CAUSAL RELATIONSHIPS AMONG WELLBEING ELEMENTS AND LIFE, WORK, AND HEALTH OUTCOMES

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ABSTRACT

Using a longitudinal sample of approximately 11,500 U.S. Gallup Panel members (5,500 employed), we explored the causal relationships among a composite of wellbeing antecedents (Career, Social, Financial, Physical, and Community (together, the WB5)) and life evaluations, daily experiences, employee engagement, workplace turnover, and health outcomes. We evaluated causality using a series of longitudinal regression analyses (linear and logistic). While causality was reciprocal, wellbeing antecedent variables were predictive of life evaluations, daily experiences, employee engagement, turnover intentions, actual turnover, unhealthy days, and new incidence of disease burden (i.e., anxiety/depression, hypertension, sleep disorders, diabetes, and obesity). A five-percentage-point change on the wellbeing composite score (using a 0-to-100 scale) was associated with a difference of 0.43 steps on the ladder scale (a scale with steps numbered from 0 to 10, based on the Cantril Self-Anchoring Striving Scale). A five-point decline in wellbeing was associated with 18.6% higher risk of sleep disorder diagnosis, 15.0% higher risk of anxiety/depression, 14.6% higher risk of diabetes, 5.9% higher risk of hypertension, 6.3% higher risk of obesity, and 0.59 more unhealthy days in the past 30 days.

OBJECTIVE

The primary objective of this study was to use longitudinal data to explore the causal relationships among wellbeing elements and a variety of wellbeing outcomes (life evaluations, daily experiences, employee engagement, employee turnover, unhealthy days, and both acute and chronic disease). That is, are wellbeing elements the cause or result of these outcomes, or is the relationship reciprocal?

METHODOLOGY

Database, Sample Characteristics, and Measures

This study used data combined from seven U.S. Gallup Panel surveys administered from September 2010 to March 2012. The Gallup Panel is a national probability-based panel of U.S. households that have agreed to participate regularly in Gallup surveys by phone, Web, or mail. Among these surveys was the annual Gallup Panel American Workforce Survey, which includes an employee engagement measurement using Gallup's Q^{12} metric, along with detailed questions about the workplace; a semi-annual wellbeing assessment using Gallup's Wellbeing Finder; Gallup's annual Health Experiences Survey, which tracks acute and chronic health issues of Americans as well as employment measures; and a one-time Gallup Panel Personality Survey measuring the Big Five personality factors of conscientiousness, extroversion, emotional stability (neuroticism), agreeableness, and intellectance (openness to experience) (Goldberg, 1999).

The Q^{12} contains 12 items measuring actionable, performance-related elements of an engaging workplace. These items are scored on a five-point agreement scale, and the composite GrandMean score is calculated as a mean of individual item scores.

Gallup administers the Wellbeing Finder assessment to Panel members with Web access on a semi-annual basis. Gallup designed the assessment to isolate discretionary wellbeing elements that individuals and organizations can act on. Gallup's Wellbeing Finder includes 50 scored questions that produce a composite wellbeing score ranging from 0 to 100. Gallup also scores each of the five wellbeing

dimensions found through factor analysis (Career, Social, Financial, Physical, and Community) using a scale of 0 to 10.

Overall life evaluations are measured using the Cantril Self-Anchoring Striving Scale (ladder of life), with an 11-point scale of 0 to 10.

Daily experiences are measured by asking respondents to recall and report levels of 10 characteristics experienced the day prior to the survey. These items, resulting in scores ranging from 0 to 10, include: being treated with respect, smiling/laughing, learning something interesting, feeling well-rested, and experiencing enjoyment, worry, stress, sadness, anger, and physical pain.

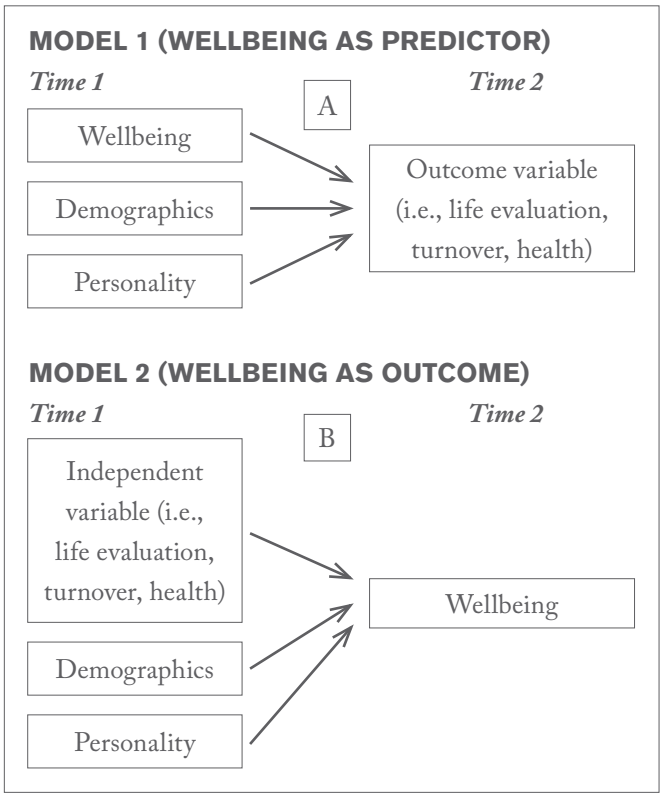
The annual Gallup Health Experiences Survey tracks incidence of unhealthy days in the past 30 days and various forms of diagnosed disease burden, including anxiety, depression, hypertension, sleep disorders, back pain, diabetes, heart attacks, and obesity through body mass index (BMI, measured through self-reported height and weight).

Turnover intentions and actual turnover are tracked via the Gallup Panel American Workforce Survey and the Health Experiences Survey. Turnover intentions are measured by asking respondents about their likelihood of changing jobs if the job market showed improvement in the next 12 months. Actual turnover is measured through responses to job status questions (Have you ever switched your place of employment? How long have you worked at your current place of employment?). Because Gallup administers these surveys annually, turnover within the past year is indicated if the respondent has ever changed jobs and has been in his or her present job for less than 12 months (less than the time frame between survey periods).

Demographic data are updated annually and were included as control variables in all the regression models (age, gender, race, education, marital status, and income (log)).

STATISTICAL ANALYSIS

Our primary analyses used linear and logistic regression (depending on the nature of the dependent variable) to study the causal relationships after combining longitudinal data sets across the common set of respondents, controlling for demographics (age, gender, education, marital status, race, and income) and personality (Big Five personality factors). The primary analyses used the Wellbeing Finder overall composite score (0 to 100) as the primary independent or dependent variable of interest, examining its relationship as a cause or consequence of 13 different variables. We examined each of the five wellbeing elements (Career, Social, Financial, Physical, and Community) separately. We conducted analyses using the statistical software program MPLUS. For more acute variables such as life evaluations, daily experiences, or unhealthy days, we used six-month time lags between independent and dependent variables, and for less frequently changing variables, such as employee turnover or disease burden, we used one-year lags between variables. The basic models tested are illustrated graphically below:



Our goal, then, was to examine the relationship between wellbeing at Time 1 with each of the 13 outcome variables at Time 2, after controlling for the demographic and personality differences of respondents at Time 1 (coefficient A in Model 1), and then to compare this relationship with the opposite relationship of each of the 13 variables at Time 1 with wellbeing at Time 2 — again controlling for demographic and personality differences at Time 1 (coefficient B, Model 2). Because some of the 13 variables are binary (turnover, diagnosis of new disease), logistic regression was most appropriate for many of the analyses. For both standard linear and logistic regression, we calculated fully standardized estimates of effect size to increase opportunity for comparison between models.

Test-retest reliability estimates were available for the wellbeing variables. As such, correction for measurement error was included in the calculations, where possible.

RESULTS

Table 1 provides the standardized effects for Model 1 (wellbeing as a predictor) and Model 2 (wellbeing as an outcome) for each of the 13 variables.

Results suggest the relationship between wellbeing and 10 of the 13 variables is at least somewhat reciprocal, with wellbeing being a stronger cause than consequence. Because the Wellbeing Finder measurement is a composite of five wellbeing variables, it is not surprising that it most strongly predicts overall life evaluation, followed by daily experiences, employee engagement, and turnover intentions. All four of these are subjective variables, likely explaining the stronger relationships. Among the more objective health outcomes, wellbeing most strongly predicted unhealthy days, sleep disorders, anxiety/depression, and diabetes. Higher wellbeing was associated with lower new incidence of these.

The analyses also suggested that wellbeing is a stronger cause than consequence of hypertension and obesity but is not predictive of back pain or heart attacks. Compared with back pain or heart attacks, hypertension is likely a more immediate outcome of low subjective wellbeing, associated with stress or unhealthy behaviors caused by daily experiences for those who are struggling or suffering. Heart attacks are more of a downstream outcome, often influenced by prolonged hypertension. Back pain may also be less

Table 1: Causal Effects of Composite Wellbeing

	A. WB5 as Predictor	B. WB5 as Outcome
Life evaluation	**0.81**	**0.74**
Daily experiences	**0.59**	**0.51**
Employee engagement	**0.47**	**0.36**
Turnover intentions	**-0.33***	**-0.20**
Actual turnover	**-0.17***	0.00
Unhealthy days	**-0.27**	**-0.22**
Anxiety/depression	**-0.20***	**-0.13**
Hypertension	**-0.12***	**-0.02**
Sleep disorders	**-0.25***	**-0.09**
Back pain	-0.04*	**-0.02**
Diabetes	**-0.20***	**-0.05**
Heart attacks	-0.06*	**-0.04**
Obesity	**-0.10***	**-0.06**

*Using logistic regression (fully standardized; WB5 predicting log odds of new incidents). All other effects are estimated based on multiple linear regression.

Note: All effects are estimated after controlling for demographics and personality differences at baseline.

Bold = 95% confidence intervals do not overlap with zero (p<.05; two-tailed)

likely influenced by more immediate subjective wellbeing variables and more particular to Physical Wellbeing; thus, the association with overall wellbeing is weak.

Table 2 provides the standardized effects for Model 1 for each of the five wellbeing elements.

These results highlight the elements that are most highly predictive of each of the 13 variables. All five wellbeing elements were highly predictive of life evaluation, with Financial, Career, and Social Wellbeing being the strongest. Career Wellbeing was, as expected, most highly predictive of employee engagement, but again all five elements predicted employee engagement. Both turnover intentions and actual turnover were best predicted by Career and Financial Wellbeing. Physical and Community Wellbeing were not related to actual turnover. Physical Wellbeing best predicted anxiety/depression, but all five elements were negatively correlated with anxiety/depression. Here again, higher wellbeing was associated with less likelihood of new incidence.

Sleep disorders were most strongly predicted by lower Physical and Financial Wellbeing, followed by Career and Community Wellbeing. In addition to Physical Wellbeing, new incidence of diabetes and obesity were also predicted by lower Financial Wellbeing.

To understand the practical meaning of the findings, Table 3 provides the unstandardized effects for each relationship. The practical effects are scaled to reflect a five-point change in overall wellbeing (0-to-100 scale). A five-point increase in wellbeing was associated with 0.43 (or a little less than one-half) steps on the ladder of life (life evaluation) and 0.48 points on the daily experiences scale (0-to-10 scale of 10 daily experiences). A five-point change in overall wellbeing was associated with 0.15 employee engagement basis points (1-to-5 scale). For an overall organization, previous Gallup research shows that 0.10 basis points in the employee engagement GrandMean is meaningful in relationship to business or performance outcomes. A decrease of five wellbeing points was also associated with

Table 2: Wellbeing Five Elements as Predictors

	Career	Social	Financial	Physical	Community
Life evaluation	**0.68**	**0.61**	**0.73**	**0.59**	**0.45**
Daily experiences	**0.50**	**0.45**	**0.46**	**0.51**	**0.34**
Employee engagement	**0.54**	**0.41**	**0.29**	**0.23**	**0.34**
Turnover intentions*	**-0.30**	**-0.21**	**-0.33**	**-0.16**	**-0.23**
Actual turnover*	**-0.25**	**-0.09**	**-0.23**	0.01	-0.07
Unhealthy days	**-0.19**	**-0.14**	**-0.13**	**-0.46**	**-0.11**
Anxiety/depression*	**-0.16**	**-0.12**	**-0.16**	**-0.23**	**-0.10**
Hypertension*	**-0.07**	**-0.05**	**-0.06**	**-0.22**	**-0.04**
Sleep disorders*	**-0.17**	-0.11	**-0.21**	**-0.34**	**-0.12**
Back pain*	-0.05	0.00	0.01	**-0.08**	-0.05
Diabetes*	-0.04	-0.11	**-0.18**	**-0.08**	-0.10
Heart attacks*	-0.06	0.03	-0.03	**-0.19**	0.03
Obesity*	-0.01	-0.04	**-0.08**	**-0.19**	-0.05

*Using logistic regression (fully standardized; WB5 predicting log odds of new incidents). All other effects are estimated based on multiple linear regression.

Note: All effects are estimated after controlling for demographics and personality differences at baseline.

Bold = 95% confidence intervals do not overlap with zero (p<.05; two-tailed)

0.59 more unhealthy days in the past 30 days, representing a sizable number of days for an entire employee population (600 days for every 1,000 employees).

The remaining effects are presented in terms of risk ratio (based on logistic regression). Five wellbeing points (decline) was associated with 19.6% higher likelihood of turnover intentions and 12.2% higher likelihood of actual turnover. Five wellbeing points (decline) was also associated with 15.0% higher likelihood of anxiety/depression, 18.6% higher likelihood of sleep disorders, 5.9% higher likelihood of hypertension, 14.6% higher likelihood of diabetes, and 6.3% higher likelihood of obesity.

Table 3
Unstandardized practical effects for wellbeing composite as a predictor, assuming a five-point change in wellbeing

Life evaluation	**0.43**
Daily experiences	**0.48**
Employee engagement	**0.15**
Turnover intentions^	**19.6%**
Actual turnover^	**12.2%**
Unhealthy days	**0.59**
Anxiety/depression^	**15.0%**
Hypertension^	**5.9%**
Sleep disorders^	**18.6%**
Back pain^	3.0%
Diabetes^	**14.6%**
Heart attacks^	4.6%
Obesity^	**6.3%**

^Using logistic regression risk ratio, calculated risk ratio for assuming a five-point change (decline) in WB5

Note: All effects are estimated after controlling for demographics and personality differences at baseline.

Bold = 95% confidence intervals do not overlap (p<.05; two-tailed)

SUMMARY

This analysis provides the first look at competing causal models examining the relationships among the five wellbeing elements and 13 possible outcome variables. Results suggest some reciprocal causality for most of the variables, but they indicate that the composite of the five elements was more strongly a cause than a consequence of a variety of subjective and objective variables. Among the more subjective variables were life evaluations, daily experiences, employee engagement, and turnover intentions. Wellbeing was a stronger predictor of employee engagement than the reverse, although the relationship was highly reciprocal. A five-point change in wellbeing was predictive of 0.15 basis points on the employee engagement survey GrandMean. Engagement is linked to a wide variety of performance outcomes. Wellbeing also appears to be an important predictor of many health outcomes, including unhealthy days and disease burden. A five-point decline in wellbeing is predictive of 0.59 more sick days per 30 days, equating to an additional 600 unhealthy days per 1,000 employees per month. These findings appear to have important practical implications for organizations considering how to reduce healthcare costs or improve the retention and performance of their workforce.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*, Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

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