IZA DP No. 4695

Objective Confirmation of Subjective Measures of Human Well-being: Evidence from the USA

Andrew J. Oswald Stephen Wu

January 2010

Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor

ΙΖΑ

Objective Confirmation of Subjective Measures of Human Well-being: Evidence from the USA

Andrew J. Oswald

University of Warwick and IZA

Stephen Wu

Hamilton College

Discussion Paper No. 4695 January 2010

IZA

P.O. Box 7240 53072 Bonn Germany

Phone: +49-228-3894-0 Fax: +49-228-3894-180 E-mail: iza@iza.org

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

IZA Discussion Paper No. 4695 January 2010

ABSTRACT

Objective Confirmation of Subjective Measures of Human Well-being: Evidence from the USA^{*}

A huge research literature, across the behavioral and social sciences, uses information on individuals' subjective well-being. These are responses to questions – asked by survey interviewers or medical personnel – such as "how happy do you feel on a scale from 1 to 4?" Yet there is little scientific evidence that such data are meaningful. This study examines a 2005-2008 Behavioral Risk Factor Surveillance System random sample of 1.3 million United States citizens. Life-satisfaction in each U.S. state is measured. Across America, people's answers trace out the same pattern of quality of life as previously estimated, using solely non-subjective data, in a literature from economics (so-called 'compensating differentials' neoclassical theory due originally to Adam Smith). There is a state-by-state match (r = 0.6, p < 0.001) between subjective and objective well-being. This result has some potential to help to unify disciplines.

One-Sentence Summary:

In a sample of one million Americans across 50 states, there is a close match between people's subjective life-satisfaction scores and objectively estimated quality of life.

JEL Classification: I31

Keywords: happiness, well-being, compensating differentials, spatial equilibrium

Corresponding author:

Andrew J. Oswald Department of Economics University of Warwick Coventry CV4 7AL United Kingdom E-mail: andrew.oswald@warwick.ac.uk

^{*} To be published in *Science*.

The full version of this paper can be read by following the links on www.andrewoswald.com.

This paper is about to be published in <u>Science</u>. For copyright reasons, it is not possible to give the full text here. But one downloadable copy is legally available to anyone to read. That copy is provided at the top of Andrew Oswald's website. It can be found by following the links on www.andrewoswald.com. An introduction to the Oswald-Wu paper appears below.

The concept of human well-being is important but difficult to study empirically. One approach is to listen to what human beings say. Research across the fields of psychology, decision science, medical science, economics, and other social sciences draws upon questionnaire data on people's subjective well-being. These are numerical scores (e.g. from very satisfied...very dissatisfied) in response to survey questions such as: how happy are you with your life? Sample sizes in these statistical analyses typically vary from a few dozen individuals in a laboratory to many tens of thousands of people in a household survey.

If reported well-being numbers provide accurate information about human experience -so are not merely random, deliberately or accidentally untruthful, or irredeemably affected by the possibility that they may not be comparable from one person to another -- such data offer important intellectual opportunities to research scientists and practical ones to policy-makers. However, currently there is little empirical evidence, of the sort able to convince a skeptic, that they do. Perhaps the closest to a validation (of the believability) of subjective well-being scores is the finding that there are correlations between reported happiness and blood pressure, and between emotions, relative reward, and the brain. This argument, while suggestive, faces a difficulty. The demonstration of a statistical link between physiological measures and subjective well-being answers usefully establishes that the latter are not random numbers. But skeptics can reasonably argue that it does little more than that. Biological indicators are not themselves unambiguous measures of human happiness or unhappiness.

This study focuses not on people but on places. Places have characteristics that human beings find objectively pleasant (Hawaiian sunshine or Colorado scenery) and unpleasant (Connecticut land prices or New York City traffic fumes); many are cardinally measurable. The study blends new data from the United States Behavioral Risk Factor Surveillance System (BRFSS), elements of the economist's compensating-differentials theory, and recent research on so-called amenity effects in happiness regression equations.

The study's principal contribution, Figure 1, offers a possible bridge between different ways of thinking -- between, in particular, the fields of hedonic psychology and neoclassical economics (the latter has traditionally been hostile to the use of data on subjectively reported feelings). It offers a cross-check on the spatial compensating-differentials theory of economics and regional science. It may also be relevant to the work of behavioral scientists, geographers, applied psychologists, and mental-health specialists. The study's finding suggests that subjective well-being data contain genuine information about the quality of human lives.





Objective Quality-of-Life Ranking (where 1 is high and 50 is low)



Each dot is a state. The correlation is significant at p<0.001 on a two-tailed test. This figure plots state dummy coefficients from a life-satisfaction equation against state rank in quality-of-life from the compensating differentials results of Gabriel et al (2003). Life satisfaction is coded for each individual from a score of 4 (very satisfied) to 1 (very dissatisfied). On the y-axis, the regression controls for household income as well as the survey respondent's gender, age, age squared, education, marital status, unemployment, and race, and also year dummies and month-of-interview dummies. Alabama is included. Washington DC is omitted from Gabriel et al (2003) and thus here. The bottom right hand observation is New York. Question wording in the BRFSS questionnaire is:

In general, how satisfied are you with your life?

(Questionnaire Line 206)

- 1 Very satisfied
- 2 Satisfied
- 3 Dissatisfied
- 4 Very dissatisfied

Table 1. Two Ways of Measuring the Quality of Life in America

	BRFSS Life-Satisf. Equation: State coefficient dummy- variable values [95% confidence interval]	Objective state quality-of-life rank: comp. diff. method (Gabriel et al 2003)
Alaska	013	23
Arizona	[018,008] .001	20
Anzona	[002, .005]	20
Arkansas	017	3
	[019,015]	
California	076 [080,072]	42
Colorado	027	34
	[030,024]	22
Connecticut	081	32
Delaman	[084,078]	20
Delaware	027	30
District of Columbia	[029,025] 048	N/A
District of Columbia	[051,045]	N/A
Florida	.004	10
	[.002, .006]	
Georgia	021	36
6	[023,020]	
Hawaii	.011	38
	[.004, .018]	
Idaho	014	5
	[017,011]	
Illinois	072	48
	[074,069]	
Indiana	078	44
	[080,077]	
Iowa	041	15
	[044,038]	
Kansas	044	19
	[046,041]	
Kentucky	045	24

	[047,043]	
Louisiana	.033	8
	[.032 , .034]	
Maine	006	9
	[009,003]	
Maryland	066	45
	[069,064]	
Massachusetts	070	27
	[073,068]	
Michigan	079	49
	[081,077]	
Minnesota	031	46
	[034,027]	
Mississippi		_
wiississippi	.001	7
Missouri	[.000, .001]	
WIISSOUTT	064	40
Montana	[066,062]	
Womana	.001	4
Nahaalaa	[002, .004]	
Nebraska	044	16
Nama da	[047,041]	
Nevada	065	29
N	[068,062]	
New Hampshire	033	43
	[036,030]	
New Jersey	078	47
	[081,075]	
New Mexico	029	14
	[034,024]	
New York	088	50
	[090,085]	
North Carolina	013	17
	[015,012]	
North Dakota	030	6
	[032,027]	
Ohio	070	33
	[071,068]	
Oklahoma	026	21
	[029,024]	
Oregon	040	22
	[044,037]	
Pennsylvania	067	35

	[069,065]	
Rhode Island	068	12
	[071,066]	
South Carolina	.001	18
	[.000, .002]	
South Dakota	014	2
	[017,010]	
Tennessee	.003	28
	[.001, .004]	
Texas	014	25
	[018,010]	
Utah	026	20
Ctuli	026	39
Vermont	[030,023]	10
v ermont	017 [020,014]	13
	1 - 0/0 - 0141	
	[020,014]	
Virginia	033	31
-		31
Virginia Washington	033 [035,031] 046	31 41
-	033 [035,031]	-
Washington	033 [035,031] 046 [049,042]	41
-	033 [035,031] 046 [049,042] 044	-
Washington	033 [035,031] 046 [049,042] 044 [046,042]	41 11
Washington West Virginia	033 [035,031] 046 [049,042] 044 [046,042] 038	41
Washington West Virginia Wisconsin	033 [035,031] 046 [049,042] 044 [046,042]	41 11
Washington West Virginia	033 [035,031] 046 [049,042] 044 [046,042] 038	41 11
Washington West Virginia Wisconsin	033 [035,031] 046 [049,042] 044 [046,042] 038 [040,035]	41 11 37
Washington West Virginia Wisconsin	033 [035,031] 046 [049,042] 044 [046,042] 038 [040,035] 013	41 11 37
Washington West Virginia Wisconsin Wyoming	033 [035,031] 046 [049,042] 044 [046,042] 038 [040,035] 013 [016,010]	41 11 37

Alabama is included in the data (and in Figure 1). It is the base category, against which the other states' coefficients are normalized. In effect, Alabama has a life-satisfaction coefficient of zero (and a ranking of 26 in Gabriel et al 2003). The standard errors were adjusted for clustering.

References

- 1. R. A. Easterlin, Proc. Natl. Acad. Sci. U.S.A. 100, 11176, (2003).
- 2. E. Diener, E.M. Suh, R. E. Lucas, H.L. Smith, Psychol. Bull. 125(2), 276 (1999).
- 3. J.H. Fowler, N.A. Christakis, B.M.J. 337 (2008). DOI: 10.1136/bmj.a2338.
- 4. A. J. Oswald, Econ. J. 107, 1815 (1997).
- 5. Y. Yang, American Sociological Review 73, 204 (2008).
- 6. B.L. Cardozo, A. Vergara, R. Agani, C.A. Gotway, J.A.M.A. 284, 569 (2000).
- 7. B. Radcliff, American Pol. Sci. Review 95, 939 (2001).
- 8. Y.J. Hu, S. Stewart-Brown, L. Twigg, S. Weich, Psychol. Medicine 37, 1005 (2007).
- 9. E.F.P. Luttmer, Q.J.Econ. 120, 963 (2005).
- 10. D. Gilbert, Stumbling on Happiness. New York: Alfred A Knopf (2006).
- 11. B. Stevenson, J. Wolfers, J. Legal Studies 37, S33 (2008).
- 12. A. E. Clark, J. Labor Economics 21, 323 (2003).
- 13. E. W. Dunn, L.B. Aknin, M.I. Norton Science 319, 1687 (2008).
- 14. E. Sandvik, E. Diener, L. Seidlitz, J. Personality 61(3), 318 (1993).
- 15. H.L. Urry et al, Psych. Sci. 15(6), 367 (2004).
- 16. A. Steptoe, J. Wardle, Neurobiology of Aging 26 (Supplement 1), S108 (2005).
- 17. K. Fliessbach, et al, Science 318, 1305 (2007).
- 18. D. G. Blanchflower, A. J. Oswald, J. Health Econ. 27(2), 218 (2008).
- 19. S.D. Barger, C.J. Donoho, H.A. Wayment, Quality of Life Research 18 (2), 179 (2009).
- 20. A. J. Oswald, S. Wu, Unpublished manuscript. University of Warwick (August 2009). Presented at the October 22 2009 IZA Prize ConferenceWashington DC. Downloadable at <u>http://www.iza.org/conference_files/prizeconf2009/oswald_a262.pdf.</u>
- 21. J. Roback, J. Pol. Econ. 90, 1257 (1982).
- 22. J. Gyourko, J. Tracy, J. Pol. Econ. 99, 774 (1991).
- 23. S.A. Gabriel, J.P. Mattey, W.L. Wascher, Regional Sci. and Urban Econ. 33, 619 (2003).
- 24. M. Moro, F. Brereton, S. Ferreira, J. P. Clinch, Ecol. Econ. 65, 448 (2008).
- 25. S. Luechinger, Econ. J. 119, 482 (2009).
- 26. A. Smith, An Inquiry into the Nature and Causes of the Wealth of Nations. Chicago: University of Chicago Press (1776, reprinted 1977).
- 27. J. Cohen, *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum (1988).
- 28. A.B. Krueger, D.A. Schkade, J. of Pub. Econ. 92(8-9), 1833 (2008).
- 29. M.G. Pittau, R. Zelli, A. Gelman, Soc. Indicators Research, in press (2009).
- 30. A. Gelman, B. Shor, J. Bafumi, D. Park, *Quarterly J. of Pol. Sci.* 2(4), 345 (2007).
- 31. J. Stiglitz et al, Commission on the Measurement of Economic Performance and Social Progress. September 2009. Downloadable at <u>www.stiglitz-sen-fitoussi.fr.</u>
- 32. <u>Acknowledgments</u>: For discussions and detailed points, we are grateful to four referees, the editor Gilbert Chin, and Peter J. Hammond, Miles Kimball, Doug Krupka, Erzo Luttmer, Jeremy Miles, Eugenio Proto, and Daniel Sgroi. Valuable suggestions were made by Dan Benjamin, Danny Blanchflower, Andrew Clark, Michael Clements, Ed Diener, Danny Dorling, Daniel Gilbert, Amanda Goodall, Carol Graham, Ori Heffetz, Simon Luechinger, Sachi Mukherjee, Robert Putnam, and Jennifer Smith. The first author's work was supported by an ESRC research professorship. No conflicts of interest.