

# Two-factor theory – at the intersection of health care management and patient satisfaction

Josef Bohm

Health Services Administration, New York City College of Technology, City University of New York, Brooklyn, NY, USA

**Abstract:** Using data obtained from the 2004 Joint Canadian/United States Survey of Health, an analytic model using principles derived from Herzberg's motivational hygiene theory was developed for evaluating patient satisfaction with health care. The analysis sought to determine whether survey variables associated with consumer satisfaction act as Hertzberg factors and contribute to survey participants' self-reported levels of health care satisfaction. To validate the technique, data from the survey were analyzed using logistic regression methods and then compared with results obtained from the two-factor model. The findings indicate a high degree of correlation between the two methods. The two-factor analytical methodology offers advantages due to its ability to identify whether a factor assumes a motivational or hygienic role and assesses the influence of a factor within select populations. Its ease of use makes this methodology well suited for assessment of multidimensional variables.

**Keywords:** two-factor theory, behavioral theory, sociology of health care, patient satisfaction

## Introduction

This investigation sought to develop an analytical tool for identification and assessment of Herzberg motivational and hygiene factors associated with patient satisfaction. Herzberg's two-factor theory (also known as Herzberg's motivational hygiene theory) states that an individual's perception of satisfaction or dissatisfaction relates to a portfolio of discrete intrinsic and extrinsic variables. It has as its central thesis a belief that a variable can uniquely influence a person's satisfaction or dissatisfaction but not both. Originally derived from his work in occupational settings, Herzberg found that factors contributing to job satisfaction can be subdivided into two groups. The term "motivator" was applied to those factors which when present increased job motivation and satisfaction but when absent did not lead to dissatisfaction. Motivating factors were seen as being intrinsic and would include attributes such as achievement, recognition, and responsibilities. Alternatively, a second group labeled as "hygiene" factors was found to relate to extrinsic environmental issues, such as policy, status, and security. When present, hygiene factors did not increase satisfaction. It is their absence that produces increased dissatisfaction and lower motivation. The antagonistic nature of motivation and hygiene factors allows the theory to challenge the assumption that satisfaction and dissatisfaction are one-dimensional polar opposites and recognizes that a variable might exclusively relate to one but not necessarily to both.<sup>1</sup>

The occupational origin of the theory has already been applied to health care. Within this industry, satisfaction for a highly skilled workforce often rests upon finding

Correspondence: Josef Bohm  
Health Services Administration,  
New York City College of Technology,  
City University of New York, 300 Jay  
Street, Midway Building Room 203,  
Brooklyn, New York 11201-1909, USA  
Tel +1 718 260 5957  
Email jbohm@citytech.cuny.edu

a balance between professional and occupational priorities. Shortell and Kaluzny<sup>2</sup> point out the general usefulness of the theory in health care administration by making managers aware of the contribution of “job challenge and responsibility in employee motivation”. In other instances, Herzberg’s theory has been successfully applied to hospital pharmacy practice as a mechanism for dealing with low staff motivation<sup>3</sup> and occupational retention for registered psychiatric nurses.<sup>4</sup>

The intuitive basis of the theory has generated interest from a broad array of nonoccupational disciplines. A number of analogs using two-factor models have been applied by investigators to a diverse range of settings, such as the evaluation of evolving technologies, teaching attributes, and quality assurance.<sup>5-7</sup> Consumers also appear to apply a two-factor paradigm to health care provision. Performing a review of the literature for the Rand Corporation, Ware et al<sup>8</sup> support the critical relationship between medical consumerism and patient satisfaction. The authors conclude that patient satisfaction is a multidimensional concept that relates to the nature of medical services, health status, and the economics of medical consumption. Their review of 24 years of published literature yields eight major dimensions for patient satisfaction, ie, art of care, technical quality of care, accessibility/convenience, finances, physical environment, availability, continuity, and outcome efficiency.

Contemporary thinking as expressed by Yi<sup>9</sup> defines consumerism as an empirical process arising from a “confirmation/disconfirmation paradigm with consumer satisfaction resulting from a process of comparison”. Using this tactic, Tuten and August<sup>10</sup> developed a generalized “bidimensional model for service industries”. Their analysis applies a two-factor premise that satisfaction and dissatisfaction represent unique constructs. Hygiene factors are viewed as tangible environmental constructs associated with consumption such as price, quality, and availability of service personnel. Alternatively, motivators relate to the interaction of the consumer with the service, and would include perceptions of utility, value, and appreciation.

While these variables represent legitimate roles in health care provision, they may also point to the reason why two-factor investigations produce controversial outcomes. Conflicting results may arise from the empirical limitation associated with the theory’s central assumption that hygiene and motivational factors act independently. To illustrate, the model devised by Tuten and August defines a product’s price point as a hygiene factor. It is possible to argue that price point can also act as a motivational factor when it influences consumer perception of the value of a service. Overlap of

hygiene and motivational factors introduces ambiguity. This is demonstrated by Maddox’s<sup>11</sup> reanalysis of a prior investigation of consumer satisfaction conducted by Swan and Combs.<sup>12</sup> Maddox demonstrated only mixed support for a two-factor methodology due to difficulty in categorizing ambiguous outcomes. He warns us that the goal of “maximizing consumer satisfaction” becomes more complicated when replaced by the two goals of “maximizing satisfaction” and “minimizing dissatisfaction”, and suggests that “patterns” may be more valid than specific product findings.

As a motivation theory, it would not be surprising to find support for two-factor methodology in behavioral studies. Both Baron and Perone<sup>13</sup> and Maia<sup>14</sup> successfully argue that two-factor theory is a viable construct in avoidance behavior. Nelson’s<sup>15</sup> assessment of coping strategies, life stresses, and social support for women was assessed using a two-factor framework for emotional wellbeing. De Jonghe et al,<sup>16</sup> supporting a two-factor model for clinical psychoanalysis, balances the “traditional structural-adaptation approach of classical psychoanalysis with post-classical analyst induced support mechanisms for the treatment ordinary neurosis”.

When examining behavior associated with medical care, two-factor theory outcomes are less compelling. Hills and Kitchen<sup>17</sup> suggested a two-factor model for assessing patient satisfaction with physical therapy. They identify hygiene factors as conditions surrounding physiotherapeutic care and motivational factors as variables not directly related to treatment but still affecting patient functioning and personal growth. Their analysis indicated that such a model, although relevant, did not adequately explain their evidence base. On the other hand, Roush and Sonstroem<sup>18</sup> as cited by Hills and Kitchen, applied a two-factor “enhancers”/“distracters” paradigm as part of a multicomponent scale in the development of their physical therapy outpatient satisfaction survey. Xu,<sup>19</sup> using a two-factor model of concordance/discordance to assess how participation between patients and care givers affects patient satisfaction, provided only limited support for relevant findings on the discordance side of the hypothesis. A two-factor model analyzing illness denial by Levine et al<sup>20</sup> demonstrated only a moderate correlation with “denial of cognition” and “denial of effects” as factors in their model.

A potentially important role in the administration of health services was supported by the application of two-factor methodology to hospital administration. Bendi et al,<sup>21</sup> using a patient expectation survey employing a two-factor expectation/disconfirmation paradigm, found it to be useful in understanding how the personal financial situation of the patient contributes to fulfillment of their expectations

and satisfaction with their hospital experience. The authors contend that “such a survey allows for needs assessment of services in both qualitative and quantitative terms and this leads to sound evidence based management practices”.

## Materials and methods

Data obtained from The Joint Canada/United States Survey of Health 2004 (JCUSSH)<sup>22</sup> were initially analyzed using logistic regression to determine how key survey variables associated with medical consumption and satisfaction might vary between US and Canadian survey respondents. The results were then compared using a descriptive methodology designed to measure the impact of each variable within a two-factor Herzberg framework.

Conducted by National Center for Health Statistics and Statistics Canada, 8700 participants (61% US, 39% Canadian) made available a comprehensive level of self-reported information on health care utilization, health status, global opinions on health care quality, and satisfaction levels derived from their interaction with clinical services. The JCUSSH is well suited for the analysis in that:

- It utilizes a large culturally diverse sample of participants across a broad spectrum of sociodemographic populations<sup>23</sup>
- Inclusion of Canadian participants allows comparison of socialized health care delivery with US market-driven systems
- The survey was conducted prior to the 2008 US presidential election, so eliminates the influence of political electioneering.

Five key variables were chosen from the survey that represent a participant's opinion on health care or, alternatively, may play a part in influencing their experience of health care delivery.<sup>24</sup> Each variable has a role in the consumption of services and is consistent with a dimension of consumer/patient satisfaction as identified by Ware et al.<sup>8</sup> Because of the cross-cultural nature of the survey population, there was an expectation that these variables would differ depending on the respondent's country of origin.

Participants assessed the overall quality of health care received within the previous 12 months, along with their overall level of satisfaction with that health care. Participants were also asked whether they were unable to obtain necessary health care within the previous 12 months. Overall health status was also estimated by the study participants. US participants were asked to identify the type of insurance under which they were covered. Canadian participants were all covered under national insurance.

## Logistic regression models

Using the aforementioned key variables, two logistic regressions were undertaken. The first model sought to determine what differences exist between Canadian and US survey respondents. The second analysis examined how these same variables contribute to forming either a positive or negative opinion for “overall satisfaction” with health care.

Table 1 identifies differences between Canadian and US survey respondents. When modeling the key variables against the participant's country of origin, despite differences between Canada and the US, health care provision survey participants from both countries rated “overall satisfaction” with health care similarly ( $P = 0.06$ ). All remaining variables were significant at the  $P = 0.05$  level. Participants from the US reported higher estimates for “quality of health services”, mostly arising from a perception of excellence in hospital-based care. Those covered under US Medicare (senior health care for individuals aged 65 years or older) and private health insurance (generally provided through employers) reported the highest quality rankings. This was followed by military veteran's health services and the US government's Medicaid program for indigent patient populations. In comparison with Canadians, US participants reported the highest levels of “unmet medical needs” by those covered by US Medicaid or veterans programs.

The second logistic regression analysis was undertaken to determine what variables contribute to the likelihood of survey respondents forming either a positive or negative opinion for “overall satisfaction” with health care. Participant “country of origin” and “self-reported health status” were no longer significant ( $P = 0.08$  and  $P = 0.15$ , respectively). The analysis demonstrates only that a survey participant's estimate of the “overall quality of health services” and the presence of “unmet medical needs” retained significance ( $P \leq 0.05$ ). In the case of US respondents, “unmet medical needs” also appeared to vary by type of insurance coverage. The lowest levels of unmet need were found for those receiving care under Medicare and the highest under Medicaid, both of which are government-sponsored programs (Table 2). In comparison, as a whole, Canadian respondents rated the quality of care they received under Canada's national health care system in a statistically similar manner to that of US respondents insured by the US Medicaid program.

## Developing the two-factor model

To apply Herzberg's theory, a two-factor analog model was designed to determine how the key variables from the

**Table 1** Variables differentiating Canadian from US respondents in logistic analysis 1

Variable	P level	Synopsis
Overall quality	<0.001	US participants report higher levels of excellence in health quality (43% US versus 38% Canada). The remaining standards of good, fair, and poor were similar regardless of the country of origin of participants ( $46\% \pm 1.5\%$ , $10\% \pm 1\%$ , and $2.5\% \pm 0.5\%$ ), respectively. For each country, satisfaction with physician care was rated as excellent at 59%. US respondents reported greater levels of excellence in hospital care (56% versus 46% for Canadians).
Overall satisfaction	0.06	Statistically similar; however, US participants reported higher levels at the scale's "very satisfied" endpoint and lower levels for the "somewhat dissatisfied" and "very dissatisfied" levels. Canadians reported higher levels for the remaining endpoints of "somewhat satisfied" or "neutral".
Unmet medical needs	0.012	Twelve and a half percent of US participants reported the presence of unmet medical needs versus 11.2% of Canadians.
Health status	0.005	US participants reported higher levels of "excellent" health status (25% US versus 22% Canadian). Canadians reported marginally higher levels for very good and good levels and lower levels for substandard health (13.6% versus 15.4% for US participants).
Type of insurance coverage	<0.001 (US population only)	US participants reported the highest levels of satisfaction for the US government Medicare program (elderly patients), followed by private employer-based coverage (general working population) and government veteran care. Ranked lowest was the US government Medicaid program for financially indigent patients. Levels of satisfaction for Canadian participants demonstrated a statistically similar pattern to that of the US Medicaid program.

logistic regression models function within a motivational/hygiene paradigm.

### Step 1

Independent variables from the logistic regression models were formatted as paired factors, one denoting the variable's presence and an inverse factor representing its absence.

The binomial variables "unmet medical needs" and "insurance coverage" produced paired factors simply based on the presence or absence of each variable. Ordinal variables with a bipolar range will have factors defined by their positioning relevant to the transitional (neutral) point of the variable; one factor representing the variable values above the inflection point of the scale, the other below. Using the neutral point of the scale minimizes factor overlap and allows for a separate analysis to determine issues that are influential at each pole of the variable's scale.

The ordinal variables were overall quality of care and health status. Paired factors for overall quality of care were perceiving high quality care (scale inflection point:

perceiving neither high nor low quality care) and perceiving low quality care. Paired factors for health status were reporting of higher levels of health (scale inflection point: reporting a good level of health) and reporting of poorer levels of health.

Much of the consumer experience is based upon perceptions. Subdividing variables into factor pairs allows the analysis to conduct separate assessments in order to determine whether the dominating influences of a factor arise from its presence or absence. Gardner<sup>25</sup> gives us a parallel by reminding us that Herzberg used separate sets of interviews to distinguish between good and bad critical incidents in the workplace and maintained their independence by separate analysis.

### Step 2

Factors were then classified using Herzberg's criteria for motivational and hygiene factors. To classify whether a factor (or its paired inverse) functions in a hygienic or motivational role, the following criteria need to be met. When absent, the

**Table 2** Variables forming either a positive or negative opinion of overall satisfaction with health care in logistic analysis 2

	Unmet medical needs		Overall quality of health care			
	Yes	No	Poor	Fair	Good	Excellent
US Medicare	8%	92%	2%	6%	41%	51%
Private/employer	8.5%	91.5%	1%	8%	47%	44%
Medicaid	19%	81%	5%	12%	47%	36%
Veterans Administration/ Indian Health Services	13%	81%	5%	12%	44%	41%
Canada	11%	89%	3%	12%	47%	38%

hygiene factor increases dissatisfaction, and when present, does not significantly increase satisfaction. When present, the motivating factor increases satisfaction, and when absent, does not significantly increase dissatisfaction.

### Step 3

Relative changes in satisfaction and dissatisfaction levels were tabulated individually for all factors using the JCUSSH. Using Table 3, when determining increases in satisfaction, the satisfaction level for the factor is compared with the overall satisfaction level of the full survey. For determining increases in dissatisfaction, the dissatisfaction level from the full survey is compared with the dissatisfaction level for either the paired inverse of the factor or the scale inflection point, depending on whether the factor represents a binomial or ordinal variable.

## Results

Elements of three variables were found to comply with the paired criteria requirement needed for classification as either a motivating or hygiene factor (Table 4). Substantiation of the findings of the two-factor model was undertaken by comparing its results with those from logistic regression.

### Self-reported health status (ordinal variable)

Self-reported health status influences patient satisfaction as a motivational factor. The factor “higher levels of health” increased satisfaction when present in the affected population, and when absent from that group, did not increase dissatisfaction:

- When present, 82.71% satisfaction was recorded for survey respondents reporting better levels of health versus 81.84% for the full survey
- When absent, 11.53% dissatisfaction was recorded for health status inflection point versus 14.64% for the full survey.

As a motivational factor, health status would be influenced by intrinsic issues directly related to health care provision; however, that effect only occurred amongst individuals reporting higher levels of health. The relatively modest increase in satisfaction (1.03 percentage points) for this group, representing one third of the survey respondents, implies that improvements in health care provision were favorably received by “healthy” persons, but its influence was weak. From an administrative standpoint, if one seeks to improve health care satisfaction levels by increasing health care provision, its effect may only be appreciated by persons who already report higher levels of health.

The inverse factor, “reporting lower levels of health”, failed to meet the required paired criteria test for either a hygiene or motivational factor, and leaves one to question how individuals reporting lower levels of health would react. For example, would provision of preventative services attract individuals who rate themselves as having poor health, ie, the very group who might benefit most from their introduction?

### Self-reported unavailability of needed care (binomial variable)

The “presence of unmet medical need” failed to meet the required individual paired criteria tests that define it as either a hygiene or motivation factor. However, the “absence of unmet medical need” was identified as a hygiene factor within the group not affected by the variable (those individuals who had not experienced unmet medical care, comprising 88% of the survey population). Compared with the full survey, when absent, this factor increased dissatisfaction by 16.31 percentage points and when present increased satisfaction by only 3.02 percentage points. For the affected group, the findings do not support a role for the inverse factor as either a hygiene or motivation factor.

The relevant significance of the inverse factor within the unaffected group demonstrates the mechanism of action of this variable. Individuals in the unaffected group are accustomed to receiving necessary care and, as a group, appear to view the absence of unavailable health services as a priority. The relative large increase in dissatisfaction (16.31 percentage points) within the unaffected group demonstrates the significance of the inverse factor because most of the survey participants fall into this group. As a hygiene factor, there is an implication that it exerts influence via mechanisms external to the direct provision of health care. Consequently, efforts to address this factor may be better suited if directed at the health care environment. This finding suggests that close attention should be given to programs that facilitate access to care as opposed to those that improve the provision of services already in place. Given that the presence of unmet medical need failed to assume a motivational or hygienic role, it also suggests that maintaining an absence of unmet need is more important than reducing its presence.

### Self-reported perception of health care quality (ordinal variable)

An individual's perception of health care quality also relates to their opinion of satisfaction with health care. The “perception

**Table 3** Satisfaction levels (as percentages) for individual factors and the survey population as a whole

Full survey: self reported, opinion for overall satisfaction with health care received	Self reported, unavailability of needed health care (All survey respondents)		Self reported, presence of insurance coverage (American respondents)		Self reported, health status (All survey respondents)		Self reported, opinion on the quality of the care received (All persons who have received health care within the last 12 months)	
	Factor: presence of un-met medical need	Factor: absence of un-met medical need	Factor: presence of insurance coverage	Factor: absence of insurance coverage	Factor: reporting better levels of health	Factor: reporting good health (infection point)	Factor: perceiving high quality care	Factor: Perceiving neither high or low quality care (infection point)
Overall satisfaction with health care received	60.66%	84.66%	87.65%	71.85%	82.71%	85.31%	94.10%	55.95%
Positive opinion (satisfaction)	81.64%	84.66%	87.65%	71.85%	82.71%	85.31%	94.10%	55.95%
Neutral opinion	3.72%	3.07%	2.63%	6.29%	3.27%	3.16%	2.54%	1.63%
Negative opinion (dissatisfaction)	14.64%	12.27%	9.71%	21.85%	14.02%	11.53%	3.37%	27.98%
	n = 8688	n = 7626	n = 4252	n = 302	n = 2082	n = 2914	n = 7013	n = 315
								n = 860

of low quality care” is identified as a hygiene factor for the population unaffected by the variable, producing a 13.34 percentage point increase in dissatisfaction. The large increase in percentage points within this relatively small population (only 4% of survey respondents report neither a high or low opinion of health care quality) reflects the selectivity and focused effect of the factor. It suggests that among individuals who have not yet formed an opinion related to health care quality, events promoting a perception of low quality care are more influential than events reinforcing high quality care. The inverse factor, perception of high quality care, failed to act as either a motivation or hygiene factor for any group.

## Discussion

Comparison of the descriptive two-factor methodology with that of the logistic regression results demonstrates the utility of this methodology in assessing satisfaction with health care. Statistical modeling seeks to find the essence of a relationship by examining the interaction between variables and eliminating potential superfluous relationships that may exist. It is left to the investigator to interpret how the relationship works.

For this study, a patient’s “overall satisfaction” as a dependent binomial outcome variable was regressed against the remaining variables in Table 1. Considering that some of the independent variables can have overlapping influence as both hygiene and motivational factors, it may be difficult for the investigator to assign them exclusively to just one category. This could account for the limitations seen in some two-factor investigations when investigators inappropriately make assumptions as to how to fit the data to the theory. An advantage is given to the two-factor descriptive model in that the status of a variable is determined as an outcome of the analysis and not by the investigator. Also, the descriptive methodology selectively identifies a factor’s method of influence within specific survey group(s) as opposed to a logistic model which assesses the strength and direction of a relationship for variables across an entire survey population.

Comparing results with the logistic models indicates that the descriptive methodology for the most part acts in parallel with the regression analysis. Both procedures acknowledged the effect of “health care quality” and the presence of “unmet medical need” on health care satisfaction. Likewise, both methods eliminated the variable “insurance coverage”. However, there are differences. While the regression model broadly discounted the effect of “health status” on patient satisfaction, the descriptive two-factor method demonstrated higher sensitivity by acknowledging a subtle motivational

**Table 4** Criteria assessment for two-factor model

Factor	Criteria	Relative change in satisfaction		
Presence of un-met medical need	When present increased satisfaction	FALSE	-20.98%	Motivator
	When absent did not significantly increase dissatisfaction	TRUE	-2.37%	No
	When absent increased dissatisfaction	FALSE	-2.37%	Hygiene
	When present did not significantly increase satisfaction	TRUE	-20.98	No
Absence of un-met med need	When present increased satisfaction	TRUE	3.02%	Motivator
	When absent did not significantly increase dissatisfaction	FALSE	16.31%	No
	When absent increased dissatisfaction	TRUE	16.31%	Hygiene
	When present did not significantly increase satisfaction	TRUE	3.02%	Yes
Presence of insurance coverage	When present increased satisfaction	TRUE	6.02%	Motivator
	When absent did not significantly increase dissatisfaction	FALSE	7.21%	No
	When absent increased dissatisfaction	TRUE	7.21%	Hygiene
	When present did not significantly increase satisfaction	FALSE	6.02%	No
Absence of insurance coverage	When present increased satisfaction	FALSE	-9.79%	Motivator
	When absent did not significantly increase dissatisfaction	TRUE	-4.93%	No
	When absent increased dissatisfaction	FALSE	-4.93%	Hygiene
	When present did not significantly increase satisfaction	TRUE	-9.79%	No
Reporting higher levels of health	When present increased satisfaction	TRUE	1.07%	Motivator
	When absent did not significantly increase dissatisfaction	TRUE	-3.11%	Yes
	When absent increased dissatisfaction	FALSE	-3.11%	Hygiene
	When present did not significantly increase satisfaction	TRUE	1.07%	No
Reporting poorer levels of health	When present increased satisfaction	FALSE	-6.68%	Motivator
	When absent did not significantly increase dissatisfaction	TRUE	-3.11%	No
	When absent increased dissatisfaction	FALSE	-3.11%	Hygiene
	When present did not significantly increase satisfaction	TRUE	-6.68%	No
Perception of high quality care	When present increased satisfaction	TRUE	12.46%	Motivator
	When absent did not significantly increase dissatisfaction	FALSE	13.34%	No
	When absent increased dissatisfaction	TRUE	13.34%	Hygiene
	When present did not significantly increase satisfaction	FALSE	12.46%	No
Perception of low quality care	When present increased satisfaction	FALSE	-77.22%	Motivator
	When absent did not significantly increase dissatisfaction	FALSE	13.34%	No
	When absent increased dissatisfaction	TRUE	13.34%	Hygiene
	When present did not significantly increase satisfaction	TRUE	-77.22%	Yes

effect for this factor within survey respondents reporting only higher levels of health.

The descriptive two-factor analysis developed in this study requires that a variable be split into inverse paired factors. This at first might seem redundant, but is needed for a variable to function within a two-factor framework. Using paired factors allows the method to conduct separate evaluations to determine whether it is the presence or absence of a variable that is important. In turn, each analysis can be further refined to determine whether that presence or absence is unique to a variable's affected or unaffected subgroup. As an outcome, this enables an investigation to determine whether a variable selectively assumes a motivational or hygienic function within defined subpopulations or whether these factors work in tandem across a broader population.

As a critique, the descriptive two-factor methodology introduces an element of subjectivity into the analysis by

leaving it to the discretion of the investigator to determine the inflection point for ordinal variables. In this analysis, the inflection point for "overall quality" was located at the scalar midpoint of the variable. However, for the variable "health status", good health was chosen because it represents the modal response of the scale.

A question remains as to whether the methodology is a useful tool for translating two-factor theory into practical decision-making. To its credit, the methodology is easy to use. It correlates well with traditional statistical methods, but knowledge concerning the statistics is not needed. Data requirements only take the form of simple tabulations and the method does not require the investigator to make assumptions about whether a variable functions as a hygienic or motivational factor. Consequently, the methodology can be useful for corroborating statistical models. However, it may be outside of the research community where the methodology

shows its greatest promise. As a practical outcome, the complexities of variables are reduced to one or more factors which can be individually assessed. Such a level of information is useful for administrative decision-making in population-based assessments where both the effectiveness and desirability of an intervention must be taken into account. Understanding whether a variable exerts influence by its presence or absence amongst affected or unaffected populations gives the administrator a mechanism for targeting resources and increasing the efficiency of health care provision. In effect, the methodology might be best suited for use as a tool for compliance-based issues.

## Conclusion

Despite its intuitive nature, two-factor theory remains controversial. Although broadly applied, studies occasionally fail to substantiate the applicable utility of the theory in attributing the relative contribution of factors to multidimensional outcome variables. This might be due in part to methodological issues arising from limitations of the data, the study design, or from interpretations made by the investigator. The data from an investigation might not neatly fit into just one of the broad hygiene/motivator classifications resulting in factor overlap. Under such circumstances, interpretation of the results might cause one to ask rhetorically whether they are testing the data in relation to the theory or conversely, testing to see if the theory fits the data.

The descriptive analytical method demonstrated in this investigation offers some advantages when performing two-factor investigations in that the investigator need not make assumptions when fitting factors to the data. As an outcome, the methodology empirically defines whether a variable contains within it hygienic or motivational elements and to whom they apply. This level of specificity provides targeted needs analysis and is inherently useful when applying Herzberg's theory to practical settings. Knowing the nature of the influence of a factor allows for the focused remediation of circumstances that negatively affect patient satisfaction.

At this point, the descriptive method also shows promise as a valid technique in that it correlates well with results from the logistic regression model. As a descriptive methodology, the analysis applies data in a straightforward manner without the need of a statistical knowledge prerequisite. The methodology has the ability to determine the nature of a factor and differentiate its effect within select populations. The information provides clear guidance and if subsequent investigations continue to uphold the utility of the method, it can function as a useful decision-making tool for administrative settings.

## Disclosure

The author reports no conflict of interest in this work.

## References

1. Herzberg F, Mausner B, Snyderman BB. *The Motivation to Work*. New York, NY: John Wiley; 1959.
2. Shortell SM, Kaluzny AD. *Health Care Management Organization Design and Behavior*. 5th ed. Clifton Park, NY: Thomson Demar Learning; 2006.
3. Grace M. Motivational theory applied to hospital pharmacy practice. *Hosp Pharm*. 1980;5(12):594–608.
4. Sharp TP. Job satisfaction among psychiatric registered nurses in New England. *J Psychiatr Ment Health Nurs*. 2008;15(5):374–378.
5. Zhang P, Small R, vonDran G, Barcellos S. Two-factor theory in website design. Presented at the 33rd Hawaii International Conference on System Sciences. Wailea, HI, January 4–7, 2000.
6. Johnston GP IIIrd. Best liked/least liked teacher attributes: Herzberg's two-factor theory of job satisfaction. *Journal of Education for Business*. 1990;66(2):121–129.
7. Utley DR, Westbrook J, Turner S. The relationship between Herzberg's two-factor theory and quality improvement implementation. *Engineering Management Journal*. 1997;9(3):9–14.
8. Ware J, Davies A, Stewart A. *The Measurement and Meaning of Patient Satisfaction. A Review of the Literature*. Santa Monica, CA: Rand Corporation; 1977. Available from: <http://www.rand.org/content/dam/rand/pubs/papers/2008/P6036.pdf>. Accessed November 25, 2011.
9. Yi Y. The determinants of consumer satisfaction: the moderating role of ambiguity. In: McAlister L, Rothschild ML, editors. *Advances in Consumer Research Volume 20*. Provo, UT: Association for Consumer Research; 1993. Available from: <http://www.acrwebsite.org/volumes/display.asp?id=7500>. Accessed January 24, 2012.
10. Tuten TL, August RA. Understanding consumer satisfaction in services settings: a bidimensional model of service strategies. *J Soc Behav Pers*. 1998;13(3):553–564.
11. Maddox R. Two-factor theory and consumer satisfaction: Replication and extension. *J Consum Res*. 1981;8(1):97–102.
12. Swan JE, Combs LJ. Product performance and consumer satisfaction: a new concept. *J Mark*. 1976;40:25–33.
13. Baron A, Perone M. Explaining avoidance: two-factors are still better than one. *J Exp Anal Behav*. 2001;75(3):357–361.
14. Maia TV. Two-factor theory, the actor-critic model, and conditional avoidance. *Learn Behav*. 2010;38(1):50–67.
15. Nelson G. Women's life strains, social support, coping, and positive and negative affect: cross-sectional and longitudinal tests of the two-factor theory of emotional well-being. *J Community Psychol*. 1990;18(3):239–263.
16. De Jonghe F, Rijnierse P, Janssen R. The role of support in psychoanalysis. *J Am Psychoanal Assoc*. 1992;40(2):475–499.
17. Hills R, Kitchen S. Development of a model of patient satisfaction with physiotherapy. *Physiother Theory Pract*. 2007;23(5):255–271.
18. Rousch SE, Sonstroem RJ. Development of the physical therapy outpatient satisfaction survey (PTOPS). *Phys Ther*. 1997;79(2):159–170.
19. Xu KT. The combined effect of participatory styles of elderly patients and their physicians on satisfaction. *Health Serv Res*. 2004;39(2):377–392.
20. Levine J, Rudy T, Kearns R. A two-factor model of denial of illness: a confirmatory factor analysis. *J Psychosom Res*. 1994;38(2):99–110.
21. Bendi S, Arya S, Sarma RK. Patient expectation survey – a relevant marketing tool for hospitals. *Journal of the Academy of Hospital Administration*. 2004;16(1).
22. Centers for Disease Control and Prevention. The Joint Canada/United States Survey of Health. Atlanta GA: National Center for Health Statistics; 2004. Available from: <http://www.cdc.gov/nchs/nhis/jcush.html>. Accessed September 10, 2010.



23. Ross NA, Wolfson MC, Dunn JR, Berthelot J, Kaplan GA, Lynch JW. Relation between income inequality and mortality in Canada and in the United States: cross sectional assessment using census data and vital statistics. *BMJ*. 2000;320(7239):898–902.
24. Bohm J. Relating patient satisfaction to insurance coverage: A comparison of market based and government sponsored health care. *Academy of Business Research*. 2012. In press.
25. Gardner G. Is there a valid test of Herzberg's two-factor theory? *Journal of Occupational Psychology*. 1977;50:297–204.

### ClinicoEconomics and Outcomes Research

Dovepress

#### Publish your work in this journal

ClinicoEconomics & Outcomes Research is an international, peer-reviewed open-access journal focusing on Health Technology Assessment, Pharmacoeconomics and Outcomes Research in the areas of diagnosis, medical devices, and clinical, surgical and pharmacological intervention. The economic impact of health policy and health systems

organization also constitute important areas of coverage. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/clinicoeconomics-and-outcomes-research-journal>