a), knowledge development (H1b), and decision participation (H1c). The data confirm H1a ($\gamma_{11} = .47$, $p < .01$) but provide no evidence for H1b and H1c ($\gamma_{21} = -.04$, $p = .17$; $\gamma_{31} = .02$, $p = .31$). By contrast, the data support H2, which posited a positive impact of self-efficacy on all three PE dimensions (H2a: $\gamma_{12} = .09$; H2b: $\gamma_{22} = .29$; H2c: $\gamma_{32} = .10$, all $p < .01$). We also find support for H3 (H3a: $\gamma_{13} = -.08$, H3b: $\gamma_{23} = -.22$; H3c: $\gamma_{33} = -.19$, all $p < .01$), which predicted a negative impact of acceptance of physician authority on the three PE dimensions.

Moreover, our results confirm the assumption that patients' information search (H4a) and knowledge development (H4b) positively influence their therapy compliance ($\beta_{41} = .11$, $\beta_{42} = .12$; both $p < .01$). Contrary to our prediction, we found a significant, negative impact of decision participation on therapy compliance (H4c: $\beta_{43} = -.09$, $p < .05$), which we further elaborate on in the Discussion

Table 3
Construct measures and squared correlations.

Predictor variable	Patient empowerment (PE)			
	Information search	Knowledge development	Decision participation	Therapy compliance
Antecedents of patient empowerment (PE)				
Health involvement	.47** (γ_{11} ; H1a)	–.04 (γ_{21} ; H1b)	.02 (γ_{31} ; H1c)	
Self-efficacy	.09** (γ_{12} ; H2a)	.29** (γ_{22} ; H2b)	.10** (γ_{32} ; H2c)	
Acceptance of physician authority	–.08** (γ_{13} ; H3a)	–.22** (γ_{23} ; H3b)	–.19** (γ_{33} ; H3c)	
Patient empowerment (PE)				
Information search				.11** (β_{41} ; H4a)
Knowledge development				.12** (β_{42} ; H4b)
Decision participation				–.09* (β_{43} ; H4c)
Type of disease ¹⁾				
Breast cancer	–.03 (γ_{14})	.01 (γ_{24})	–.20** (γ_{34})	.29** (γ_{41})
HIV/AIDS	.01 (γ_{15})	.08 (γ_{25})	–.09 (γ_{35})	.35** (γ_{42})
Diabetes	.09 (γ_{16})	.24** (γ_{26})	–.10* (γ_{36})	.20** (γ_{43})
Obesity w/diabetes	.15** (γ_{17})	.12** (γ_{27})	–.07 (γ_{37})	.08* (γ_{44})
Patient demographics				
Gender (male) ²⁾	–.01 (γ_{18})	.00 (γ_{28})	–.00 (γ_{38})	–.11** (γ_{45})
Age	–.06* (γ_{19})	–.09** (γ_{29})	–.10** (γ_{39})	.20** (γ_{46})
Education level	.02 (γ_{110})	.06** (γ_{210})	–.04 (γ_{310})	.00 (γ_{47})

Notes: $\chi^2/df = 3.99$, TLI/NNFI = .94, CFI = .96, RMSEA = .04, SRMR = .05.

¹⁾ Type of disease was operationalized as a dummy variable with $k - 1$ parameter values ($k = 5 =$ number of diseases). Obesity served as the reference category.

²⁾ Gender was operationalized as a dummy variable with $k - 1$ parameter values ($k = 2 =$ number of genders). Female served as the reference category.

** $p < .01$; * $p < .05$.

section. Table 3 reports the results of the hypotheses testing as well as the control effects.

6. Post-hoc analyses

6.1. Analyses on the moderating role of the type of disease

To assess the differences of the hypothesized main effects with regard to the patient groups (type of disease), we used a multi-group SEM approach (Muthén & Muthén, 2007). The patient group suffering from obesity was too small to conduct separate analyses ($n = 80$, see Table 1), so we included the remaining four groups (breast cancer, HIV/AIDS, diabetes, obesity w/diabetes) for which we recalculated our main model. Table 4 reports the results of the analyses. In this table, we arranged the diseases from the comparably severest disease (breast cancer) on the left to the comparably least severe disease (obesity w/diabetes) on the right. As, overall, any type of chronic diseases could be regarded as severe, we based the arrangement of the diseases on assessments of physicians and patients, also taking into account the general acuteness of the disease as well as the burden exposed to patients through the associated treatments (see also Knaus, Draper, Wagner, & Zimmerman, 1985).

6.1.1. The disease-specific impact of PE antecedents on PE

With regard to the impact of PE antecedents on information search, no substantial differences occur for health involvement's effects across the four patient groups ($\gamma_{bc} = .41$, $\gamma_{H/A} = .46$, $\gamma_{diab} = .49$, $\gamma_{ob/di} = .40$,

Table 4
Results of post-hoc analyses: multi-group SEM for patient groups.

Predictor variable	Dependent variable	Breast cancer	HIV/AIDS	Diabetes	Obesity w/diabetes	
Health involvement	Information search	.41**	.46**	.49**	.40**	(line 1)
Self-efficacy		.07	.02	.14**	.29**	(line 2)
Acceptance of physician authority	Knowledge development	-.20*	.00	-.19**	.00	(line 3)
Health involvement		-.05	-.08	.00	.05	(line 4)
Self-efficacy		.31**	.33**	.31**	.18*	(line 5)
Acceptance of physician authority	Decision participation	-.27**	-.29**	-.16**	-.20*	(line 6)
Health involvement		-.02	.05	-.05	.30**	(line 7)
Self-efficacy		.13*	.14*	.04	.24**	(line 8)
Acceptance of physician authority		-.31**	-.22**	-.16**	-.15*	(line 9)
Information search	Therapy compliance	-.05	.17**	.09	.28**	(line 10)
Knowledge development		.12	.08	.29**	.02	(line 11)
Decision participation		-.02	-.14*	-.19**	.18*	(line 12)

** $p < .01$.
* $p < .05$.

all $p < .01$; see Table 4, line 1). Furthermore, we find that while self-efficacy does not significantly drive the information search of breast cancer and HIV/AIDS patients ($\gamma_{bc} = .07, p = .14; \gamma_{H/A} = .02, p = .36$), it does so for patients suffering from diabetes or obesity w/diabetes ($\gamma_{diab} = .14, \gamma_{ob/di} = .29$; both $p < .01$; see Table 4, line 2). Moreover, results reveal that the acceptance of physician authority shows significant effects on information search for the groups of breast cancer and diabetes patients ($\gamma_{bc} = -.20, \gamma_{diab} = -.19$; both $p < .01$) but not of HIV/AIDS and obesity w/diabetes patients ($\gamma_{H/A} = .00, p = .49; \gamma_{ob/di} = .00, p = .48$; see Table 4, line 3).

PE antecedents' effects on knowledge development do not greatly differ across patient groups. For all four groups health involvement has no impact on knowledge development ($\gamma_{bc} = -.05, p = .26; \gamma_{H/A} = -.08, p = .17; \gamma_{diab} = .00, p = .49; \gamma_{ob/di} = .05, p = .33$; see Table 4, line 4), self-efficacy significantly enhances patients' knowledge development ($\gamma_{bc} = .31, \gamma_{H/A} = .33, \gamma_{diab} = .31, p < .01; \gamma_{ob/di} = .18, p < .05$; see Table 4, line 5) and the acceptance of physician authority significantly attenuates it in all four groups ($\gamma_{bc} = -.27, \gamma_{H/A} = -.29, \gamma_{diab} = -.16, p < .01; \gamma_{ob/di} = -.20, p < .05$; see Table 4, line 6).

By contrast, PE antecedents' effects on decision participation diverge substantially across groups. Specifically, the respective impact of health involvement is only significant and positive in the obesity w/diabetes group ($\gamma_{ob/di} = .30, p < .01; \gamma_{bc} = -.02, p = .36; \gamma_{H/A} = .05, p = .20; \gamma_{diab} = -.05, p = .23$; see Table 4, line 7). Moreover, this group also shows the strongest positive impact of self-efficacy ($\gamma_{ob/di} = .24, p < .01; \gamma_{bc} = .13, p < .05; \gamma_{H/A} = .14, p < .05; \gamma_{diab} = .04, p = .28$; see Table 4, line 8) but reveals the weakest negative impact of acceptance of physician authority on decision participation ($\gamma_{ob/di} = -.15, p < .05; \gamma_{bc} = -.31, \gamma_{H/A} = -.22, \gamma_{diab} = -.16, p < .01$; see Table 4, line 9).

6.1.2. The disease-specific impact of PE on therapy compliance

The results on the impact of PE on therapy compliance reveal quite diverging patterns. In particular, none of the PE dimensions have a significant impact on therapy compliance in the patient group of the comparably severest disease (i.e., breast cancer: $\gamma_{bc} = -.05, p = .23; \gamma_{bc} = .12, p = .12; \gamma_{bc} = -.02, p = .42$; see Table 4, lines 10, 11, and 12). By contrast, in the group of the comparably least severe disease (obesity w/diabetes), PE's impact on therapy compliance is positive and significant, except for knowledge development ($\gamma_{ob/di} = .28, p < .01; \gamma_{ob/di} = .02, p = .44; \gamma_{ob/di} = .18, p < .05$; Table 4, lines 10, 11, and 12). For the two groups in between—HIV/AIDS and diabetes—the impact of decision participation on therapy compliance is negative and significant ($\gamma_{H/A} = -.14, p < .05; \gamma_{diab} = -.19, p < .01$; Table 4, line 12). Moreover, information search significantly enhances therapy compliance of HIV/AIDS patients ($\gamma_{H/A} = .17, p < .01; \gamma_{diab} = .09, p = .11$; Table 4, line 10), whereas knowledge development significantly increases therapy compliance of diabetes patients ($\gamma_{diab} = .29, p < .01; \gamma_{H/A} = .08, p = .17$, Table 4, line 11).

6.2. Mediation analyses

To analyze whether PE mediates the PE antecedents' impact on therapy compliance, we conducted additional analyses. To be consistent with the analysis method of our main model we also base our mediation analyses on SEM (Mplus 4.1). In doing so, we follow suggestions in the literature that recommend SEM as a particularly suitable method to calculate mediation effects because it estimates more than one mediator as well as the final dependent variable simultaneously in one model, in contrast with, for example, regression analyses, in which these effects must be tested separately across various models (Iacobucci, Saldanha, & Deng, 2007; James, Mulaik, & Brett, 2006).

We base our approach on the three-step procedure as described in Zhao, Lynch, and Chen (2010). In a first step, we checked for the effects that fulfilled the requirement of having path coefficients from the predictors (PE antecedents) to the mediator variables (PE dimensions) and from the mediator variables to the final dependent variable (therapy compliance) that are significantly different from zero (Preacher & Hayes, 2008; Taylor, MacKinnon, & Tein, 2008; Zhao et al., 2010). Table 5 summarizes the paths that fulfilled these requirements (based on the results in Table 3).

In a second step, we estimated the significance of the respective indirect effect PE antecedents on therapy compliance. To do so, we first conducted a Sobel test as integrated in Mplus. The results show that for all identified paths relevant for potential mediation,

Table 5
Estimation of indirect effects.

	Relevant mediators (= PE dimensions)		
	Information search	Knowledge development	Decision participation
Resulting indirect effects on therapy compliance			
Mediated Predictors (= PE antecedents)			
Health involvement	= $\gamma_{11} \cdot \beta_{41}$ = (.47) · (.11) = .051**	n/a	n/a
Self-efficacy	= $\gamma_{12} \cdot \beta_{41}$ = (.09) · (.11) = .010*	= $\gamma_{22} \cdot \beta_{42}$ = (.29) · (.12) = .034**	= $\gamma_{32} \cdot \beta_{43}$ = (.10) · (-.09) = .009*
Acceptance of physician authority	= $\gamma_{13} \cdot \beta_{41}$ = (-.08) · (.11) = -.009*	= $\gamma_{23} \cdot \beta_{42}$ = (-.22) · (.12) = -.026**	= $\gamma_{33} \cdot \beta_{43}$ = (-.19) · (-.09) = .018*

n/a = Effect of the predictor on the mediator was not significant according to the results of the hypotheses testing in Table 3. Thus, a potential mediation cannot be further explored in this case.

** $p < .01$.
* $p < .05$.

the indirect effects were significant (all $p < .05$, see Table 5). Bootstrapping with 95% confidence intervals (excluding zero) confirms these results (Preacher & Hayes, 2008; Zhao et al., 2010), providing further evidence that PE dimensions indeed mediate the impact of PE antecedents on therapy compliance.

In a third step, we checked for potential direct effects of PE antecedents on therapy compliance. We found that PE antecedents also influence therapy compliance directly ($\gamma_{41} = .08, p < .01$; $\gamma_{42} = .08, p < .05$; $\gamma_{43} = .11, p < .01$). Overall, we can thus conclude that the three PE dimensions partially mediate PE antecedents' impact on therapy compliance (Iacobucci et al., 2007; James et al., 2006).

7. Discussion

7.1. Implications for research

7.1.1. Implications from findings on PE antecedents

Our study is the first to systematically explore major antecedents of PE. To do so, we base our conceptualization of PE on the well-established SDT and clearly define PE as a three-dimensional behavior including information search, knowledge development, and decision participation. In general, we while patients' information search is primarily driven by their health involvement, their knowledge development is most strongly affected by their self-efficacy and their decision participation by their acceptance of physician authority. Thus, each PE dimension is affected most effectively by a different PE antecedent. This implies that PE dimensions based on patients' need for competence (i.e., information search and knowledge development) are most strongly driven by PE-enhancing antecedents, whereas the PE dimension based on patients' need for autonomy (i.e., decision participation) depends more on the PE-reducing antecedent. Hence, we advance theory (Deci & Ryan, 1985b; 2000) by showing that stimulating the need for competence vs. stimulating the need for autonomy may vary in importance across different situations. That is, under serious conditions, stimulating patients' need for competence seems to be more effective for encouraging PE than stimulating patients' need for autonomy.

Second, another major finding pertains to the role of patients' health involvement. While, as predicted, health involvement fuels patients' information search, it does not affect their knowledge development and decision participation. This finding may be explained by the "ostrich tactic": patients highly involved with their health may at a certain point become reluctant to engage further with their disease to avoid becoming fully aware of its severity or potential difficulties with related therapies (Gordon, Walker, & Carrick-Sen, forthcoming). Though heavily engaged in gathering information, these patients obviously do not wish to deal with the collected information any further. Opponents of consumer empowerment support this view and question consumers' ability to properly process and use collected information in decision making. They assume that consumers feel overwhelmed by the amount of information available and thus refrain from making efforts to comprehend the information and from making decisions that involve numerous alternatives (Dhar, 1997; Jayanti & Singh, 2010).

Third, in contrast with self-efficacy's impact on all PE dimensions, we find that the acceptance of physician authority affects all three PE dimensions negatively. A strong acceptance of physician authority may thus create severe problems with regard to their information search and knowledge development and, thus, therapy compliance. However, as decision participation reduces therapy compliance, acceptance of physician authority's attenuating impact on decision participation can still benefit therapy compliance overall. We thus demonstrate that the degree to which PE antecedents may

eventually enhance or decrease therapy compliance depends on which PE dimension they affect.

7.1.2. Implications from findings on therapy compliance

On a general level, our results reveal that the impact of patients' PE behavior on their therapy compliance differs not only in intensity but also in direction so that our results support and contradict previous findings at the same time. As expected, and in line with studies claiming a positive outcome of PE (e.g., Broadstock & Michie, 2000; Lenert, 2009), we find positive outcomes of PE as patients' information search and knowledge development can enhance their therapy compliance. However, contrary to our hypothesis but in line with Camacho et al. (2014), who investigated the impact of PE on therapy compliance in a multi-national context, we also detect negative outcomes of PE in that decision participation reduces therapy compliance, thus challenging previous research emphasizing only positive outcomes of PE (Broadstock & Michie, 2000; Williams et al., 1998).

Several reasons could explain this unexpected finding. First, empowered patients may have greater confidence in their decision-making capabilities with regard to treatment choices and may eventually become overconfident in making educated decisions (Camacho et al., 2014). Thus, they may believe they have the full picture on their situation and may intentionally ignore the physician's treatment recommendation (Bowman, Heilman, & Seetharaman, 2004).

Second, prior research suggests that providing individuals with numerous choice options (such as treatment choices), especially in severe situations, does not increase the likelihood of making a choice and being content with that choice (Botti et al., 2009; Scheibehenne, Greifeneder, & Todd, 2010), so that patients may not stick to prior treatment choices (Anderson & Funnell, 2010).

In summary, although empowering patients may be beneficial for therapy compliance in terms of stimulating their information search and knowledge development, experts' call to involve patients more strongly in their treatment decisions may backfire. Hence, the active involvement of patients in their therapy decisions should, if at all, only be conducted with caution and care.

7.1.3. Implications from findings across different types of diseases

Our study is the first to analyze PE for different types of serious medical conditions based on a unique and large-scale sample of different chronic diseases. This is particularly noteworthy as related studies on decision-making for important issues (e.g., Botti et al., 2009; Pavia & Mason, 2004; Wong & King, 2008) have so far been based primarily on small samples and on only one serious disease.

7.1.3.1. Disease-related differences regarding therapy compliance. The most surprising finding pertains to the impact of PE on therapy compliance. For patient groups with particularly severe diseases (breast cancer, HIV/AIDS) the impact of PE is substantially lower (or even non-existent) than for groups with less severe diseases (diabetes, obesity w/diabetes). The diverging findings across different types of chronic diseases may thus serve as a first explanation of the previous mixed findings with regard to PE's impact on therapy compliance. Specifically, these previous studies have not explicitly considered the type of disease as a major influence factor (e.g., Broadstock & Michie, 2000; Camacho et al., 2014; Lenert, 2009). The results of our study indicate that this is clearly a factor which must be considered because the impact of PE on compliance varies substantially depending on the type of disease.

In particular, while PE has no impact on therapy compliance of patients suffering from the most severe disease, i.e., breast cancer, it even enhances therapy compliance of patients suffering from the least severe disease, i.e., obesity w/diabetes. It seems that breast cancer

patients are overwhelmed by their diagnosis, thus relying on their physician's advice. This reasoning becomes particularly obvious when considering the impact of decision participation on therapy compliance. In line with this, Botti et al. (2009) suggest that people may refrain from making choices in the case of tragic medical decisions to mitigate negative emotional consequences, such as cognitive dissonance. The reluctance of patients to participate in decision making may be due to emotional stress and the uncertainty associated with making the best choice (Iyengar & Lepper, 2000), as patients with a particularly severe chronic disease (e.g., breast cancer) either tend to ignore their situation or develop fatalism, thus putting themselves fully in the hands of specialists, such as physicians.

A possible explanation for the finding that decision participation of patients in the obesity w/diabetes group enhances therapy compliance may lie in the flexibility of treatment options available to these patients, such as different diets, sports, or supplementary medication (e.g., Metformin). These can be more flexibly organized and also do not particularly restrict their lives (in contrast to chemotherapies). Participating in the decision on these flexible treatments may thus motivate patients even more to comply with them (see also Senécal et al., 2000).

7.1.3.2. Disease-related differences with regard to PE antecedents. First, results show that the overall PE-enhancing impacts of health involvement and self-efficacy tend to decrease with a rising severity of disease (Table 4, lines 1–9). Specifically, these two antecedents are most influential in the group of patients suffering from obesity w/diabetes (i.e., the least severe disease), followed by the diabetes and HIV/AIDS patients, while they are the least influential in the group of breast cancer patients (i.e., the most severe disease). By contrast, the overall PE-reducing effect of the acceptance of physician authority tends to increase with a rising severity of disease (Table 4, lines 1–9). It is most influential for PE in the group of breast cancer patients, followed by HIV/AIDS and diabetes, but it is the lowest for the obesity w/diabetes group. Thus, if stakeholders' goal is to enhance patients' PE, they may be most successful if they encourage PE in patients suffering from a less severe disease, and vice versa.

Second, the impact of patients' acceptance of physician authority is particularly noteworthy. While it affects information search in the groups of patients suffering from breast cancer and diabetes, it has no respective impact in the groups of HIV/AIDS and obesity w/diabetes patients. In these cases, the explanation for group differences may not lie in the severity of the disease, but rather in the extent to which patients actively care about the prevention of chronic diseases. While people may not be able to actively protect against breast cancer or diabetes, they could protect against obesity w/diabetes or HIV/AIDS by keeping a proper diet or practicing safe sex. Yet many patients do not know about or are indifferent to prevention options (Puhl & Brownell, 2003; Raghurir & Menon, 1998). Thus, the results imply that patients suffering from HIV/AIDS or obesity do not seem to have actively cared about prevention, thus also being less consistent in seeking information.

Third, with regard to decision participation, we observe a special role of patients' health involvement as it only drives patients' decision participation in the case of the least severe disease (i.e., obesity w/diabetes). Thus, although they may be highly involved in their health, patients suffering from more severe diseases do not dare to take an active role in deciding on what treatment they should follow to combat their disease. Perhaps patients' perceived risk of making a wrong decision in such a delicate situation outweighs their need for autonomy with regard to behaviors determining their health.

7.1.3.3. Implications from findings of mediation analyses. Our mediation tests imply that PE antecedents affect therapy compliance not only indirectly but also directly. Thus, patients' health involvement, self-efficacy, and acceptance of physician authority can still determine the degree to

which they follow their doctor's advice, whether they are empowered or not.

While health involvement and self-efficacy enhance compliance directly and indirectly through information search and knowledge development, they also have negative indirect impacts on compliance mediated by decision participation. These effects, however, are smaller than the positive effects, so that health involvement and self-efficacy have an overall positive impact on therapy compliance.

By contrast, the acceptance of physician authority can be a double-edged sword. While it enhances therapy compliance both directly and indirectly (as mediated by decision participation), it also substantially reduces therapy compliance in an indirect manner, as mediated by information search and knowledge development. Therefore, because it is difficult to draw final conclusions on the overall benefits of acceptance of physician authority, we recommend consideration of the potential benefits depending on patients' specific situation, such as the type of disease (see Table 4).

7.2. Implications for practitioners

7.2.1. Implications for physicians

While physicians should, in general, refrain from integrating patients too much into decision making on treatments and therapies, they should encourage patients to engage in information search on their disease and to develop related knowledge. However, this approach also carries substantial risks. Available information, particularly from the Internet may be of low quality, and especially the "legitimacy of knowledge generated in consumer communities is [...] questionable" (Jayanti & Singh, 2010, p. 1079). Thus, physicians should proactively try to discuss patients' gathered information with them and also recommend more valid information sources, such as self-help groups or official platforms.

Physicians should also adapt their patient interaction strategies to patients' disease and especially encourage PE for less severe diseases to advance therapy compliance. If treating obesity w/diabetes patients, for example, physicians should stimulate patients' information search and decision participation, whereas specialists in diabetes may especially stimulate patients' knowledge development. By contrast, there is no need to encourage PE in the case of severe diseases such as breast cancer.

Moreover, hypotheses testing and the mediation analyses show that health involvement has a purely enhancing (direct and indirect) impact on therapy compliance, so we recommend that physicians stimulate patients' positive attitudes toward their health, particularly by stressing the advantages of maintaining a good health. However, when patients exhibit low health involvement, physicians might instead try to increase patients' respect for the disease by clearly describing the disease's negative outcomes. This recommendation holds true for all types of diseases.

7.2.2. Implications for healthcare companies

We also encourage healthcare companies to support patient information search and to knowledge development by providing useful material and conceptual grids that help patients better organize the gathered information. Moreover, physicians and pharmaceutical companies should work together to identify specific needs of the different patient groups and adequately support patients with useful information, official discourses, and even training in how to deal with their individual health conditions. The joint efforts of physicians and pharmaceutical firms could be supported by interaction platforms that foster exchange between them and patients, in addition to stimulating inter-patient exchanges. This approach makes use of pharmaceutical firms' knowledge while ensuring that the focus remains on the patient. In addition, as our results indicate that PE is especially beneficial for patients suffering from less severe

diseases (e.g., obesity w/diabetes), healthcare firms acting in this field may (if allowed by healthcare policy makers) directly approach patients with suitable medication through direct-to-consumer advertising (e.g., Liu & Gupta, 2011; Stremersch, Landsman, & Venkataraman, 2013).

7.2.3. Implications for healthcare policy makers

Many physicians are not sufficiently experienced in patient-centered communication styles that could help patients better satisfy their need for competence in terms of understanding the complex nature and treatment options of their disease; thus, we suggest that healthcare policy makers provide physicians with corresponding skills. Improving the medical communication activities that today still reflect a physician-centered “doctor knows best” approach (van den Berg & Donyai, 2010) requires not only specific trainings for physicians but also specific guidelines and incentives. Specifically, physicians require sufficient time to ask patients about their needs and fears and to provide obligatory information. However, many healthcare systems follow a short-term-focused cost-saving approach that supports quick and focused treatments, which leaves little room for encouraging patients to search for useful information and develop profound knowledge on treatment options. Switching to a long-term-focused approach that encourages PE when applicable (e.g., diabetes or obesity) may eventually even reduce healthcare costs because of stronger therapy compliance. This, however, requires that policy makers further examine how to effectively design these guidelines and incentives.

7.2.4. Implications for future research

First, we suggest that researchers in the area of healthcare further explore the relationship between PE and therapy compliance to gain a deeper understanding of the link between decision participation and

therapy compliance. In this context, researchers might also consider additional consequences of PE, including patient-related outcomes such as patient satisfaction or coping.

Second, researchers could consider more specific characteristics of diseases (e.g., perceived risk, duration) as well as additional circumstances, such as the patient's position (e.g., type of insurance, salary) or treatment characteristics (e.g., surgery vs. long-term medication). Moreover, it would be worthwhile to explore potential quasi-moderating impacts of PE on therapy compliance.

Third, controllability over one's health (e.g., in terms of disease prevention) may play an important role in further explaining compliance, particularly with regard to more lifestyle-oriented diseases such as obesity w/diabetes. Thus, we encourage researchers to explore how controllability over one's health affects patients' willingness to adapt their behavior and to comply with their therapy.

Fourth, PE research could benefit from exploring the role one's self-labeling as patient and how it affects patients' subsequent behaviors in terms of both PE and therapy compliance. In addition, PE may vary with patients' personal characteristics, such as the Big Five personality traits (Barrick & Mount, 1991), or cognitive abilities, such as memory, logical thinking, or creativity.

Finally, because public policy makers are particularly interested in the specific impact of PE on healthcare costs, future studies might work with cost-related public policy data. By building on our results on therapeutic behavior, they could investigate how the potentially cost-reducing impact of therapy compliance eventually affects the overall healthcare costs of a public healthcare system.

Acknowledgments

The article benefited from the support of Hoffman-La Roche and Roche Diagnostics.

Appendix A

Constructs	Items	IR	FL	
PE antecedents	(1) Health involvement	My health is most important to me.	.38 .62**	
		I am concerned about my health and try to take action to prevent health hazards.	.37 .60**	
		Taking care of my health means a lot to me.	.68 .82**	
	(2) Self-efficacy	When I am confronted with a new situation, I know how to deal with it.	.56 .75**	
		I can usually think of a solution if I am in trouble.	.66 .81**	
	(3) Acceptance of physician authority	Whatever comes my way, I can handle it.	.56 .75**	
The treatment of diseases is primarily a doctor's job.		.56 .75**		
The doctor usually knows best about what is good for the patient.		.91 .95**		
Patient empowerment (PE)	(4) Information search	One should follow a doctor's treatment recommendation.	.53 .73**	
		I am interested in searching for information concerning my disease.	.53 .72**	
	(5) Knowledge development	I regularly search for information concerning my disease.	.78 .89**	
		I systematically search for information concerning my disease.	.75 .87**	
		I spend a lot of time collecting information concerning my disease.	.64 .80**	
	(6) Decision participation	Compared to other patients with my disease, I would call myself an “expert”.	.61 .78**	
		Compared to my doctor, I easily keep up with current knowledge about my disease.	.68 .83**	
		I systematically examine the acquired information about my disease.	.40 .63**	
	PE consequence	(7) Therapy compliance	I contribute with suggestions in planning my treatment.	.51 .71**
			I have an essential influence on decisions regarding treatment.	.79 .89**
Together with my doctor, I participate extensively in planning treatment of my disease.		.51 .71**		
I take the medication prescribed by my doctor at the right time.		.61 .78**		
Control variables	(8) Type of disease	I take the right dosage of the medication prescribed by my doctor.	.60 .78**	
		I follow the prescribed treatment regularly and continuously.	.86 .93**	
	(9) Gender	Please indicate your disease.	– –	
	(10) Age	Please indicate your gender.	– –	
	(11) Education level	Please indicate your age.	– –	
		Please indicate your educational level.	– –	

IR = item reliability; FL = item factor loading; ** $p < .01$.

References

- Alba, J. W., & Hutchinson, W. J. (1987). Dimension of consumer expertise. *Journal of Consumer Research*, 13(4), 411–454.
- Anderson, R. M., & Funnell, M. M. (2010). Patient empowerment: Myths and misconceptions. *Patient Education and Counseling*, 79, 277–282.
- Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, 14, 396–402.
- Atakan, S. S., Bagozzi, R. P., & Yoon, C. (2014). Consumer participation in the design and realization stages of production: How self-production shapes consumer evaluations and relationships to products. *International Journal of Research in Marketing*, 31(4), 395–408.
- Aujoulat, I., d'Hoore, W., & Deccache, A. (2007). Patient empowerment in theory and practice: Polysemy or cacophony? *Patient Education and Counseling*, 66, 13–20.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–97.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory* (1st ed.). New York: Prentice-Hall.
- Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, 25(5), 729–735.
- Bandura, A., & Jourden, F. (1991). Self-regulatory mechanisms governing the impact of social comparison on complex decision making. *Journal of Personality and Social Psychology*, 60(6), 941–951.
- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44(1), 1–26.
- Bem, D. J., & Allen, A. (1974). On predicting some of the people some of the time: The search for cross-situational consistencies in behavior. *Psychological Review*, 81(6), 506–20.
- Boeckner, L. S., Kohn, H., & Rockwell, S. K. (1990). A risk-reduction nutrition course for adults. *Journal of the American Dietetic Association*, 90, 260–263.
- Bolton, R. N. (1993). Pretesting questionnaires: Content analysis of respondents' concurrent verbal protocols. *Marketing Science*, 12(3), 280–303.
- Botti, S., Orfali, K., & Iyengar, S. S. (2009). Tragic choices: Autonomy and emotional responses to medical decisions. *Journal of Consumer Research*, 36(3), 337–352.
- Bowman, D., Heilman, C. M., & Seetharaman, P. B. (2004). Determinants of product-use compliance behavior. *Journal of Marketing Research*, 41(3), 324–338.
- Broadstock, M., & Michie, S. (2000). Processes of patient decision making: Theoretical and methodological issues. *Psychology and Health*, 15, 191–204.
- Camacho, N., de Jong, M., & Stremersch, S. (2014). The effect of customer empowerment on adherence to expert advice. *International Journal of Research in Marketing*, 31, 293–308.
- Camacho, N., Landsman, V., & Stremersch, S. (2010). The connected patient. In S. Wuyts, M. G. Dekimpe, E. Gijbrecchts, & R. Pieters (Eds.), *The connected customer: The changing nature of consumer and business markets* (pp. 107–139). New York: Taylor & Francis.
- Chaudhuri, A. (2000). A macro analysis of the relationship of product involvement and information search: The role of risk. *Journal of Marketing Theory and Practice*, 8(1), 1–15.
- Day, J. L. (2000). Diabetic patient education: Determinants of success. *Diabetes/Metabolism Research and Reviews*, 16(1), S70–S74.
- De Cremer, D., & Tyler, T. R. (2007). The effects of trust in authority and procedural fairness on cooperation. *Journal of Applied Psychology*, 92, 639–649.
- Deci, E. L., & Ryan, R. M. (1985a). *Intrinsic motivation and self-determination in human behavior* (1st ed.). New York: Springer.
- Deci, E. L., & Ryan, R. M. (1985b). The general causality orientation scale: Self-determination in personality. *Journal of Research in Personality*, 19, 109–134.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuit: Human needs and self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Dellande, S., Gilly, M. C., & Graham, J. L. (2004). Gaining compliance and losing weight: The role of the service provider in health care services. *Journal of Marketing*, 68(3), 78–91.
- Delnoij, D., & Hafner, V. (2013). *Exploring patient participation in reducing health-care-related safety risks*. World Health Organization.
- Deshpande, A. D., Menon, A. M., Perri, M., III, & Zinkhan, G. M. (2004). Direct-to-consumer advertising and its utility in health care decision making: A consumer perspective. *Journal of Health Communication*, 9(6), 499–513.
- Dhar, R. (1997). Consumer preference for a no-choice option. *Journal of Consumer Research*, 24(2), 215–231.
- Dunst, C. J., & Trivette, C. M. (1996). Empowerment, effective helping practices and family-centered care. *Pediatric Nursing*, 22(4), 334–343.
- Etgar, M. (2008). A descriptive model of the consumer co-production process. *Journal of the Academy of Marketing Science*, 36(1), 97–108.
- Fletcher, S. W., Morgan, T. M., O'Malley, M. S., Earp, J. A. L., & Degnan, D. (1989). Is breast self examination predicted by knowledge, attitude beliefs or sociodemographic characteristics? *American Journal of Preventive Medicine*, 5(4), 207–215.
- Flynn, L. R., & Goldsmith, R. E. (1999). A short, reliable measure of subjective knowledge. *Journal of Business Research*, 46(1), 57–66.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Funnell, M. M., Anderson, R. M., Arnold, M. S., Barr, P. A., Dennelly, M., Johnson, P. D., Taylor-Moon, D., & White, N. H. (1991). Empowerment: An idea whose time has come in diabetes education. *The Diabetes Educator*, 17(1), 37–41.
- Galea, G. (2014). *The inevitable epidemic? Major chronic diseases in the European Union. Presentation at the Chronic Disease Summit, Brussels*.
- Gibson, H. (1991). A concept analysis of empowerment. *Journal of Advanced Nursing*, 16, 354–361.
- Gordon, C., Walker, M., & Carrick-Sen, D. (2013). Exploring risk, prevention and educational approaches for the non-diabetic offspring of patients with type 2 diabetes—A qualitative study. *Journal of Advanced Nursing*, 69 (12), 2726–2737.
- Guadagnoli, E., & Ward, P. (1998). Patient participation in decision-making. *Social Science & Medicine*, 46(3), 329–339.
- Hadley, C. N., Pittinsky, T. L., Sommer, S. A., & Zhu, W. (2011). Measuring the efficacy of leaders to assess information and make decisions in a crisis: The C-LEAD scale. *The Leadership Quarterly*, 22(4), 633–648.
- Hausman, A. (2004). Modeling the patient–physician service encounter: Improving patient outcomes. *Journal of the Academy of Marketing Science*, 32(4), 403–417.
- Iacobucci, D., Saldanha, N., & Deng, X. (2007). A meditation on mediation: Evidence that structural equations models perform better than regressions. *Journal of Consumer Psychology*, 17(2), 139–153.
- Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, 79(6), 995–1006.
- James, L. R., Mulaik, S. A., & Brett, J. M. (2006). A tale of two methods. *Organizational Research Methods*, 9(2), 233–245.
- Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research*, 30(2), 199–218.
- Jayanti, R. K., & Burns, A. C. (1998). The antecedents of preventive health care behavior: An empirical study. *Journal of the Academy of Marketing Science*, 26(1), 6–15.
- Jayanti, R. K., & Singh, P. (2010). Pragmatic learning theory: An inquiry-action framework for distributed consumer learning in online communities. *Journal of Consumer Research*, 36(6), 1058–1081.
- Johnson, M. O. (2011). The shifting landscape of health care: Toward a model of health care empowerment. *American Journal of Public Health*, 101(2), 265–270.
- Jones, G. R. (1983). Psychological orientation and the process of organizational socialization: An interactionist perspective. *Academy of Management Review*, 8, 464–474.
- Knaus, P. A., Draper, E. A., Wagner, D. P., & Zimmerman, J. E. (1985). APACHE II: A severity of disease classification system. *Critical Care Medicine*, 13(10) (X–X).
- Kuo, F.-Y., Chu, T.-H., Hsu, M.-H., & Hsieh, H.-S. (2004). An investigation of effort–accuracy trade-off and the impact of self-efficiency on Web searching behaviors. *Decision Support Systems*, 37(3), 331–342.
- Leisen, B., & Hyman, M. R. (2004). Antecedents and consequences of trust in a service provider: The case of primary care physicians. *Journal of Business Research*, 57(9), 990–999.
- Lenert, L. (2009). Transforming healthcare through patient empowerment. *Information Knowledge Systems Management*, 8(1–4), 159–179.
- Liu, Q., & Gupta, S. (2011). The impact of direct-to-consumer advertising of prescription drugs on physician visits and drug requests: Empirical findings and public policy implications. *International Journal of Research in Marketing*, 28(3), 205–217.
- Lynn, P. (2003). PEDAKSI: Methodology for collecting data about survey non-respondents. *Quality and Quantity*, 37(3), 239–261.
- Menon, S. T. (1999). Psychological empowerment: Definition, measurement, and validation. *Canadian Journal of Behavioral Science*, 31(3), 161–164.
- Menon, A. M., Deshpande, A. D., Zinkhan, G. M., & Perri, M., III (2004). A model assessing the effectiveness of direct-to-consumer advertising: Integration of concepts and measures from marketing and health care. *International Journal of Advertising*, 23(1), 91–118.
- Mittal, B. (1989). Must consumer involvement always imply more information search? *Advances in Consumer Research*, 16(1), 167–172.
- Moorman, C. (1990). The effects of stimulus and consumer characteristics on the utilization of nutrition information. *Journal of Consumer Research*, 17(3), 362–374.
- Moorman, C., & Matulich, E. (1993). A model of consumers' preventive health behaviors: The role of health motivation and health ability. *Journal of Consumer Research*, 20(2), 208–228.
- Muthén, L. K., & Muthén, B. O. (2007). *Mplus user's guide* (4th ed.). Los Angeles, CA: Muthén & Muthén.
- Ouschan, R., Sweeney, J. C., & Johnson, L. W. (2000). Dimensions of patient empowerment: Implications for professional services marketing. *Health Marketing Quarterly*, 18(1/2), 99–114.
- Ouschan, R., Sweeney, J. C., & Johnson, L. W. (2006). Customer empowerment and relationship outcomes in healthcare consultations. *European Journal of Marketing*, 40(9/10), 1068–1086.
- Ozer, E. M., & Bandura, A. (1990). Mechanisms governing empowerment effects: A self-efficacy analysis. *Journal of Personality and Social Psychology*, 58(3), 472–486.
- Pavia, T. M., & Mason, M. J. (2004). The reflexive relationship between consumer behavior and adaptive coping. *Journal of Consumer Research*, 31(2), 441–454.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, 19, 123–205.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- Puhl, R., & Brownell, K. D. (2003). Ways of coping with obesity stigma: Review and conceptual analysis. *Eating Behaviors*, 4(1), 53–78.
- Raghubir, P., & Menon, G. (1998). AIDS and me never the twain shall meet: The effects of information accessibility on judgments of risk and advertising effectiveness. *Journal of Consumer Research*, 25(1), 52–63.
- Rifon, N. J., & Mavis, B. E. (1992). Health promotion services consumption: Involvement and program choice. *Advances in Consumer Research*, 19(1), 679–687.
- Rigby, K. (1986). Acceptance of authority, self, and others. *The Journal of Social Psychology*, 126(4), 493–501.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.

- Scheibehenne, B., Greifeneder, R., & Todd, P. M. (2010). Can there ever be too many options? A meta-analytic review of choice overload. *Journal of Consumer Research*, 37(3), 409–425.
- Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). NFER-NELSON: Windsor.
- Senécal, C., Nouwen, A., & White, D. (2000). Motivation and dietary self-care in adults with diabetes: Are self-efficacy and autonomous self-regulation complementary or competing constructs? *Health Psychology*, 19(5), 452–457.
- Singh, J., Cuttler, L., & Silvers, J. B. (2004). Toward understanding consumers' role in medical decisions for emerging treatments: Issues, framework and hypotheses. *Journal of Business Research*, 57(9), 1054–1065.
- Stremersch, S. (2008). Health and marketing: The emergence of a new field of research. *International Journal of Research in Marketing*, 25(4), 229–233.
- Stremersch, S., Landsman, V., & Venkataraman, S. (2013). The relationship between DTCA, drug requests, and prescriptions: Uncovering variation in specialty and space. *Marketing Science*, 32(1), 89–110.
- Stremersch, S., & van Dyck, W. (2009). Marketing of the life sciences: A new framework and research agenda for a nascent field. *Journal of Marketing*, 73(4), 4–30.
- Tattersall, M. H. N. (2011). Can a second medical opinion in a patient with cancer be truly independent? *Asia-Pacific Journal of Clinical Oncology*, 7, 1–3.
- Taylor, A. B., MacKinnon, D. P., & Tein, J. -Y. (2008). Tests of the three-path mediated effect. *Organizational Research Methods*, 11(2), 241–269.
- U.S. National Health Council (2014). About chronic diseases. Press release from 29.7.2014 <http://www.nationalhealthcouncil.org/sites/default/files/AboutChronicDisease.pdf>
- van den Berg, M., & Donyai, P. (2010). How was patient empowerment portrayed in information leaflets describing the community pharmacy medicines use review service in the UK? *Patient Education and Counseling*, 80(2), 274–276.
- Veitch, K. (2010). The government of health care and the politics of patient empowerment: New labour and the NHS reform agenda in England. *Law and Policy*, 32(3), 313–331.
- Williams, A. (1988). Priority setting in public and private health care: A guide through the methodological jungle. *Journal of Health Economics*, 7(2), 173–183.
- Williams, G. C. (2002). Improving patients' health through supporting the autonomy of patients and provider. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 233–254). Rochester: University of Rochester Press.
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values of medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, 70(4), 767–779.
- Williams, G. C., Rodin, G. C., Ryan, R. M., Grolnick, W. S., & Deci, E. L. (1998). Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology*, 17(3), 269–276.
- Wong, N., & King, T. (2008). The cultural construction of risk understandings through illness narratives. *Journal of Consumer Research*, 34(5), 579–594.
- Wosinska, M. (2005). Direct-to-consumer advertising and drug therapy compliance. *Journal of Marketing Research*, 42(3), 323–332.
- Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research*, 12(3), 341–352.
- Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197–206.
- Zoffmann, V., & Lauritzen, T. (2006). Guided self-determination improves lifeskills with type 1 diabetes and A1C in randomised controlled trial. *Patient Education and Counseling*, 64(1–3), 78–86.