

IMPROVING HEALTH THROUGH RESEARCH WITH IMPACT

*Tom Holman
Peter Everett
Jonathan Lough
Melissa Hatty
Colin Jevons
Jim Irving*

INTRODUCTION

Over the past decade, many different forces have influenced the consumption of healthcare services and medical treatments. Not the least of these forces is the change in consumer or patient expectations, fuelled by information from a wide variety of sources. This information is often driven by marketers seeking to change consumer behaviour.

Different forces exist in the clinical world. While they vary by country, at least one new force has emerged over the past decade – ‘patient-centeredness.’ It is now widely accepted that a patient-centred approach can lead to behavioural changes that improve clinical outcomes (Grover et al, 2007; Little et al, 2001; Safran et al, 2001; Vale et al, 2003). Just as a customer-centred view changed the commercial world, a patient-centred view is changing the clinical world. Clinicians are learning how better to change patient behaviour.

Today, a wide range of patient survey instruments are commonly included in clinical studies. The ability to validate psychometric instruments against clinical outcomes provides the opportunity to: 1) identify instruments that are associated with improved outcomes; and 2) use the information derived from the instruments to design interventions that change patients’ behaviour and improve health outcomes.

One example can be found among patients admitted to hospital after a heart attack. Using a variety of research

techniques, from analyses of patients’ drawings of their heart to the administration of psychometric instruments, researchers have found that patients’ perceptions of their health and their illness are reflected in their health behaviours and in the clinical outcomes they achieve later, after discharge from the hospital. Moreover, these perceptions can be more reliable predictors of long term outcomes than the blood tests that are normally used (Broadbent et al, 2004, 2006; Petrie et al, 1996). These findings prompted the design of an intervention where, on admission to hospital, a random selection of individuals received an education program designed to educate them about heart attacks and correct misconceptions found to be common in previous studies. The intervention caused positive changes in the intervention group’s perception of their illness (particularly their beliefs about the long term consequences of the illness and their ability to control or cure the illness), better attendance at rehabilitation clinics, faster return to work, and a 63% reduction in the frequency of angina symptoms three months after discharge (Petrie et al, 2002).

Findings such as these offer promise. By understanding perceptions of health and the motivations behind health behaviours, we will be better able to develop programs that alter behaviour in a meaningful way, sufficient to achieve outcomes.

Our objective was to develop an easily administered, psychometrically tested instrument that measured

health and attitudes to health. It was built from items that had been repeatedly shown to have strong associations with changes in healthy behaviour such as weight loss, smoking cessation, and exercise and with clinical outcomes such as blood tests.

Our vision is to use this instrument to help clinicians, public health officials and marketers develop and monitor programs that change the behaviour of ‘healthsumers’ – those who consume health services. Whether healthsumers are patients (in the clinical world) or consumers (in the commercial world), a healthsumer-centred approach can achieve both clinical and commercial outcomes.

ITEM SELECTION

We searched the clinical literature for published surveys measuring patient’s health and attitudes to health. We sought instruments that had been used in a wide variety of situations that had also been shown to successfully predict outcomes in follow-up studies of three or more months post-intervention. We eventually settled on three sets of survey instruments for closer attention.

The first set of survey instruments were self-assessed health surveys such as SF-8, 12 and 36 (Saris-Baglama, 2004), EQ-5D (Devlin et al, 2005) and the Medical Outcomes Survey (Stewart and Ware, 1991) that attempt to measure ‘actual’ health. These instruments range from a simple five-item questionnaire to a more complex 116-item instrument utilizing eight subscales. Two subscales are common across instruments: physical health (its effect on daily activities) and vitality (e.g. ‘feel healthy’ and ‘have enough energy’). A total of 15 health items were selected, based on the strength of their associations with behavioural change in clinical trials.

The second set of survey instruments were based on the Personal Autonomy Model. Research using these instruments has revealed strong associations with smoking cessation, weight loss, and blood sugar control in patients with diabetes (Williams et al, 1996, 1998a, 1998b, 2002, 2004). In the model, when patients are autonomously motivated (i.e. motivated from within), they

gain competence in dealing with health issues. Various forms of the autonomous motivation and perceived competence instruments were reviewed and 10 items selected (two perceived competence, eight autonomous motivation).

The final set of instruments tapped health literacy, which has been shown to have an impact on health and health outcomes (Nielsen-Bohlman, 1992). While evidence linking health literacy with outcomes in randomised trials is currently lacking, it has been observed that those with low literacy have a 52% higher all-cause mortality rate than those with adequate literacy (Baker et al, 2007). This observation prompted us to include 13 literacy items, including eight selected from the eHealth Literacy Scale (eHEALS; Norman and Skinner, 2006).

SURVEY DESIGN


The 38 items selected from existing instruments were re-written to suite a standard question format where the respondent was asked to ‘... please indicate your level of agreement with each of the following statements.’ These were used to populate three tables spread across the first two pages of an online survey. Ratings used five-point Likert scales where 1 = strongly disagree and 5 = strongly agree).

The first page of questions asked about health (figure 1). It began with a general satisfaction question, and a question about changes in health in the previous 12 months, followed by two tables presenting the 15 health items, eight autonomous motivation items and two perceived competence items. Items were randomly distributed across the two tables and were presented in a random sequence within each table.

Using a similar format to that shown in figure 1, the second page asked about the use of health information. The 13 literacy items were asked in a table at the end of this page. The other questions on this page were: *Overall, how satisfied are you with the information sources you use to help manage your health problems and treatments? Which of the following sources of information do you use to help manage your health*

FIGURE 1
SCREEN GRAB OF SURVEY

About Your Health

Your progress: 

In general, how satisfied are you with your current state of health?

Satisfaction 1=very low; 5=very high; NA=Not Applicable	1	2	3	4	5	NA
Satisfaction with health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall, compared to 12 months ago, how do you think your health is at present?

I feel better than last year
 I feel the same as last year
 I feel worse than last year

Thinking about your health in general, please indicate your level of agreement with each of the following statements.

Activity	Level of agreement (1=strongly disagree; 5=strongly agree)					NA
	1	2	3	4	5	
It is very important for me to be as healthy as possible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have decided that I want to be healthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

problems and treatments? (17 sources in checkbox format) and *How much do you TRUST each of the following sources of information on health problems and treatments?* (17 sources rated on a 5-point Likert scale where 1 = very low and 5 = very high).

The third page contained standard demographic questions. A number of questions designed to quantify lifestyle risk factors such as smoking and drinking behaviours were also included.

The following pages of the survey assessed satisfaction with the healthcare services used in the previous 12 months. These are not described here.

The final page asked *How satisfied are you with your life in general at present?* This is the third measure of satisfaction described here.

FIELDWORK

An email inviting participation in the survey was sent to a list of 58,102 individuals aged 18 years and over which was purchased from a known supplier. A reminder was emailed to non-responders after one week. A second reminder was sent to non-responders at the end of the second week. A total of 9,091 responses were received between 1st August and 30th August 2007 (15.6% response rate). More than 88% of respondents answered all items about themselves in the first three pages.

ANALYSIS

The prospect of establishing a health personality measure was flagged following survey creation and implementation. An initial 'core' of items was identified

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and included in initial analyses; these were items that qualitatively appeared to be the most appropriate to form the basis of a personality measure (34 items). An additional 26 items that seemed less appropriate, but still potentially relevant, were also included.

Reliability analyses (Cronbach’s Alpha) were conducted for each item, along with item total correlations and scale alpha if item deleted. The top 50% of items with the highest corrected item total correlation (against satisfaction with health) in each group were flagged for inclusion in the pool for further analysis.

Items were added and removed in an iterative fashion until a solution was found which showed a maximum of four factors, and a minimum of four items per factor. A four-factor solution was decided upon in order to simplify the analysis and subsequent profiling. A large number of iterations were examined. The specific decision rules were:

- Items should have reasonable factor loadings (items with loadings less than 0.5 were discarded)
- Items should load on only one factor

The final solution contained three central aspects of health personality relating to ‘control’, ‘vitality’, and ‘literacy’. The fourth factor related to medications. However, given that not all members of the sample population reported taking medications, this factor was separated from the main factors.

TABLE 1
HEALTH/MALS™ PROFILES

	Prevalence	Vitality	Control	Literacy
Active Positivist	25%	High	High	High
Comfortable Romantic	10%	High	High	Low
Happy Unaware	10%	High	Low	Low
Carefree Investigator	5%	High	Low	High
Apathetic Cynic	21%	Low	Low	Low
Passive Worrier	7%	Low	Low	High
Weary Detective	12%	Low	High	High
Anxious Fatalist	8%	Low	High	Low

The final set of fifteen items came out neatly with five items loading per factor. Anti-image collations were all above .87, indicating the dataset was suitable for factor analyses. A MAP test of the final 15 items indicated 3 factors.

A set of health personality profiles – HEALTHimals™ – were created by classifying each respondent as having a high or low score on each of the three psychological factors. The prevalence of each of the resulting eight profiles is shown in table 1. A professional psychologist then wrote a description of each profile based on the items included in each factor. This description was used to brief a creative agency to illustrate each profile using well known Australian animals.

Following development of the health personality profiles, further analyses were conducted to investigate how perceptions of physical health may relate to health personality profile. Four items assessing perceptions of physical health were included in subsequent analyses, along with final set of 15 ‘health personality’ items. The final four-factor solution is described in table 2.

SATISFACTION MEASURES

The mean scores for the three satisfaction questions are shown in table 3; the inter-correlations between them (IMPACT, the Pearson’s Correlation Coefficient) are also shown.

TABLE 2
FACTOR DESCRIPTION

Physical Health	Ability to do normal physical activities (e.g. walking), work, school or other daily activities, social activities with family and friends, vigorous physical activities (e.g. playing sport).
Vitality	Feel healthy, have enough energy, health is consistent with life goals, confident in ability to be healthy, feel calm and peaceful.
Control	Important to be as healthy as possible, have decided that I want to be healthy, have thought carefully about health and believe it is important, try to do things that I believe are best, actively try to prevent disease and illness.
Literacy	Know how to use the health information I find, seek out health information that answers health questions, feel confident in using information to make decisions about my health, find out everything about the issue, enjoy learning about health issues.

TABLE 3
SATISFACTION MEASURES

	Mean Satisfaction Score	IMPACT Scores		
		Life	Health	Information
How satisfied are you with your life in general at present?	3.77	1.00	0.53	0.36
In general, how satisfied are you with your current state of health?	3.47		1.00	0.35
Overall, how satisfied are you with the information sources you use to help manage your health problems and treatments?	3.67			1.00

IMPACT: Pearson's Correlation Coefficient

Health satisfaction has a high IMPACT on Life satisfaction, accounting for 25% of the variance. Satisfaction with health information accounts for 13% of the variance in Health satisfaction and Life satisfaction.

HEALTHVIEWS

HealthViews comprises the results for the satisfaction with health question and the mean scores for each of the four factors. To illustrate, figure 2 shows HealthViews for four different age groups. The strength of the relationship each factor has with health satisfaction (IMPACT, Pearson's Correlation Coefficient) provides insight into the importance of each factor's contribution to health satisfaction (see table 4).

Vitality stands out as having the highest *impact* on satisfaction with Health, accounting for 46% of the variance in the satisfaction scores.

The utility of HealthViews is illustrated by the picture it paints of age-related changes in physical health. Generation Y have the best physical health, but it has a low *impact* on their satisfaction with health, as though health is not all that important to them. Generation X are just as physically healthy as Generation Y, but it seems that their health matters more – the *impact* of their physical health on their satisfaction with health is high. Baby Boomers' physical health is significantly worse than their younger counterparts and, with a high *impact*, it matters to them. Seniors have the lowest physical health score yet, with a low *impact*, it doesn't seem to matter to them.

Despite having the lowest physical health score, Seniors have the highest satisfaction with health. They also have the highest vitality, control and literacy scores, the three factors used to calculate a HEALTHimals™ profile.

FIGURE 2
HEALTHVIEWS

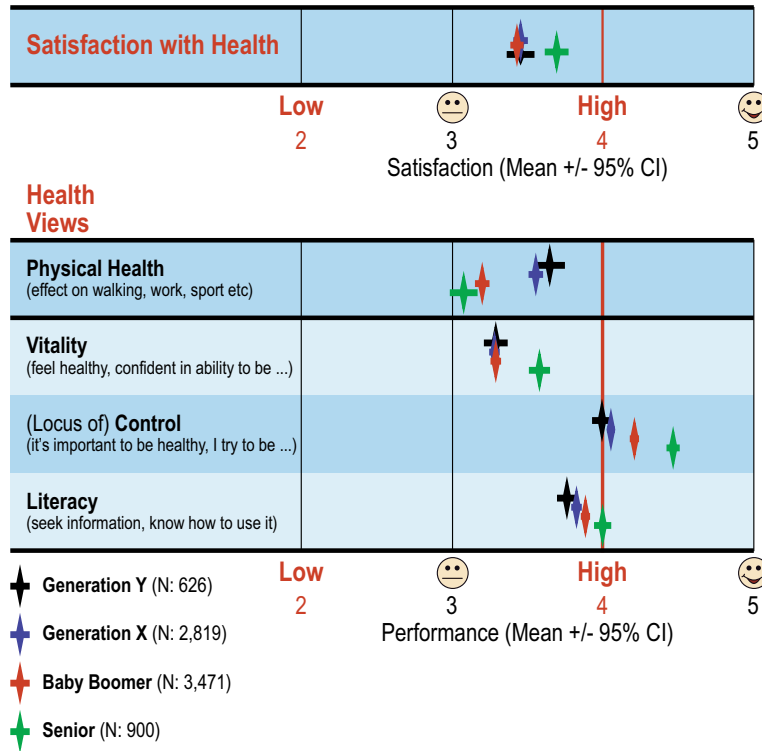


TABLE 4
IMPACT (PEARSON'S CORRELATION) OF FACTORS ON SATISFACTION WITH HEALTH

	Gen Y	Gen X	Baby Boomers	Seniors
	N: 626	N: 2,819	N: 3,471	N: 900
Physical Health	0.20	0.44	0.34	0.18
Vitality	0.63	0.68	0.68	0.68
Control	0.28	0.23	0.22	0.24
Literacy	0.16	0.18	0.14	0.16

NB: All correlations are significant at the 0.001 level

Accordingly, the Active Positivist has a higher prevalence among Seniors (38% vs. 25% among all Respondents; $p < 0.01$) while the Apathetic Cynic has a lower prevalence (9% vs. 21%; $p < 0.01$).

INFORMATION USAGE

The 8,294 respondents answering this question nominated 45,398 sources of information (Mean: 5.5 each). Information use (the proportion of respondents

nominating each source) and level of trust for each of the 17 sources of information are shown in table 5.

The importance of interpersonal sources of information, mostly from healthcare professionals, is evident – they are widely used and highly trusted. Information acquired through the media, particularly the Internet and television, is widely used but has lower levels of trust. Contacting health groups and community services have low usage, yet levels of trust equal to some interpersonal sources.

TABLE 5
INFORMATION SOURCES

	% Nominating	Trust (Mean)
Interpersonal		
Talking to my GP	82%	4.40
Talking to other people (friends, family etc)	58%	3.29
Talking to a pharmacist	50%	4.14
Talking to a specialist	42%	4.38
Talking to alternative health providers	29%	3.63
Talking to a physiotherapist	17%	3.85
Media		
Searching the Internet	68%	3.25
Watching health programs on TV	58%	3.41
Reading health stories in magazines & newspapers	48%	3.26
Listening to radio programs	23%	3.02
Books		
Purchasing books to read	19%	3.49
Visiting a library to read books	12%	3.49
Contacting ...		
Specific health groups (e.g. Heart Foundation)	15%	3.94
Community health services	11%	3.59
Government health departments	7%	3.36
Medical device companies	2%	2.76
Pharmaceutical companies	2%	2.72

N: 8,294 nominating an information source

HEALTHIMALS™

The prevalence of each HEALTHimal was shown in table 1. A summary of top-line health and information statistics is shown in table 6.

Differences in HEALTHimal prevalence were explored in a range of demographic groups. Few differences were seen in standard demographics such as age and gender, while statistically significant differences (p<0.001) were frequently seen among those who felt worse and those engaging in lifestyle risk factors such as smoking and frequently drinking alcohol. The Apathetic Cynic was consistently found to have a higher prevalence among those engaging in health-compromising behaviours. (See figure 3.)

With low levels of satisfaction with health, the Apathetic Cynic has low vitality, control and literacy. Compared with its 21% prevalence among all Respondents, the Apathetic Cynic is more common among those who smoke (30%), and those who drink every day (29%) as well as among those who reported feeling worse now than last year (30%). The Apathetic Cynic also has a low Physical Health score (3.18 vs. 3.35; p < 0.001).



Apathetic Cynics have a low satisfaction with information and use the lowest number of health information sources of the eight profiles. Not surprisingly, Apathetic Cynics also tend to generally have the lowest trust in information sources. Analyses of the different information sources used by Apathetic Cynics reveals that their use of GPs and their trust in GPs are the only scores that are not significantly lower than the scores calculated for all Respondents.

TABLE 6
HEALTH/MALS™ STATISTICS

	N:	Satisfaction with Health (Mean)	Satisfaction with Information (Mean)	% citing 1 or more information sources	Number of sources cited (Mean)
ALL Respondents	8,131	3.47	3.67	100%	5.49
Active Positivist	2,049	4.16*	4.21*	100%	6.09*
Comfortable Romantic	815	4.04*	3.84*	100%	4.75*
Happily Unaware	840	3.84*	3.54*	99%	4.23*
Carefree Investigator	420	3.91*	3.89*	100%	5.55
Apathetic Cynic	1,743	2.94*	3.15*	100%	4.64*
Passive Worrier	600	2.90*	3.55	100%	6.06*
Weary Detective	1,016	2.78*	3.68	100%	6.97*
Anxious Fatalist	670	2.86*	3.28*	100%	5.58

* p<0.001 compared to the mean score for ALL Respondents

FIGURE 3
TWO HEALTH/MALS™

	<p>Active Positivist (Prevalence: 25%)</p> <p>With a high level of participation, they assume control of their health, treating health professionals as partners or valuable resources. With faith in their ability to comprehend health information they apply it to their situation. With a positive outlook, they try another treatment if the first fails to yield results.</p> <p>More prevalent among: Seniors, Never smoked 'Never drink' and 'Feel better'</p>
	<p>Apathetic Cynic (Prevalence: 21%)</p> <p>With a low level of interest and participation, they do not feel that they have any control over their health; 'what will be, will be'. With low levels of energy, they have a more skeptical view of health treatments than others. With a low interest in the treatment process they tend to "tune out" when such is being described</p> <p>More prevalent among: Smokers, Drink every day and 'Feel worse'</p>

DISCUSSION

Our vision of using these instruments to help clinicians and marketers develop programs that change healthsumer behaviour in a way that achieves outcomes can be illustrated with the Apathetic Cynic, a potential target in the promotion of public health.

Petrie and colleagues' (2002) clinical example, cited in the introduction, provides insight into the nature of a program that has proven effective in achieving clinical outcomes.

In addition to the routine medical education provided to the control group, attention was given to 'broadening the patient's causal model' by asking them to think of factors that may contribute to providing 'more avenues for future personal control and management of the disease'. Patients were then assisted in the development of a plan to minimise risks, and encouraged to believe in their ability to control their condition.

At discharge from hospital, those in the intervention group were more satisfied with the quality of the information provided, and felt they had a better understanding of the information. Their belief in their ability to control their condition, as measured using the Control/Cure sub-scale of the Illness Perception Questionnaire (IPQ; Weinman, 1996), was substantially increased at discharge and was one of only two subscales that remained significantly different at the three month follow-up.

In another example, patients admitted to hospital for a variety of heart conditions, including heart attacks received a coaching program via telephone and mail after being discharged from the hospital. The program achieved significant improvements in blood cholesterol levels and most other coronary risk factors as well as improvements in quality of life (Vale et al, 2003).

In a primary care setting, patients who had a high coronary risk were given regular feedback on their coronary risk profile (Grover et al, 2007). Patients were able to see that as pharmaceutical therapies and lifestyle modifications reduced their coronary risk profile, their

life expectancy increased. Compared to usual care, these patients were significantly more likely to achieve blood cholesterol targets.

Getting the Apathetic Cynic to believe that there is something they can do needs to be a key element of any intervention program. This notion is reinforced by the substantial contribution that Control/Cure makes to the outcomes reported by Petrie et al (2002), as well as the proven utility of the Autonomous Motivation instrument (Williams et al, 1996, 1998a, 1998b, 2002, 2004) – of which some questions contribute to the Control factor described above. When combined with general health education and specific health information on targets and risks, such a belief may stimulate changes in behaviour, but will require support and reinforcement in order to become sustained.

This work has clearly demonstrated that healthsumer behaviour is a key factor in achieving desirable patient outcomes. Medical practitioners should pay attention to these issues as well as objective measurements.

The next step is to provide clinicians with healthsumer education materials and to train them in recognising and communicating specifically with the profiles. Clinical trials could then assess whether outcomes do in fact differ. Such an approach could also be used with marketing strategies for public health initiatives like Quit or Get Fit campaigns.

Is our health system ready to move from a professional-centric orientation to a healthsumer focus? It has to be.

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The Authors

Tom Holman is Managing Director, UltraFeedback, Australia.

Peter Everett is the Healthcare Strategist, UltraFeedback, Australia.

Jonathan Lough is Research Director, UltraFeedback, Australia.

Melissa Hatty is Research Analyst, UltraFeedback, Australia.

Colin Jevons is affiliated with Monash University, Australia.

Jim Irving is Director, Corporate Affairs, Johnson & Johnson, Canada.