Ignorance is Bliss… Or is It?

An Empirical Look at the Relationship Between Higher Education and Happiness

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4/13/2010

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> A good education is another name for happiness.
>
> -Ann Plato

> It has always seemed strange to me that in our endless discussions about education, so little stress is laid on the pleasure of becoming an educated person, the enormous interest it adds to life. To be able to be caught up into the world of thought—that is to be educated.
>
> -Edith Hamilton

> Miss Wormwood…If ignorance is bliss, this lesson would appear to be a deliberate attempt on your part to deprive me of happiness, the pursuit of which is my inalienable right according the Declaration of Independence. I therefore assert my patriotic prerogative not to know this material. I'll be out on the playground.
>
> -*Calvin & Hobbes*

American students today are faced with more pressure than ever regarding educational attainment. When my parents graduated from high school at the end of the 1970s, it was quite possible to be successful in the world of work with only a high school diploma, but students today do not enjoy that luxury—we are constantly bombarded with the message that a college degree is the only way to be competitive, especially as the job market remains in its recession-induced dip. And, as the number of college graduates continues to swell, many are beginning to view graduate school as the only way to truly stand out in the job search.

Our views toward education have, therefore, been changing. In the late 1960s, over 80% of college freshman said that it was "very important or essential" to "develop a meaningful philosophy of life," while about 40% indicated that financial well-being was "very important or essential." In 2000, those numbers have almost completely flip-flopped.[1] Perhaps this is why students complain about homework and dread taking tests: education has become just another hoop to jump through

[1] Myers, 2000, pp. 58-59

on the road to success. The hope is that career success will translate into a happier life. After all, this is what our society tells us. As children in America, we learn that our job is an integral part of who we are, and if we can only find the right job, make the right salary, and marry the right person, we will be happy.[2] However, almost one-half of all college freshman still indicate that "developing a meaningful life philosophy" is a very important goal for the their education. We may not be able to clearly articulate it, but there is some sense that education makes us happier simply by virtue of exposing us to new ideas and concepts, rather than by just increasing our earning potential.

Economists today are beginning to seriously consider the questions these musings lead to: do the "perfect job" and the higher salary actually make us happier? I propose the question, does an increase in educational attainment lead to an increase in happiness? The literature, discussed in Section III, has taken it as generally accepted that people with a college education are more likely to be happy than those with only a high school education, but there has been no study to confirm this. Also, no one has bothered to consider the influence of graduate-level attainment vs. baccalaureate-level attainment. It is my goal to answer the follow question: Does formal post-graduate education lead to increased levels of happiness?

To answer this, I begin by defining what, precisely, I mean by happiness and education (Sections I and II). Then, I consider the literature on happiness economics in Section III, and establish my theory in Section IV. In Section V, I define my variables and explain the statistical methods I use to test my hypothesis. Section VI contains my data analysis, and Section VII explains the meaning of my findings. I suggest areas for further research in Section VIII and conclude in Section IX. As noted above, however, the first step is to define what happiness is, and how to measure it.

[2] Rapaille, 2006, pp. 112-129

I. A Brief History of Happiness

In the thousands and thousands of years since humans first began to study happiness, we still have yet to agree upon a single definition. Much of Western philosophy and thought has focused on this very issue, from Socrates to Bentham, Christ to Darwin; we have struggled to figure out what it really means to be "happy". Darrin M. McMahon, in his book *Happiness: A History*, traces the path that Western Civilization has wandered in its unending pursuit of happiness. I give a (very) brief summary of that history here.

The Ancient Greeks were the first known speculators on human happiness in the West. Their original belief system stated that happiness could not be known by any living person, as it was a condition acknowledged only after one was dead. Happiness for the Greeks meant living a life of virtue and honor, leaving healthy children and grandchildren, not being subjected to horrendous natural disasters or pillaging armies, and leaving this life with just as much honor. McMahon, on p. 6, notes that it is the final criterion that is so markedly different from our modern notions of happiness. Since, for the Greeks, the future was so unpredictable, a person could not be considered happy until they could no longer be *un*happy. Ultimately, to know happiness in this life was in the realm of the gods. Humans had no chance for it.

Socrates, Plato, and especially Aristotle, however, viewed happiness as something achievable in this world, and not up to the dictates of fate. In fact, not only was happiness achievable, but it was the final end toward which humans ought to strive. Granted, the Greek philosophers did not believe that all would or even could be happy in this life, and happiness was still closely associated with a god-like existence, but it was no longer considered impossible. As Noddins notes on pp. 10-11, ultimate happiness for the Greeks was the full use of reason and rationality.

With the rise of Christianity, a new definition of happiness emerged: happiness through suffering. Christianity promised eternal salvation and bliss in the afterlife, earned through living a life

of suffering and sacrifice here on earth. Religion was both the journey and the destination when seeking happiness. This perception persisted throughout the Middle Ages and the Renaissance in various forms, and it was not until the Enlightenment that a new view on suffering and happiness developed: religion was no longer seen as the gateway to happiness, but rather as a barrier to be overcome on the journey to earthly felicity. In this new thought, we find the first definition that could be useful for quantifying happiness.

No longer seen as a virtuous life with few misfortunes, nor as a state to be attained after death as a reward for faithful service in the here and now, Enlightenment thinkers saw happiness as the sum of all pleasant experiences minus the sum of all unpleasant, or painful, experiences. At its extreme, the Enlightenment encouraged hedonism: the pursuit of maximum individual pleasure—however that is defined by the individual—without regard for the consequences. However, most people found hedonism to be *too* extreme. Enlightenment philosophy is best summed up by utilitarianism, the brain-child of Jeremy Bentham and expanded upon by John Stuart Mill. In Utilitarianism, the benchmark to be used in determining the ethical and moral validity of an act is that it produces the greatest amount of good for the greatest number of people, thus putting a restraint on hedonism. This concept has especially impacted economics, where the enjoyment and welfare that consumers gain from consumption and leisure time is referred to as utility.

However, utilitarianism is not without its potholes as a definition of happiness. In many instances, utilitarianism requires personal sacrifices in the name of the "greater good." As an example, consider a group of friends looking to order a pizza. One friend is a vegetarian, but all other friends are meat-lovers, and gain a considerable amount of utility from having pepperoni pizza with bacon bits. By the mandate of utilitarianism, these friends ought to order the pepperoni pizza, as the vegetarian's loss of utility is less than the loss to the carnivorous friends. Or, taking a broader view, *not* eating meat could put farmers, butchers, and meat packers out of work, so one ought not

to be a vegetarian at all, unless the utility of the cows and pigs being slaughtered for the pizza is also morally pertinent. Such a definition is therefore useful, though somewhat difficult, for determining the happiness of a group or society, but not the individual, and it is the aggregated individual that I am interested in.

Contemporary thought still struggles with the balance between pleasure and virtue, but takes our confusion over happiness even further: happiness is not only a right, it is a choice. Of course, it is still unclear what happiness truly is, but that uncertainty has not prevented us from aiming toward it. Get-happy-quick schemes and self-help books and gurus are all the rage. One cannot walk into a Barnes & Noble or other book retailer without being assaulted by thousands of titles. A GoogleBooks search for "happiness" gives over 375,000 titles. "Happy" serves out over 650,000 titles. Tellingly, the first title is *How We Choose to be Happy: The 9 Choices of Extremely Happy People.*

None of these various definitions, though, (happiness as reason, as pleasure, or as choice) give us anything concrete to work with. When we speak of happiness as economists, what do we mean? How do we measure it? Regardless of one's philosophic leanings, modern-day social scientists have settled on a simple answer: ask people and let them define it for themselves. Ask many people how happy they are, and record the answer. To do this, social scientists use various surveys to elicit responses of global well-being—that is, they ask respondents to consider their life as a whole and rate their level of happiness on a scale that ranges from not happy to very happy. The number of possible responses varies by survey, but the overall results tend to be very similar. This measure of happiness is referred to as "global subjective well-being" or global SWB.

But like all concrete measurements of abstract concepts, global SWB is not perfect. Below is a discussion of some of the complaints against global SWB. For those wishing for more detailed information on these imperfections, I recommend the following studies: Di Tella, MacCulloch, and Oswald (2003); Di Tella and MacCulloch (2006); Easterlin (1974); Easterlin (2001); Kahneman and

Krueger (2006); Krueger and Schkade (2008); Kahneman, Krueger, Schkade, Schwarz, and Stone (2006); and especially Smith (1979). (Most other sources cited in the bibliography also discuss the various issues—and solutions to the issues—related to using SWB measures.)

One of the main problems with global SWB measures is the lack of comparability between respondents. Because each person defines what "very happy" means for themselves, there is no reason to believe that one person's definition of very happy corresponds to another person's definition. Similarly, as Kahneman and Krueger (2006) point out, some people prefer to avoid superlatives when describing anything, while others use them more than they ought. However, Easterlin (2001) points out that while comparing one person's SWB to another's may not be possible, aggregating this data smoothes out such discrepancies and comparisons between large groups of people do give meaningful results.

Other methods of measuring subjective well-being, such as the Day Reconstruction Method (DRM) or the Experience Sampling Method (ESM)[3], measure what Kahneman (2007) refers to as experienced utility. Kahneman and Krueger (2006) find these measures to be more reliable and more accurate as measures of how people actually experience pleasant and unpleasant events, and thus preferable to survey-type data. These alternate measures, however, introduce biases of their own, which it is beyond the scope of this paper to completely discuss, but seem, in my opinion, to be more closely measuring happiness based on a hedonic understanding: experiencing minimal pain and maximal pleasure. Global well-being responses, however, allow people to take into account the positive (negative) benefits of some of their painful (pleasant) experiences, leading us closer to the

[3] DRM asks participants to fill out a questionnaire and compile a journal of their previous day. They are then asked to split this day into "episodes" (people typically split their day into 12-14 episodes) and rate their experience of specific emotions during that episode on a scale of one to six. This information is then used to determine what percent of the day was spent experiencing positive emotions and what percent was spent experiencing negative emotions. It is a less expensive alternative to ESM, which requires participants to carry a mini-computer that prompts them at specific intervals to log their current emotional state, creating a daily log of their emotional life as it is being lived.

definition of happiness that almost all philosophers have returned to again and again: pleasure tempered with virtue. Global well-being evaluations allow people to look at the consequences of their actions, while DRM and ESM do not.

Despite the arguments for and against global measures of SWB and using responses to surveys as a measure of subjective well-being, it is clearly the dominant measure of happiness used in the economics literature, as well as the most accessible source of happiness data for those with limited resources (such as myself). In order to allow my results to be comparable with other studies, I will be using global SWB as measured by the United States General Social Survey (GSS). The GSS is a large-scale survey conducted annually from 1972-1994, with the exceptions of 1979, 1981, and 1992, and biannually from 1994 to the present by the National Opinion Research Center (NORC), and has been collecting data on SWB since its first round in 1972. For the economic study of happiness in the United States, the GSS is the main data set used, as it includes data on income, family, work, health, and most pertinent to this study, educational attainment.

II. Connecting with Education

With this definition of happiness in hand, I will define what I mean by educational attainment, and how I plan to measure it. Typically in economics, education refers to any sort of training—formal or informal—that increases a laborer's productivity, his or her human capital. The concept of human capital is addressed in any undergraduate intermediate macroeconomics course, and generally refers to "skilled labor." The training that a worker undergoes to become "skilled" can include post-secondary schooling, on-the-job training, or some sort of continuing education program, but is usually some mix of all three.

For my purposes, on-the-job training or one-time educational seminars are not included in the definition of education. I mean formal education only, as I am not attempting to measure the effect of education on productivity or output growth, or some other standard economic topic. I simply want to see whether or not having received graduate-level education, *ceteris paribus*, leads to higher levels of global subjective well-being than having received only undergraduate education. I define educational attainment as the highest number of years of schooling the respondent completed. This gives me an intuitive measure for the variable. From this point forward, the term "education" will be used to refer to formal schooling.

Of note is that there are numerous benefits associated with pursuing both an undergraduate and a graduate degree. Philip Oreopoulos and Kjell G. Salvanes (2009, unpublished) posited that there are a number of returns to education beyond a higher income (which is the one parents typically cite when admonishing their children to do their homework—unless they fall back on "Because I said so!"). These returns are listed in Table 1.

Oreopoulos and Salvanes first find that higher education increases reported happiness. Discussing this point is imperative, as it appears that they have answered my question, but *they have not*. They are comparing the effect of having more or less than a high school education on SWB.

While similar to my question, it is not the same, and the answer they find may not be the answer I find. My question is, how much happier are those with *more* than a bachelor's degree compared with those having received *only* a bachelor's degree, which is not something they address.

Table 1. Returns to Higher Education
Source: Oreopoulos and Salvanes (2009)

SWB	More likely to rate themselves as happy or very happy
Employment	More likely to hold a more prestigious job
	Increased levels of job security
	Increased levels of job satisfaction
	More likely to be given autonomy at work
	Less likely to be unemployed
	More likely to find employment after a period of unemployment
Thinking	More able to engage in critical thinking
	Better at problem-solving
Social Skills	Increased ability to interact with others
	Less likely to divorce their spouse
	More likely to trust others
Children	Fewer children (causality is questionable)
	More likely for children to be considered successful
Other	More likely to seek out delayed gratification (patient)
	Less likely to engage in risky behaviors
	Less likely to feel rushed
	Increased health support

Yet this question is of particular relevance because it changes the view we must take of education. If we agree with Aristotle humanity's ultimate purpose is happiness, then we must value anything that brings us to that end. Economics, though, has traditionally viewed education as a "black box." Unskilled laborers go in, and skilled laborers come out. Depending on the particular branch of economics being studied, the reason for having skilled labor varies. There is no branch, however, that views education as a direct means to increased happiness. Rather, it has been a means toward other means considered to lead to the end of happiness, especially financial means. Noddins notes that educators in the public school system seem to have also taken this view of education's role in our lives.[4] If, however, a connection emerges between happiness and education, ignoring all other ends to which education is a means, then we can begin to view education as an end in itself, and value education not because it will make us more money, but because it will lead to a more fulfilled life.

[4] Noddins, 2003, pp. 25-26, 29

III. Let's Ask the Experts

While the study of happiness economics is relatively recent, there is still a large body of literature on the subject that is worth reviewing briefly. While little has been done regarding education specifically, a number of important studies do provide significant insight into the nature of SWB and its relationship with economics. (For an excellent survey of this literature, see Frey and Stutzer (2002).)

The most well-known and widely-cited study of happiness economics was done by Richard Easterlin in 1974 as part of a festschrift honoring Moses Abramovitz and testing Abramovitz' belief that changes in the rate of economic growth cannot be considered an accurate proxy for changes in the rate of growth of welfare. Easterlin tested this assertion by considering global SWB data collected from two surveys and found that at any given point in time, those in the higher income brackets are more likely to rate themselves as "happy" or "very happy" than those in the lower income brackets. Simultaneously, as GNP in the United States rose from 1946-1970, SWB ratings have remained stagnant. Also, SWB levels are relatively similar across countries, despite widely divergent levels of GNP per capita. These results have come to be known as the "Easterlin Paradox," and Easterlin concluded that the lack of growth in happiness over time is due to a higher weight on *relative* income than absolute income, and that over time, as our consumption norms have changed, so too have our opinions on what is required to be satisfied and be "very happy."

This emphasis on changing aspirations has become the cornerstone of Easterlin's work, and is challenged by the research of the psychologist Daniel Kahneman and his various co-researchers. Kahneman argues for set-point theory, the idea that humans have a set happiness level and that while our current happiness may fluctuate, it does so around this level and even extreme events such as winning the lottery or the death of a loved one do not have a lasting impact on our overall happiness level. In Kahneman, Krueger, Schkade, Schwarz, and Stone (2006), he argues that we have

a tendency to overemphasize what we consider important to our well-being when prompted to think about it, even though it may rarely influence our daily life. In Kahneman and Krueger (2006), he invokes this reasoning to explain why even extreme events don't have a lasting impact on human happiness: "an essential mechanism of adaptation to circumstances such as being a paraplegic or a lottery winner is that these circumstances occupy the individual's attention for a diminishing fraction of the time as they gradually lose their novelty."[5]

In this view, then, there should be no reason why higher levels of education would lead people to rate themselves as happier than those with lower levels of educational attainment, unless only happy people elect to pursue post-secondary and post-graduate degrees, which seems unlikely. Easterlin (2006) takes issue with Kahneman and Krueger's (2006) view, countering that life-cycle happiness data do not support set-point theory. For the US, happiness reaches its (barely noticeable) peak around middle age. David Blanchflower and Andrew Oswald (2007, 2009) find that Europeans have a U-Shape to life-cycle happiness, and that happiness reaches its lowest point around middle-age. Because of these changes in well-being over the life-cycle, Easterlin asserts that there is no good reason to assume that people have a fixed happiness level that they cannot overcome.

Psychologist Sonja Lyubomirsky (2008) explains, though, how set-point theory could be reconciled with the life-cycle data. She finds that three factors influence how happy we are. Genetics account for 50% of the variation in happiness levels, life circumstances for 10%, and what she refers to as "intentional activity"—counting your blessings, meditating, setting goals, etc.—explains the remaining 40%. Not surprisingly, economists do not accept this breakdown. After all, if circumstances only account for 10% of our well-being, what is the point of making everyone better off economically? Of note, however, is that whether or not one's "happiness genes" are expressed

[5] Kahneman and Krueger, 2006, p. 18.

has to do with environmental factors.[6] These can include economic circumstances, social support networks, and family life. By this reasoning, life circumstances could influence up to 60% of one's experienced happiness, if they are also a factor in determining our genetic expression. Unfortunately, there has been little overlap between psychology and economics in determining how life circumstances influence happiness, and whether set-point theory or the aspirations treadmill offers a stronger explanation for the lack of increasing levels of SWB over the decades.[7]

Other important findings include the impact of macroeconomic events on happiness. For example, Rafael Di Tella, Robert J. MacCulloch, and Andrew Oswald (2003) found that unemployment has a significant negative impact on people's reported levels of well-being, and Oswald (1997) found that unemployed males were significantly more likely to commit suicide than employed males, or than either employed or unemployed females. Di Tella, MacCulloch, and Oswald (2003) also note that simply being in a recession decreases the level of SWB of everyone in the economy. This is due not simply to unemployment, but to the fear that a recession can cause—will I lose my job? Can I still send my kids to school? What if I lose my house?

All of these factors are vitally important, and give us clues as to how to test for the relationship between education and happiness. But one issue with all of these studies is the lack of framework. There is no basic theory that is used in the economics literature to establish why social scientists should believe that each factor influences happiness one way or the other, except perhaps the basic concept of utility maximization. But simply maximizing utility does not explain why someone who has been unaffected by the current recession would still be more likely to rate him- or herself as "not too happy" than if they were not in a recession.

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[6] Lyubomirsky, 2008, pp. 57-60

[7] One ten page psychology paper on what makes people happy devoted four pages to discussing wealth and other economic factors, but quoted only anecdotal evidence from one economists, and noted only Easterlin's study of the income/happiness relationship in countries outside the US. No other economic source was used. Similarly, few economists quote psychologists other than Kahneman—and that is likely because Krueger, his research partner, is an economist.

IV. The Theory behind the Curtain

I propose the use of Amartya Sen's capabilities approach to frame the analysis of education's relationship with happiness. For a good summary of this approach, see Amartya Sen, "Capability and Well-Being" in *The Quality of Life*, Amartya Sen and Martha C. Nussbaum, eds. While Sen originally developed this approach as a tool for use in the study of economic development, I believe that it is rich enough to form a theoretical backdrop for considering the relationship between education and happiness. Sen's capabilities approach is based on the idea that people do not seek out consumption for consumption's sake, but because consuming certain goods leads to certain "functionings." Sen defines a functioning as a "[part] of the state of a person—in particular the various things that he or she manages to do or be in leading a life."[8] Functionings are not the same as utility. Consumption induces particular functionings, and from these functionings we experience utility or disutility. For example, a space heater is a good we can consume. Turning the heater on could induce the functioning of "warm," which in turn could provide utility if we were cold or disutility if we were already uncomfortably warm.

A person's capability is defined by Sen as

> "reflect[ing] the alternative combinations of functionings the person can achieve, and from which he or she can choose one collection. The approach is based on a view of living as a combination of various 'doings and beings', with quality of life to be assessed in terms of the capability to achieve valuable functionings."[9]

So the functionings that we choose for our life depend on the value that we get from those functionings. Sen notes that these functionings may not necessarily give utility, but that we choose them because they are important on their own, such as liberty: I personally may not experience

[8] Sen, 1993, p. 31
[9] Sen, 1993, p. 31

utility from speaking out against the government, but I would still choose to have the freedom to do so because liberty is valuable in and of itself. Sen also points out that capabilities and freedom are not the same thing, but rather that personal capabilities contribute (often substantially) to a person's individual freedom. The size of one's capability reflects their *freedom to achieve* certain functionings.

Of course, no one is just one thing at a time, and so Sen introduces the concept of functioning "*n*-tuples," or what I call "bundles." To make this more concrete, consider the following bundles: hungry, cold, and tired; full, cold, and tired; hungry, warm, and tired; hungry, cold, and well-rested; full, cold, and well-rested; full, warm, and tired; hungry, warm, and well-rested; full, warm, and well-rested. If this is the entirety of functioning bundles that you can choose from, then this is your capability. Now suppose you *achieve* the functioning bundle of hungry, warm, and well-rested. Because you end up hungry, warm, and well-rested, you have achieved this particular bundle. However, you have the *freedom to achieve* the other seven possible bundles.

This freedom to achieve is also thought to contribute to well-being, and there are two types of functionings one can achieve: well-being and agency. Consider the above capability. Since all the functioning bundles increase your well-being, they are well-being goals. But if we included a functioning of feeding your child, that would be an agency goal. Now, if for you, the freedom to achieve is meaningless, then this first capability would be considered just as good as a set containing only the functioning you chose: hungry, warm, and well-rested. Most people, though, would consider this second set to be drastically inferior to the first, despite the achieved well-being in both cases being identical. Similarly, adding in the functioning of feeding your child is also a beneficial increase to the size of your capability. It is this point that is especially significant when considering the impact of education on happiness.

Because of the increased functioning bundles that become available to a person as he or she increases their educational levels, that person now has a larger capability than before, which—even

should they choose to be a janitor after receiving a Master's or a Ph. D.—will increase his or her well-being simply by those options being available. It also means that each bundle includes a greater number of functionings, both affecting well-being and agency goals. That is, each bundle previously open to him or her now also includes such functionings as understanding academic articles, speaking knowledgably about world events, making a difference in improving local politics, etc. Whether or not they choose these bundles is irrelevant. The simple fact that they are now available to them, based on the capabilities approach, ought to increase their well-being. From this conversation, I draw my hypothesis: people who choose to pursue post-graduate education—17 years or more of schooling—will be more likely to rate themselves as "very happy" than those with only a Bachelor's degree.

V. Of Methods and Variables

To test my hypothesis, I follow the literature and run an ordered logit regression. In an ordered logit regression, the dependent variable is a dummy variable (that is, it is categorical rather than continuous), and the response categories have an inherent ranking to them. In this instance, my variable is reported levels of happiness, and it is obvious that an answer of "very happy" is better than an answer of "pretty happy," which in turn is superior to "not too happy." I am using the statistics software package STATA to run my regressions.

The ordered logit model is a probability model, and is interpreted differently from the ordinary least squares model, or OLS regression. Unlike a probability model, the OLS measures the marginal impact on the dependent variable of a one-unit change in the independent variable. For instance, imagine a model that regresses price of pizza on the number of toppings. Assume it finds that $PRICE = 5.98 + 1.25 \cdot TOP$, where PRICE is the price of the pizza in dollars, and TOP is the number of toppings. The coefficient tells us that increasing the number of toppings on the pizza by one will increase the price of the pizza by $1.25. However, this type of interpretation is not meaningful in a probability model, where the dependent variable has only two or three possible values (i.e., 1 = A occurred, 0 = not-A occurred, or 1 = A occurred, 2 = B occurred, 3 = C occurred)[10]. There can be no intermediate values for the dependent variable. Therefore, the coefficients in a probability model indicate the effect on the *chance* that event A will or will not occur.

There are several ways to interpret the coefficient on an ordered logit model. Most introductory-level econometrics textbooks gloss over these interpretations when discussing probability models, but I will explain here those I will be using. (This discussion draws heavily from *Interpreting Probability Models: Logit, Probit, and Other Generalized Linear Models* by Tim Futang Liao, a highly accessible work for anyone with an interest in the interpretation of probability models.)

[10] Technically, the dependent variable can have more than three possible values, but the point is that there are a finite number of discrete values it can take on, as it is measuring categorical, rather than continuous, data.

The first way to interpret the coefficients, denoted here as β, on a probability model is the most basic: look at the signs. This is nothing unique to probability models, but it gives general information about how the independent variable and the dependent variable interact. As one would expect, a negative coefficient ($\beta < 0$) for an independent variable indicates that as that variable increases, the odds of the dependent variable taking on a specific value decreases and vice versa. Similarly, a positive coefficient indicates that the independent and dependent variables move together, with an increase in the independent variable leading to an increase in the odds of the dependent variable taking on that value, and a decrease leading to a decrease. However, this does not say anything about the magnitude of the increase or decrease in the odds. For this reason, we must also consider the value of the coefficient.

So, what does the coefficient in a logit model actually represent? When dealing with a dependent variable with three choices (which we are in this instance), Liao tells us that when the appropriate assumptions[11] hold, "the effect of [the independent variable] would induce a change in the odds of responding to category 1 instead of 2 and 3, or 1 or 2 instead of 3, by a factor of exp(β)."[12] That is, we can take the value of the coefficient, use it as the exponent for e^x, and that value will be the marginal odds. So, for instance, if we consider the price (in dollars) of a pizza to be an independent variable influencing the choice of small (=1), medium (=2), or large (=3), and our ordered logit regression gives a coefficient of $\beta = -0.423$, then we calculate that $e^{-0.423} = 0.655$. This means that a one-dollar increase in the price of pizza will multiply the odds of choosing a large pizza over either a medium or a small pizza by 0.655: the odds of choosing a large pizza when the price of the pizza increases by $1.00 is about two-thirds what it would be without the price increase.

[11] The appropriate assumption in this case is that the effect of the independent variable on the dependent variable should not be reliant upon which response category of the dependent variable is being considered. In this instance, the effect of education on the odds of responding "not too happy" should be the same as the effect on the odds of responding "pretty happy" or "very happy." This is a strict assumption, but is one that is necessary for meaningful interpretation of the coefficients.

[12] Liao, 1994, p. 42

(This leads to an important point that Liao makes numerous times. When looking at odds, having no impact is represented by a value of 1 rather than a value of 0, as is the case for an OLS coefficient. Thus, odds of less than one indicate an inverse relationship between the independent and dependent variables, while odds of greater than one indicate a direct relationship.)

It is important to recognize that this value reflects the marginal *odds* rather than the marginal *probability* of a certain response. In this pizza example, converting the odds to a probability gives 0.396, which means that the probability of selecting a large pizza over either medium or small is about 40% what it would be had price not increased.[13] Typically, economists work with probabilities more than odds, but as the logit model naturally gives us a result of log-odds, I will be interpreting all coefficients as the marginal effect on the odds of choosing each response.

The most important issue with any regression, of course, is the choice of variables to use. Here, there are a number of considerations to make: how to measure the dependent variable, which explanatory variables to include, and how to measure each of them. (See Appendix A for a list of each GSS variable being used.) The first I have addressed in Section I, and that is how one ought to measure a concept such as happiness, my dependent variable. As explained previously, I will be using subjective well-being as captured by the GSS, specifically using the variable HAPPY. Because I wish to discover the impact of education on happiness, education is the most obvious explanatory variable to include. As noted in Section II, I am using years of schooling as a proxy for educational attainment. However, because I am looking not at years of schooling on their own, but specifically at the marginal impact of graduate education on happiness, I need to cluster levels of educational attainment together.

[13] Technically, calculating the marginal effect on probability should be done using the partial derivative of the probability of choosing each response with respect to the particular independent variable being considered. Because this is simply extra work, I will be sticking with the marginal effect on the odds.

The clusters I have chosen are less than a high school diploma, a high school diploma, some college, a bachelor's degree, and some graduate/a graduate degree. (The combination of some graduate-level schooling and receiving a graduate degree is based on the small number of respondents in the GSS who have done either of the two, and because the amount of time it takes to earn a graduate degree is far more flexible than the amount of time it takes to earn, say, a high school diploma.) Because my hypothesis is that graduate education increases happiness, I expect a positive coefficient for my graduate-level education variable.

The theory dictates which other explanatory variables to include. One important variable is income level. Two people may have the same educational attainment, but have drastically different incomes. (Consider, for example, a college graduate who goes on to work with an NGO vs. a college graduate who becomes an executive in a Fortune 500 company.) This difference in income can also have a large influence on one's capability. Someone with an income in the top 10% is able to achieve many more of both agency and well-being goals than is someone with an income half that size. However, because one of the returns to education cited above is an increase in income, we need to separate out the impact of income on happiness and the impact of education on happiness. That is, without adding in a measure for income, the coefficient on our educational attainment variable may be picking up the effect of an income increase instead of just an increase in education.

To measure income, I have chosen the GSS variable CONINC, which is a measure of the respondent's family income in constant 2000 US dollars. I have chosen this variable for both theoretical and practical purposes. Theoretically, one has access to one's family income, which can increase capability. After all, most college students still receive some sort of financial assistance from their parents, even when they are not employed, and stay-at-home parents may use their spouse's income, which certainly has an impact on their capability. On a more practical level, this variable

included the largest number of observations of the various income measures offered by the GSS. I expect a positive coefficient for this variable as well.

Employment is another important variable to consider. Someone who is unemployed has a much smaller capability than someone who is employed because their freedom to achieve certain functionings (being stress-free, going on vacation, etc) is much smaller than that of someone who is employed. Again, we have seen that those with higher levels of educational attainment are more likely to be employed and to find employment after a period of unemployment. As with income, I need to make sure that the coefficient on education is measuring only education's impact on happiness, and is not picking up the effects of being unemployed. For this reason, I need to include a variable accounting for labor force status. To measure this variable, I am using the GSS variable WRKSTAT, which asks respondents what their labor force status in the previous week was. I expect to see a negative coefficient on unemployment.

Another explanatory variable is job security, which can have a major influence on capability. Someone whose job is secure has the freedom to achieve more well-being and agency goals, such as reforming the format of workplace meetings or taking a guilt-free vacation. However, someone whose job is not secure does not have the freedom to achieve these goals. So the happiness a person reports may be due to increased job security rather than to education However, without a measure for job security, education will pick up the effect of higher levels of job security. Unfortunately, the only GSS variable that could proxy for job security is REPLACEU, a measure of how easily the respondent believes his or her employer could replace him or her. This variable has only about 2500 observations, and they are all from the same year. As a result, the data set would be far too small if this variable were included and so we must simply beware that the coefficient for education could be attributable in part to higher levels of job security.

Another important caveat is that the quality of education is not being controlled for. It is not difficult to assume that a higher quality of education would result in a larger capability. While there is a clear difference in the quality of education received at an inner-city public high school and a private prep school, the GSS has no variable that could account for this variation. The respondent's geographical data is not publically available, and there is no specific question regarding the type of institution the respondent attended. So, again, we must be aware that part of the effect being attributed to educational attainment could be due to differences in quality of education; i.e., students receiving low-quality education are going to have a smaller increase in their capability, and are less likely to move on to higher levels of education.

It is important that we also control for the year the survey was taken. While SWB has been found to be reliable and relatively unaffected by the mood of the respondent, factors such as recessions can have an impact on happiness levels. As noted in Section III, Di Tella, MacCulloch, and Oswald, 2003, find that there is a sort of "fear effect" during economic downturns that decreases the happiness of everyone, even those who have been unaffected by the recession. In the terms of the capabilities approach, even those who have not been impacted will consider themselves less free to achieve their various agency and well-being goals, and so will experience a decrease in capability. For instance, during recessions, many people begin to fear becoming unemployed, and so no longer feel that they are free to enjoy, say, meals at fancy restaurants, which decreases their capability. Because there have been a number of recessions between 1972 and 2008, we need to control for the year in which the survey was taken.

The final set of explanatory variables is demographic variables. These include age, race, gender, marital status, the number of children, and health. Each of these factors can have a large influence on one's capability, and so a measure for each must be included to capture this influence and prevent bias in the results for education. As noted in Section III, the literature finds an uncertain

relationship between age and happiness. In America, there is a slight hill shape in SWB across the life-cycle, while Europe finds a slight U-shape. One reason for this, based on Sen's approach, is that there is a trade-off in available functionings as one gets older. For instance, working adults have relatively fewer opportunities for frequent socialization than do college students. This is a decrease in capability. However, college students do not have the functioning of being CEO of a Fortune 500 company available to them simply because of their lack of experience (lack of age), while someone 50 years old potentially could have that functioning available—an increase in capability. I suspect the differing results in America and Europe are due to the differing nature of the trade-offs on either side of the Atlantic. The relevant GSS variable is AGE. Because I am using a survey of Americans only, I anticipate a small, positive coefficient for AGE.

Race is a fairly obvious demographic variable to control for: thanks to the persistence of racism in the US, non-whites simply have smaller capabilities. The same is true with gender. In the 1970s, women were still largely unable to achieve the same sorts of goals as men (being CEO, working outside the home, etc.) and this still persists to some extent. Also, there are a number of fields that women without higher education simply have more difficulty getting into—for instance, how many female car mechanics does one normally run into? As a result, theoretically, education has a larger impact on women's capabilities than it does on men's, and a larger impact on non-whites' than on whites' capabilities. Thus, controlling for race and gender helps to eliminate this magnification effect. Unfortunately, due to the limited number of observations in the GSS, I cannot also control for whether or not someone is Hispanic, which could have an impact on capability and thus happiness. The GSS variables here are RACE and SEX, and I expect a change from non-white to white to have a positive coefficient. I am uncertain what sign to expect on a change from male to female, as either a positive or a negative coefficient would seem reasonable for varying reasons.

Marital status and the respondent's number of children also need to be controlled for. One of the important benefits of higher education is increased social skills and increased likelihood of marriage. Marriage is an event that greatly influences happiness because it is the achievement of what, for many, is a significant well-being goal. Also, marriage opens up a host of other functionings, such as having a stable family, being a homemaker, taking family vacations, etc. Because married people are typically happier than non-married people (whether they have ever been married before or not), I need to control for whether or not the respondent is married. I use the GSS variable MARITAL to do so, and expect a change from marriage to any other marital status to have a negative coefficient.

Controlling for the number of children is also important. Having children would absolutely influence one's capability, though the direction of the impact that children have on capability is uncertain. On the one hand, children increase capability by adding such functionings as being a grandparent, having something to brag about, etc. This would increase happiness. On the other hand, it also decreases available functionings because some events, such as travel, become more difficult—and sometimes impossible—once children enter the picture. As with age, this decrease in functionings—theoretically—may or may not outweigh the increase, but in reality, unlike with age, it is likely to be the dominant effect across the board. We need to control for children, then, so that the coefficient on education does not accidentally pick up this effect and produce skewed results. I will be measuring the number of children using the GSS variable CHILDS, and expect a negative sign on the coefficient.

Finally, it is important to control for the individual's health. It should be no surprise that a healthy individual has a larger capability than someone who is suffering from, say, emphysema. The GSS variable I use to measure health is HEALTH. Because of the way this variable is coded, an increase in health is actually represented by a decrease in the value of HEALTH (1 = excellent

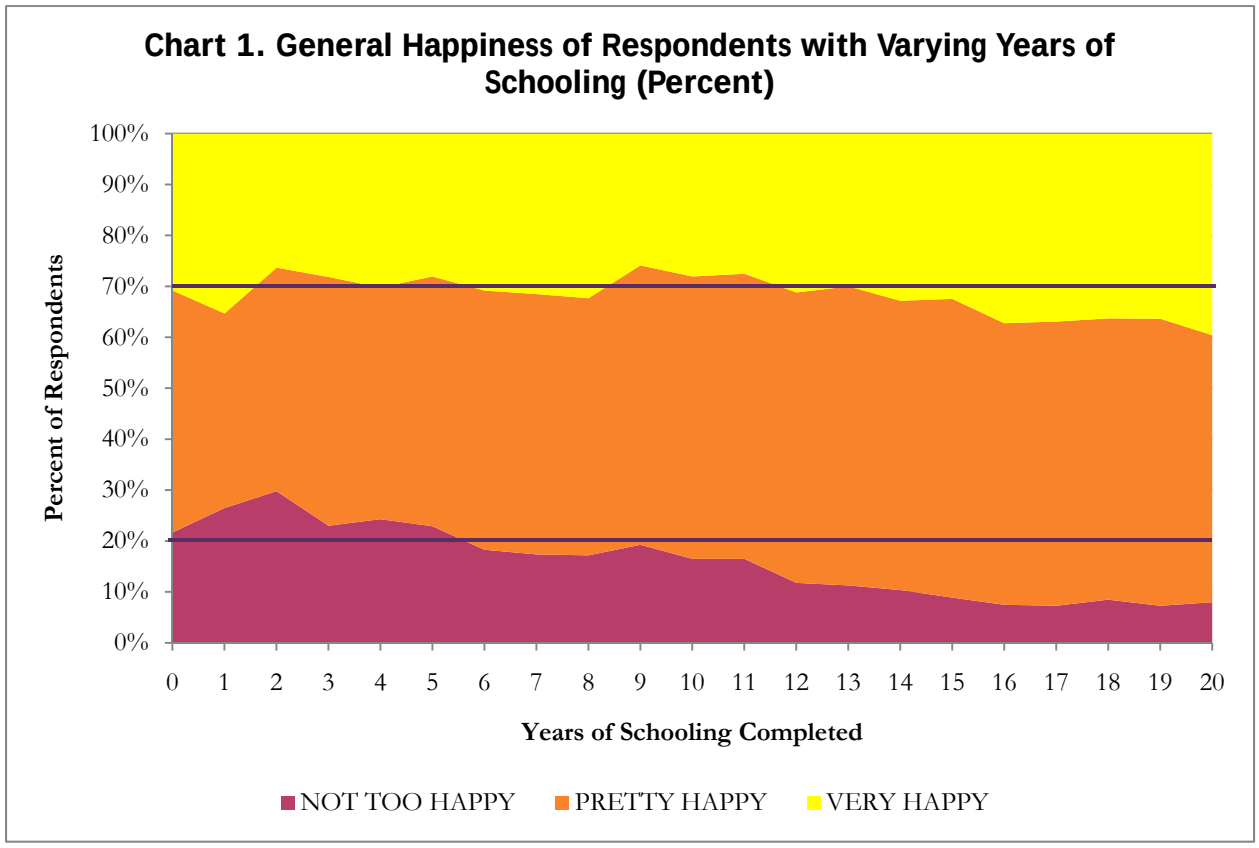
health, 4 = poor health), so we would expect a negative coefficient. Because most of the GSS variables are categorical with more than one category, I have recoded them (with the exception of HEALTH) so that they are either more specific or will result in a more intuitive understanding of the coefficients. Table 2 below indicates which variables have been recoded and regrouped, and Appendix A offers a more in-depth explanation of the various GSS variables, such as the literal question the respondent was answering in the survey.

Table 2. Recoding of GSS Variables			
Original GSS Variable	Recoded As…	Defined As…	What It Measures
HAPPY	HAPPYR	3 = "very happy" 2 = "pretty happy" 1 = "not too happy"	Respondent's self-reported level of happiness.
EDUC	HIGH DIPLOMA COLLEGE BCHLR GRAD	0-11 years of schooling 12 years of schooling 13-15 years of schooling 16 years of schooling 17-20 years of schooling	Highest level of schooling respondent has completed and received credit for completing.
CONINC	--	Inflation-adjusted family income	Midpoint of income bracket respondent placed self in, converted to constant 2000 US dollars
MARITAL	MARRIED DIVORCE WIDOW NOTMAR	1 = Married, 0 = else 1 = Divorced or Separated, 0 = else 1 = Widowed, 0 = else 1 = Never been married, 0 = else	Respondent's self-reported marital status
CHILDS	--	Number of children	Respondent's self-reported number of children ever born alive.
AGE	--	Respondent's age	Respondent's age calculated from self-reported date of birth.
SEX	MALE	1 = Male, 0 = Female	Interviewer's perception of respondent's gender.
RACE	WHITE	1 = White, 0 = else	Interviewer's perception of respondent's race.
HEALTH	--	1 = Excellent 2 = Good 3 = Fair 4 = Poor	Respondent's self-reported condition of health.
WRKSTAT	EMPLY UNEMPLY NOWRK	1 = employed either full- or part-time, 0 = else 1 = currently seeking work, 0 = else 1 = student, retired, or keeping house, 0 = else	Respondent's self-reported level of labor force participation.

*Note that the coding for HEALTH indicates we would expect a negative sign on its coefficient. Also, a dummy variable for each year of the survey has been included. For surveys in the 1970s, the variable is named SVN# where # is the final digit of the year. The variable for surveys in the 1980s is EHT#, in the 1990s is NIN#, and in the 2000s is TWO#. (Example, 1973 = SVN3.)

VI. "Data! Data! Data! …I Can't Make Bricks Without Clay!"[14]

The first step in assessing the relationship between happiness and higher education is to look at the raw data. Without controlling for anything, is there an actual relationship between happiness and education, or is it simply a random chance that an educated person would be "pretty happy" or "not too happy"? Looking at Chart 1, we can see that there is absolutely a clear relationship between increasing education and increasing happiness. However, the size of this relationship is not clear simply by glancing at the chart. To determine the magnitude, I run my first regression. The results are given in Table 3. Here we can see that there is a positive relationship between educational attainment and SWB, and we can also see how large that relationship is. Increasing educational attainment by one year results in odds of reporting oneself "very happy" as compared to "pretty happy" or "not too happy" that are 1.058 times higher than if that extra year of schooling had not



[14] Conan Doyle, 1892, p. 289.

Table 3. Ordered Logit Regression: Happiness on Educational Attainment

Ordered logistic regression					Number of obs =	31295	
					LR chi2(4) =	291.21	
					Prob > chi2 =	0.000	
Log likelihood =	-29474.093				Pseudo-R2 =	0.0049	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
EDUC	0.0568	0.00354	16.05	0.000	0.0499	0.0638	1.058
/cut 1	-1.267	0.0471			-1.359	-1.174	
/cut 2	1.480	0.0471			1.388	1.573	

been completed. This result is statistically significant at a 99% confidence level. That is, there is less than a 1% chance that education does not actually influence one's level of reported happiness. This is good news for my hypothesis, but does not really address the question at hand.

What we are most interested in here is the marginal impact of graduate-level educational attainment on happiness over the impact of receiving a bachelor's degree. To test this, we begin again with the raw data, and regress HAPPYR on the different educational attainment clusters I constructed from the EDUC variable, leaving out BCHLR as the variable of comparison. These results are given in Table 4A, and are much less promising than those presented in Table 3. What they show is that having 17 years or more of higher education is not statistically significant in its impact on the marginal odds of reporting oneself as "very happy" versus having completed just 16

Table 4A. Ordered Logit Regression: Happiness on Educational Attainment (BCHLR not included)

Ordered logistic regression					Number of obs =	31295	
					LR chi2(4) =	291.21	
					Prob > chi2 =	0.000	
Log likelihood =	-29474.093				Pseudo-R2 =	0.0049	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.524	0.0392	-13.37	0.000	-0.601	-0.447	0.592
DIPLOMA	-0.285	0.0375	-7.61	0.000	-0.359	-0.212	0.752
COLLEGE	-0.246	0.0393	-6.27	0.000	-0.323	-0.169	0.782
GRAD	0.0738	0.0478	1.54	0.123	-0.0199	0.168	1.077
/cut 1	-2.256	0.0352			-2.325	-2.187	
/cut 2	0.493	0.0321			0.430	0.556	

years of education. I am only 87.7% confident in saying that the odds of being "very happy" after completing graduate-level education are 1.077 times higher than the odds of being "very happy" after completing undergraduate-level education. This result appears to call for the rejection of my hypothesis. However, I have not yet controlled for demographics, labor force status, health, or income. Until we know how these variables all interact, we cannot reject anything.

Including the dummy variables for the year gives us virtually the same results as not including the years, except that now, at a 90% confidence level, the coefficient on GRAD becomes statistically significant—see Table 4B. (For all tables of results that include year variable coefficients, please see Appendix B. I have not included them here to conserve space.) Six of the twenty-two years included in the regression had statistically significant coefficients at the 95% confidence level compared to 2000. I chose 2000 for two main reasons. First, income is in constant 2000 dollars, and it made sense to stay consistent for the year of comparison. Second, 2000 was a year of change: a new centruy *and* a new millenium, new technologies, the beginning of the end of the dot-com bubble, a new president, etc. The statistically significant years were 1973 (positive impact), 1974 (positive impact), 1976 (positive), 1977 (positive), 1988 (positive), and 1994 (negative impact). No other years were statistically significant.

Table 4B. Ordered Logit Regression: Happiness on Educational Attainment (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(26) =	389.93	
					Prob > chi2 =	0.000	
Log likelihood =	-29424.731				Pseudo-R2 =	0.0066	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.559	0.0398	-14.05	0.000	-0.637	-0.481	0.572
DIPLOMA	-0.303	0.0377	-8.03	0.000	-0.377	-0.229	0.739
COLLEGE	-0.245	0.0393	-6.24	0.000	-0.323	-0.168	0.782
GRAD	0.0799	0.0479	1.67	0.095	-0.0140	0.174	1.083
/cut 1	-2.267	0.0545			-2.374	-2.160	
/cut 2	0.488	0.0526			0.385	0.591	

Table 5A. Ordered Logit Regression: Happiness on Educational Attainment With Demographics (BCHLR not included)

Ordered logistic regression					Number of obs =	31295	
					LR chi2(11) =	2317.57	
					Prob > chi2 =	0.0000	
Log likelihood =	-28460.912				Pseudo-R2 =	0.0391	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.501	0.0410	-12.21	0.000	-0.581	-0.4205	0.606
DIPLOMA	-0.303	0.0383	-7.92	0.000	-0.378	-0.228	0.739
COLLEGE	-0.155	0.03998	-3.88	0.000	-0.234	-0.0769	0.856
GRAD	0.0643	0.0487	1.32	0.186	-0.0311	0.1597	1.066
WIDOW	-1.0164	0.0458	-22.18	0.000	-1.106	-0.927	0.362
DIVORCE	-1.0888	0.0336	-32.40	0.000	-1.155	-1.0229	0.337
NOTMAR	-0.716	0.0341	-21.01	0.000	-0.783	-0.649	0.489
CHILDS	-0.0189	0.00726	-2.60	0.009	-0.0331	-0.00462	0.981
AGE	0.00809	0.000807	10.04	0.000	0.00651	0.00968	1.008
MALE	-0.162	0.0230	-7.07	0.000	-0.207	-0.117	0.850
WHITE	0.0413	0.0308	13.04	0.000	0.341	0.462	1.042
/cut 1	-2.147	0.0582			-2.262	-2.033	
/cut 2	0.752	0.0567			0.641	0.863	

Tables 5A and 5B show the results of controlling for demographics: marital status, number of children, age, sex, and race. As expected, all demographic variables are significant at a 99% confidence level. However, we see that graduate education is *not* statistically significant at any generally accepted confidence level. That is, there is a 19.5% chance that the actual coefficient is zero, meaning that the odds of being "very happy" are the same whether one has completed 16 years or 17 or more years of formal schooling. With such a large margin of uncertainty, I cannot reject the possibility that this is the actual case. When I add in the demographic variables, the years with statistically significant coefficients change. Now there are only four years that are significant at a 95% confidence level: 1972 (negative), 1975 (negative), 1985 (negative), and 1994 (negative). Interestingly, only 1994 is statistically significant with and without the demographic variables, and adding in the variables turns almost all the coefficients negative. Only 1988 and 1990 have a positive coefficient, but neither of them are statistically significant.

Table 5B. Ordered Logit Regression: Happiness on Educational Attainment With Demographics (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(33) =	2376.07	
					Prob > chi2 =	0.0000	
Log likelihood =	-28431.661				Pseudo-R2 =	0.0401	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.494	0.0417	-11.85	0.000	-0.575	-0.412	0.610
DIPLOMA	-0.300	0.0384	-7.81	0.000	-0.375	-0.225	0.741
COLLEGE	-0.154	0.0400	-3.85	0.000	-0.232	-0.0756	0.857
GRAD	0.063	0.0487	1.29	0.195	-0.0324	0.159	1.065
WIDOW	-1.022	0.0459	-22.27	0.000	-1.112	-0.932	0.360
DIVORCE	-1.096	0.0340	-32.27	0.000	-1.163	-1.0297	0.334
NOTMAR	-0.724	0.0344	-21.07	0.000	-0.792	-0.657	0.485
CHILDS	-0.019	0.00727	-2.59	0.010	-0.0331	-0.00455	0.981
AGE	0.008	0.000813	9.91	0.000	0.00646	0.00965	1.008
MALE	-0.160	0.0230	-6.96	0.000	-0.205	-0.115	0.852
WHITE	0.402	0.0312	12.89	0.000	0.341	0.463	1.495
/cut 1	-2.243	0.0728			-2.386	-2.1006	
/cut 2	0.660	0.0715			0.5199	0.8001	

Continuing on, I now control for labor force status: is the respondent unemployed? The dummy variable UNEMPLY has been added into the regression. (When NOWRK was the variable of comparison, EMPLY was not statistically significant, so I have not included it in these runs.) The results, displayed in Tables 6A and 6B, do not bode well for my hypothesis. Without controlling for year, there is a 21.8% chance that graduate-level education is no different from receiving a bachelor's degree in terms of its imapct on happiness. Once I control for year, I find that this chance increases to 22.7%. No other variable has a major change in terms of its significance or the magnitude of its coefficient. So, when I control for labor force participation and demographics, having more than 16 years of education does not seem to make a difference in SWB levels, though all other educational attainment level coefficients are still statistically significant. The year variables of significance at a 95% confidence level are 1972 (negative), 1985 (negative), and 1994 (negative). The following years have positive, though not statistically significant, coefficients: 1974, 1984, 1988, and 1990.

Table 6A. Ordered Logit Regression: Happiness on Educational Attainment With Demographics and Labor Force Status (BCHLR not included)

Ordered logistic regression					Number of obs =	31295	
					LR chi2(12) =	2453.99	
					Prob > chi2 =	0.000	
Log likelihood =	-28392.701				Pseudo-R2 =	0.0414	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.477	0.0411	-11.60	0.000	-0.572	-0.396	0.621
DIPLOMA	-0.288	0.0383	-7.51	0.000	-0.363	-0.213	0.750
COLLEGE	-0.151	0.0400	-3.77	0.000	-0.229	-0.0726	0.860
GRAD	0.06004	0.0487	1.23	0.218	-0.0354	0.155	1.062
WIDOW	-1.0128	0.0459	-22.08	0.000	-1.103	-0.923	0.363
DIVORCE	-1.0719	0.0337	-31.85	0.000	-1.138	-1.00599	0.342
NOTMAR	-0.691	0.0342	-20.22	0.000	-0.758	-0.624	0.501
CHILDS	-0.0192	0.00727	-2.64	0.008	-0.0334	-0.00492	0.981
AGE	0.00755	0.000808	9.34	0.000	0.00597	0.00914	1.008
MALE	-0.142	0.0230	-6.18	0.000	-0.188	-0.0973	0.867
WHITE	0.0395	0.0308	12.83	0.000	0.335	0.455	1.040
UNEMPLY	-0.793	0.0677	-11.71	0.000	-0.926	-0.660	0.453
/cut 1	-2.180	0.0584			-2.295	-2.0660	
/cut 2	0.731	0.0568			0.620	0.842	

Table 6B. Ordered Logit Regression: Happiness on Educational Attainment With Demographics and Labor Force Status (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(34) =	2511.25	
					Prob > chi2 =	0.0000	
Log likelihood =	-28364.073				Pseudo-R2 =	0.0424	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.470	0.0417	-11.28	0.000	-0.552	-0.389	0.625
DIPLOMA	-0.285	0.0385	-7.41	0.000	-0.361	-0.210	0.752
COLLEGE	-0.150	0.0400	-3.74	0.000	-0.228	-0.0714	0.861
GRAD	0.0589	0.0488	1.21	0.227	-0.0366	0.154	1.061
WIDOW	-1.0187	0.0460	-22.17	0.000	-1.109	-0.929	0.361
DIVORCE	-1.0790	0.0340	-31.72	0.000	-1.146	-1.0123	0.340
NOTMAR	-0.698	0.0344	-20.27	0.000	-0.766	-0.631	0.497
CHILDS	-0.0191	0.00728	-2.62	0.009	-0.0333	-0.00482	0.981
AGE	0.00752	0.000815	9.23	0.000	0.00593	0.00912	1.008
MALE	-0.140	0.0231	-6.08	0.000	-0.185	-0.0950	0.869
WHITE	0.396	0.0312	12.68	0.000	0.334	0.457	1.485
UNEMPLY	-0.790	0.0678	-11.66	0.000	-0.923	-0.657	0.454
/cut 1	-2.180	0.0584			-2.295	-2.0660	
/cut 2	0.731	0.0568			0.620	0.842	

Table 7A. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, and Health (BCHLR not included)

Ordered logistic regression					Number of obs =	31295	
					LR chi2(13) =	4335.78	
					Prob > chi2 =	0.0000	
Log likelihood =	-27451.809				Pseudo-R2 =	0.0732	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.146	0.0423	-3.46	0.001	-0.229	-0.0635	0.864
DIPLOMA	-0.131	0.0390	-3.37	0.001	-0.208	-0.0550	0.877
COLLEGE	-0.0479	0.0406	-1.18	0.238	-0.127	0.0317	0.953
GRAD	0.0334	0.0494	0.68	0.499	-0.0634	0.130	1.034
WIDOW	-0.997	0.0462	-21.58	0.000	-1.087	-0.906	0.369
DIVORCE	-1.0346	0.0339	-30.56	0.000	-1.101	-0.968	0.355
NOTMAR	-0.651	0.0345	-18.86	0.000	-0.718	-0.583	0.522
CHILDS	-0.0153	0.00735	-2.08	0.037	-0.0297	-0.000909	0.985
AGE	0.0148	0.000837	17.65	0.000	0.0131	0.0164	1.015
MALE	-0.177	0.0233	-7.59	0.000	-0.223	-0.131	0.838
WHITE	0.319	0.0311	10.25	0.000	0.258	0.380	1.376
UNEMPLY	-0.741	0.0683	-10.85	0.000	-0.875	-0.608	0.476
HEALTH	-0.653	0.0153	-42.58	0.000	-0.683	-0.623	0.521
/cut 1	-3.136	0.0638			-3.261	-3.0110	
/cut 2	-0.0816	0.0604			-0.200	0.0367	

Adding in health makes a huge difference in the results I get. Tables 7A and 7B present this impact. Graduate education now has a 50:50 chance of having an actual coefficient equal to zero, and now having 13-15 years of schooling has a 23.8% chance of not being any different from having sixteen years of schooling. However, a college education still has a significant impact on happiness over having only a high school dimploma or less. Having children also loses statistical significance at the 99% confidence level, but remains significant at the 95% level. Controlling for the year does not produce any major changes, but the years that are statistically significant at the 95% confidence level are 1972 (negative), 1975 (negative), 1985 (negative), and 1994 (negative). This time, the only positive coefficient is for 1988, and there is 20.9% chance that this coefficient is actually zero.

Table 7B. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, and Health (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(35) =	4400.55	
					Prob > chi2 =	0.0000	
Log likelihood =	-27419.22				Pseudo-R2 =	0.0743	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.137	0.0429	-3.19	0.001	-0.221	-0.0527	0.872
DIPLOMA	-0.127	0.0391	-3.25	0.001	-0.204	-0.0503	0.881
COLLEGE	-0.0461	0.0406	-1.13	0.257	-0.126	0.0335	0.955
GRAD	0.0322	0.0494	0.65	0.514	-0.0647	0.129	1.033
WIDOW	-1.00207	0.0463	-21.66	0.000	-1.0928	-0.911	0.367
DIVORCE	-1.0426	0.0342	-30.46	0.000	-1.110	-0.975	0.353
NOTMAR	-0.660	0.0348	-18.96	0.000	-0.728	-0.592	0.517
CHILDS	-0.0151	0.00736	-2.06	0.040	-0.0296	-0.000715	0.985
AGE	0.0147	0.000843	17.45	0.000	0.0131	0.0164	1.015
MALE	-0.175	0.0234	-7.49	0.000	-0.221	-0.129	0.839
WHITE	0.318	0.0315	10.1	0.000	0.257	0.380	1.375
UNEMPLY	-0.741	0.0684	-10.83	0.000	-0.875	-0.607	0.477
HEALTH	-0.655	0.0153	-42.66	0.000	-0.685	-0.625	0.520
/cut 1	-3.241	0.0778			-3.393	-3.088	
/cut 2	-0.181	0.0748			-0.328	-0.0349	

The final blow to my hypothesis—the deathblow, as it were—comes when I add income to the mix. Although income has a very small coefficient, it is significant. See Table 8A. (The smallness of the coefficient results from income being measured in dollars, rather than hundreds or thousands of dollars. However, when we multiply the coefficient by 1000, we find that the marginal odds for CONINC are 1.004. That is, when income increases by $1000, the odds of being "very happy" are 1.004 times higher than they were before the income increase.) The coefficient for graduate-level education loses all semblence of any form of statistical significance at this point, and all other educational attainment levels also become statistically insignificant. There is now only a 22.5% chance that the actual coefficient on GRAD is *not* equal to zero, and the coefficient on COLLEGE has only a 21.9% chance that it is not equal to zero. For the first time, we also see HIGH and DIPLOMA lose their statistical significance, though DIPLOMA is significant at a 90% confidence

Table 8A. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, Health, and Income (BCHLR not included)

Ordered logistic regression — Number of obs = 31295
LR chi2(14) = 4418.89
Prob > chi2 = 0.0000
Log likelihood = -27410.251 — Pseudo-R2 = 0.0746

HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.0401	0.0439	-0.91	0.360	-0.126	0.0459	0.961
DIPLOMA	-0.0653	0.0397	-1.65	0.100	-0.143	0.0125	0.937
COLLEGE	-0.00613	0.0409	-0.15	0.881	-0.0863	0.0741	0.994
GRAD	0.00780	0.0496	0.16	0.875	-0.0893	0.105	1.008
WIDOW	-0.921	0.0469	-19.63	0.000	-1.0131	-0.829	0.398
DIVORCE	-0.969	0.0346	-28.03	0.000	-1.0373	-0.902	0.379
NOTMAR	-0.584	0.0353	-16.58	0.000	-0.654	-0.515	0.557
CHILDS	-0.0167	0.00736	-2.27	0.023	-0.0311	-0.00225	0.983
AGE	0.0147	0.000837	17.62	0.000	0.0131	0.0164	1.015
MALE	-0.195	0.0234	-8.31	0.000	-0.241	-0.149	0.823
WHITE	0.299	0.0312	9.56	0.000	0.237	0.360	1.348
UNEMPLY	-0.719	0.0684	-10.51	0.000	-0.853	-0.585	0.487
HEALTH	-0.636	0.0154	-41.23	0.000	-0.667	-0.606	0.529
CONINC	0.00000365	0.000000401	9.10	0.000	0.00000287	0.00000444	1.000
/cut 1	-2.893	0.0691			-3.028	-2.757	
/cut 2	0.167	0.0663			0.0366	0.296	

Table 8B. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, Health, and Income (BCHLR not included), Controlling for Year

Ordered logistic regression — Number of obs = 31295
LR chi2(36) = 4479.28
Prob > chi2 = 0.0000
Log likelihood = -27380.060 — Pseudo-R2 = 0.0756

HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.0378	0.0444	-0.85	0.394	-0.125	0.0491	0.963
DIPLOMA	-0.0645	0.0398	-1.62	0.105	-0.143	0.0135	0.937
COLLEGE	0.00791	0.0496	0.16	0.873	-0.0893	0.105	1.008
GRAD	0.00780	0.0496	0.16	0.875	-0.0893	0.105	1.008
WIDOW	-0.928	0.0470	-19.73	0.000	-1.0199	-0.836	0.395
DIVORCE	-0.976	0.0350	-27.84	0.000	-1.0442	-0.907	0.377
NOTMAR	-0.592	0.0356	-16.62	0.000	-0.662	-0.522	0.553
CHILDS	-0.0166	0.00737	-2.25	0.024	-0.0311	-0.00216	0.984
AGE	0.0148	0.000844	17.5	0.000	0.0131	0.0164	1.015
MALE	-0.192	0.0235	-8.19	0.000	-0.238	-0.146	0.825
WHITE	0.297	0.0316	9.38	0.000	0.235	0.359	1.346
UNEMPLY	-0.719	0.0685	-10.5	0.000	-0.854	-0.585	0.487
HEALTH	-0.638	0.0155	-41.31	0.000	-0.669	-0.608	0.528
CONINC	0.00000358	0.000000404	8.86	0.000	0.00000279	0.00000437	1.000
/cut 1	-2.986	0.0828			-3.149	-2.824	
/cut 2	0.0773	0.0804			-0.0802	0.235	

level. However, once we control for year (see Table 8B), we lose even that level of confidence. Controlling for year does not give any large changes in coefficient or significance. However, the years 1972, 1985, and 1994 have negative coefficients that are statistically significant at the 95% confidence level. There are no positive, statistically significant coefficients for the year variables. In fact, only 1974, 1984, and 1988 have positive coefficients at all.

What all this tells us is that while there is a positive relationship between education and happiness, when we control for the year of the survey, important demographic variables, labor force status, health, and income, there does not appear to be any actual relationship between educational attainment, as I have grouped the years of schooling, and the odds of rating oneself "very happy" instead of "not too happy" or "pretty happy."

VII. Whatever is Left, However Improbable, Must be the Truth

The logical question to ask at this point is, why did I get the results I got? Why did I find no statistically significant relationship between happiness and education? One reason could be that the variables I used were not the best proxy for the characteristics that I wished to measure, especially the EDUC variable. Another reason could be that my hypothesis, quite simply, was not correct. There are other possibilities, but these are the two that I will address here.

So what if my hypothesis is correct? What could explain results that fail to support it? One possibility is that the EDUC variable was not the correct variable to assess education's relationship to happiness. As explained in Appendix A, EDUC is one of two variables in the GSS that measures educational attainment. The second variable is DEGREE, which records the highest degree the respondent earned. Because this variable groups those with graduate education but no graduate degree earned into the "Bachelor's" category, I chose to create my own clusters based on the highest year of schooling completed. In this way, I aimed to keep those who had completed some graduate education separate from those who had received their Bachelor's degree and then left the educational system.

The problem with this approach is that the achievement of post-secondary degrees is much less strictly defined by the number of years of schooling completed. While virtually all high school graduates earn their diploma in twelve years, there are a number of college students who require at least five years to complete their bachelor's degree, and also many who do so in fewer than four years. In constructing my variables, I assumed that the number of respondents requiring more or less than four years to earn a bachelor's degree was negligble. It is possible, however, that this population is *not* negligble, and is responsible for the results showing a lack of significance in graduate-level education versus undergraduate-level education. Perhaps GRAD did not accurately distinguish between those with only a four-year degree and those with graduate-level educational

attainment. This would explain the lack of significance found in the coefficient for GRAD even before any controls were added into the regressions. It would not, however, explain why adding in controls for demographics, unemployment, health, and income would result in all levels of educational attainment being insignificant in explaining the likelihood of someone to rate his or her life as "very happy."

There are two different ways that my hypothesis could be incorrect. The first is that self-selection creates a bias in the data. It's also possible that education does not actually increase one's capability enough to influence one's perception of well-being. Each possibility seems plausible. Recall that the definition of capability is the set of all possible functionings one can achieve; that is, it is the set of everything a person can do or be in life. Obviously, as noted in Section IV above, education does increase the number of possible functionings one can achieve in their lifetime. However, education also leads to some decreases in possible functionings. We can think of these functionings as the opportunity costs to education—beginning one's career early, traveling the world with family and friends, etc. If these costs outweighed the returns to education—the increase in available functionings—then saying that education decreases one's capability could be justified. This does not mesh well with established economic theory, though: if the opportunity costs to continued education outweigh the benefits, then a rational person will not pursue a higher level of education.

However, this points out an interesting fact: there is some level of self-selection that goes into who does and does not achieve higher levels of education. For those to whom the costs outweigh the benefit, they would be happier by *not* going on to college or graduate school. For those to whom the benefits are the greater, happiness would be maximized by continuing their education. As a result, we would not see a correlation in the data between education and happiness, even though—for those who choose higher education—there is a relationship: they are happier after completing their education than they would have been had they not done so.

Also, it is important to remember that I am analyzing data going back to 1972, with respondents who often had been out of school for decades by the time they were surveyed. For many of these people—especially women and minorities—discrimination was an insurmountable barrier to completing education, even if they would have chosen to continue on, had there been no discrimination. This could explain the persistence of lower levels of educational attainment having statistically significant negative coefficients—once we reach college, discrimination has had its say, and so happiness as related to graduate versus undergraduate education will be smoothed through the self-selection process, though discrimination prevented self-selction from working properly when moving from high school into college.

It is also possible that, if it is the case that my hypothesis is not correct, then it is because the increase in capability due *only* from education is not enough to impact how one views his or her life as a whole. The literal question respondents are asked is "Overall, how would you say things are today? Would you say you're—very happy, pretty happy, or not too happy?" When evaluating such a question, the respondent is not likely considering how much better off they are because they are able to understand what the Easterlin paradox is. In fact, many times, these sorts of things can become every-day, so that we forget that we once did not have such a functioning available to us (another form of the aspirations treadmill). If, as Easterlin (1974, 1976, 2001, 2006) posits, we as humans construct our responses to questions of global SWB by considering how we would like our lives to be and looking at how well our lives actually stack up to these aspirations, then, indeed, such an increase in capability would be insignificant. Because education is so often a means to an end, rather than an end in and of itself, educational achievement may not factor into any sort of mental calculus of goals and their achievement or failure to be achieved.

VIII. The End of the Beginning

While the results I found were not the results I expected, they open the door to several new areas of exploration when we ask ourselves, what next? An obvious first step is to check the results of my analysis by using a different measure for education, specifically the GSS's DEGREE variable. While I wanted to keep those with even some graduate education separate from those with only undergraduate education, it is conceivable—as noted in Section VII—that I failed to do so in my groupings. It would be interesting to see if the same results hold when grouping "some attainment" of the various levels with the lower degree earned. That is, using DEGREE would be the equivalent of grouping COLLEGE and DIPLOMA, and non-degree earners of graduate-level educational attainment from GRAD with BCHLR. Also, DEGREE adds in those respondents who have received a two-year degree, such as an Associate'a degree, as a separate category. If the same results were found, it would be a much more powerful nail in my hypothesis' coffin.

Another area for research would be to follow Kahneman and Krueger's preference for measures of experienced, rather than remembered, subjective well-being, and assess whether or not those respondents with higher levels of education spent more or less time experiencing positive emotions than those with less education. If this were found to be the case, then it could be possible that education really does increase happiness on its own while we are experiencing our daily lives. The difference would simply be that, when reflecting upon our lives as a whole, the impact of education tends to get lost in the noise of our internal dialogue about what and who we believe we should be versus what and who we really are. This would also help to establish the difference between experienced and remembered utility, which Kahneman has studied in some depth.

If we find, however, that such experiments still do not support my hypothesis, then we need to find out why. One way would be to use longitudinal data to examine the extent of self-selection in educational attainment. Are those with higher levels of educational attainment happier before or

after they receive their degree? The GSS does not provide enough information to examine this question, but it could provide powerful insights into the interaction between happiness and education. We also need to consider what it is that people really value. Are economists' utility functions really capturing all that we care about—consumption and a vaguely-defined "leisure"? Why do we continue to support education so strongly? Obviously it brings along improvements to economic performance, but does it add any value to our individual lives? Why do we still see the correlation between education and SWB in the raw data? What is it that we are getting from education that makes us happier? These are also powerful questions and deserve consideration.

One final issue I would like to point out is the impact of HEALTH on the regression results. I believe this is an area that ought to be explored. Why was it that when a measure for (self-perceived) health condition was included, education became so insignificant in explaining (self-reported) happiness? Is there any reason that this should have happened? HEALTH had the largest z-score, in absolute value terms, of any other coefficient, indicating that it must be very important in explaining why people rate their happiness as they do. This relationship should be explored, as it has potential political implications regarding the current health care debates.

IX. So, What Did We Learn Today?

Education is clearly important in our society. Students are continually barraged with the message that today's economy requires them to earn at least a bachelor's degree to be competitive, and many feel at least a Master's is needed to keep their head above water. But the main motivation for such emphasis is the financial and material benefits that education brings. Oreopoulos and Salvanes (2009) presented a number of other returns to schooling, indicating that an emphasis on only the material benefits to education is too limited. My attempt has been to determine how education can influence one's happiness, proxied by subjective well-being.

To determine this, I began by defining what is meant by the term "happiness." While there is a long philosophical tradition aimed at defining what happiness is and how best to achieve it, the social sciences have focused more on the aspects of well-being that can be measured. Psychologists tend to prefer examining experienced well-being, while economists look at global evaluations of well-being as captured by surveys such as the GSS. As an economist, and because of available resources, I chose to follow the norm prescribed by previous economics research into happiness, using the GSS variable HAPPY as my main measurement of happiness.

To explain the impact of education on happiness, I turned to Amartya Sen's capabilities approach, arguing that education leads to an increase in one's ability to achieve life goals, as well as an increase in options for other achievements in life (being well-read, being financially stable, etc.). Because of this increase in capability, those with higher levels of education would be expected to consider themselves better off—or happier—than those with lower levels of educational attainment. Because it has been fairly well-established that the likelihood of being "very happy" increases with a college education over only a high school education, I wanted to look at the impact of graduate-level education on happiness when compared to undergraduate-level education.

Other life factors, of course, can impact one's happiness, and so these factors need to be controlled for when analyzing the relationship between happiness and education. The factors that I considered were demographics (age, race, gender, marital status, and number of children), labor force status (unemployed or either employed or not in the labor force), health, and income level. To analyze the data and establish the relationship between education and happiness, I used an ordered logit regression. In this particular type of probability model, the coefficient on each variable is the marginal effect that an increase in that variable will have on the log-odds[15] of choosing "pretty happy" or "very happy" over "not too happy," or of choosing "very happy" over "pretty happy" or "not too happy." (Based on the assumptions required of the ordered logit model, these two interpretations are the same.)

Conducting the analysis led to some unexpected results. Before even controlling for any of my other factors, I found that graduate-level education is statistically insignificant in affecting the odds of being "very happy." Adding in progressively more and more controls produced less and less statistical significance in this coefficient, completely counter to my expectations. One possible explanation for this is that my hypothesis was not correct: education does not increase one's capability by enough to affect a global evaluation of one's well-being. Another possibility is self-selection: people choose the level of education that will result in the most happiness for them. Bias in my measured variables could also give results that fail to support my hypothesis. For example, people who have not actually received graduate-level education may be counted in GRAD when they should be in BCHLR, and similarly, people who ought to be in COLLEGE were counted as part of BCHLR because of the increased flexibility in the time required to earn post-secondary degrees.

[15] Because the coefficient is the marginal impact on the log-odds, I also calculated exp(β) to determine the marginal odds for a more intuitive interpretation of each variable's coefficient.

Some logical next steps would be to reconduct the analysis using DEGREE as the explanatory variable of interest rather than EDUC, or to use some other measure of subjective well-being as the dependent variable. It would also be interesting to see what returns to education have the greatest impact on one's well-being, as my first regression using the raw data clearly shows that there is a powerful correlation between education and happiness before we include controls. Using longitudinal data to look more into possible self-selection biases regarding who decides to attend higher-level educational institutions could also provide useful information for new analyses on the impact of education on happiness.

Overall, the results I found indicated that, once we control for other factors that influence happiness, there is little association between educational attainment and how people report their well-being. This does not mean, of course, that education is "useless." There are numerous ways in which education benefits people, and we should continue to push for higher education in the United States and basic education in developing countries. We simply need more clarity on how all these different benefits interact with each other and with one's perception of his or her quality of living.

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Appendix A—Variables

There are eleven variables from the GSS cumulative dataset that I am using. They are HAPPY, EDUC, CONINC, MARITAL, CHILDS, AGE, SEX, RACE, HEALTH, WRKSTAT, and YEAR. This appendix is meant to give a clear idea of what the different variables are measuring, and what changes I have made in recoding. (Table 2 in the body of the text gives a concise explanation of the recodings, but here I go into more depth as to what the original variables actually measured.)

HAPPY: The literal question that respondents were asked to answer is "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?" The original coding for this variable is 1 = "very happy," 2 = "pretty happy," and 3 = "not too happy." Between 1972 and 2008, there have been 46,303 valid responses to this question. Approximately 33% of respondents have chosen "very happy," 56% have chosen "pretty happy," and 11% have chosen "not too happy." Because, with the current coding, an increase in happiness is represented by a decrease in the value of HAPPY, I have reversed the coding of "very happy" and "not too happy" to ensure signs on coefficients that match our intuition (i.e., a positive coefficient on education represents an increase in happiness when years of schooling increase, rather than a decrease in happiness when years of schooling increase).

EDUC: Respondents were asked the highest year of elementary or high school they had ever completed and received credit for. If they had completed 9-12 years of schooling, they were asked about receipt of either a GED or diploma. For those who received a GED or diploma, they were asked if they had completed one or more years of college for credit, not including business, technical, or vocational school. If they had, the next question was how many years and if they had received any degrees. If they had earned a college degree, the degree earned was recorded. The information for the highest degree earned was used to construct the variable DEGREE, while the

number of years completed was used to construct the variable EDUC, a continuous variable that ranges from 0 to 20 years of schooling.

I have chosen to use EDUC over DEGREE because my hypothesis is that even a year or two of graduate education, without a degree being earned, increases happiness. In the variable DEGREE, anyone with graduate education but no graduate degree would be placed in the category "Bachelor's," which would produced biased results. It is important to note, however, that my recoding of education introduces its own biases. Because I have placed all respondents having completing 16 years in the BCHLR category, I am not taking into account the fact that there are many people, especially today, who must complete more than four years of post-secondary education in order to earn their Bachelor's degree. These people are then added to the GRAD category. However, I am assuming that the number of respondents in the GRAD category who have actually only attended undergraduate institutions is negligible.

CONINC: This measure of income is a measure of the respondent's family income in constant 2000 US dollars. It has been constructed by aggregating seven different income variables from the GSS. The specific questions have asked respondents to choose the income bracket within which their family income falls. Because of inflation and changing standards of living, the brackets chosen have changed as well. For instance, in 1972, the lower bound of the uppermost bracket was $30,000, but between 1991-1996 was $75,000. Also, because the responses are in terms of income brackets, the actual values recorded are the midpoints of the bracket, adjusted to be in constant 2000 US dollars. As a result, the minimum value of CONINC is $441, and the maximum value is $180,386. Because of this, we must treat the coefficient on income with some caution.

MARITAL: For this variable, respondents were asked, "Are you currently—married, widowed, divorced, separated, or have you never been married?" The coding is 1 = "Married," 2 = "Widowed," 3 = "Divorced," 4 = "Separated," and 5 = "Never married." Only 14 respondents out

of 51,020 did not answer the question. I created four dummy variables out of the five categories. The dummy variable DIVORCE aggregates the responses for "divorced" and "separated" into one variable, as only about 2% of respondents reported being separated.

CHILDS: To construct this variable, respondents were asked, "How many children have you ever had? Please count all that were born alive at any time (including any you had from a previous marriage)." The number of children was then recorded. Eight or more children are recorded together and coded as "8." Only 172 out of the 51,020 respondents since 1972 have given an answer of "don't know" or have refused to answer the question. I have not recoded this variable.

AGE: The respondent's age was calculated by asking for year of birth in 1972-1975, and for date of birth from 1976 onward. This was then subtracted from the current year (or date) and recorded as data for AGE. Anyone 89 years of age and older has been recorded as "89." The minimum age is 18 years old. There are a total of 184 missing cases for this variable. I have not recoded any part of AGE.

SEX: Here, the variable is constructed based on the interviewer's perception of the respondent's sex. I have recoded this variable into the dummy variable MALE, which sets the code for "female" to 0 rather than 2, and leaves the code for "male" at 1.

RACE: Again, this variable is constructed based on the interviewer's perception of the respondent. However, the interviewer is prompted to question the respondent if his or her race is unclear. Because this variable has three options, "white," "black," and "other," I have combined the responses of "black" and "other" into the code 0, and left a response of "white" coded as 1. I have named this new dummy variable WHITE. Because of the small number of responses to "other," (only about 5% of respondents), it made sense to simply compare being a minority to being white, without distinction as to which minority group the respondent belonged.

HEALTH: Respondents were asked, "Would you say your own health, in general, is excellent, good, fair, or poor?" for this variable. The coding is 1 = "excellent," 2 = "good," 3 = "fair," and 4 = "poor." Although I could have recoded this variable for a more intuitive understanding of the meaning of an increase in the value of HEALTH as an increase in the respondent's perception of his or her own health, I have left it as is. As noted in the footnote for Table 2, this indicates that, based on the capabilities approach, we would expect a negative coefficient for this variable. There were 12,529 missing cases for this variable, as it was not asked in 1978, 1983, or 1986.

WRKSTAT: The literal wording for the question used to construct this variable is, "Last week were you working full time, part time, going to school, keeping house, or what?" The responses are coded as follows:

- 1 = "Working full-time"
- 2 = "Working part-time"
- 3 = "With a job, but not at work because of temporary illness, vacation, strike"
- 4 = "Unemployed, laid off, looking for work"
- 5 = "Retired"
- 6 = "In school"
- 7 = "Keeping house"
- 8 = "Other"

The interviewer is instructed to record the smallest code if the respondent gives more than one answer. That is, if a respondent replies that they are in school and working part-time, they would be coded as "2." I have used this data to construct three dummy variables: EMPLY, which codes 1, 2, or 3 as a 1 and 4-7 as a 0; UNEMPLY, which codes 4 as a 1 and all others replies as a 0; and

NOWRK, which codes 5-7 as 1 and all other responses as a 0. Because only about 2% of respondents fell in the "other" category, I have thrown these observations out of my sample. There are only eight respondents who did not answer the question.

For further questions about the variables, please contact me at jbtaubel@gmail.com, or visit the GSS website at <http://www.norc.org/GSS+Website/Browse+GSS+Variables/Mnemonic+Index/>.

Appendix B—Full Regression Tables

For space reasons, I did not include the regression results for each of the year variables in the body of the paper. Most of the coefficients were not statistically significant, and the average reader would not have much interest in those coefficients. However, for completeness I have added them to the tables of regression results from Section VI so that those who are interested may see what the coefficients actually were. I will not be reanalyzing the regression results here, because seeing the year coefficients does not make a difference to the interpretation of the coefficients of interest in the regression. If you are interested in the actual STATA log of the regressions, please email me at jbtaubel@gmail.com, and I will send you a PDF file (approximately 9 pages) that includes all the regressions in this paper.

Table A. Ordered Logit Regression: Happiness on Educational Attainment (BCHLR not included), Controlling for Year

Ordered logistic regression — Number of obs = 31295; LR chi2(26) = 389.93; Prob > chi2 = 0.000; Log likelihood = -29424.731; Pseudo-R2 = 0.0066

HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.559	0.0398	-14.05	0.000	-0.637	-0.481	0.572
DIPLOMA	-0.303	0.0377	-8.03	0.000	-0.377	-0.229	0.739
COLLEGE	-0.245	0.0393	-6.24	0.000	-0.323	-0.168	0.782
GRAD	0.0799	0.0479	1.67	0.095	-0.0140	0.174	1.083
SVN2	-0.0607	0.0686	-0.89	0.376	-0.195	0.0737	0.941
SVN3	0.181	0.0692	2.62	0.009	0.0456	0.317	1.199
SVN4	0.241	0.0696	3.47	0.001	0.105	0.378	1.273
SVN5	0.0717	0.0688	1.04	0.298	-0.0632	0.207	1.074
SVN6	0.139	0.0688	2.03	0.043	0.00449	0.274	1.149
SVN7	0.183	0.0688	2.66	0.008	0.0483	0.318	1.201
EHT0	0.0612	0.0697	0.88	0.379	-0.0753	0.198	1.063
EHT2	-0.0765	0.0656	-1.17	0.243	-0.205	0.0520	0.926
EHT4	0.106	0.0700	1.51	0.131	-0.0316	0.243	1.111
EHT5	-0.0801	0.0678	-1.18	0.238	-0.213	0.0528	0.923
EHT7	-0.0954	0.0655	-1.46	0.145	-0.224	0.0330	0.909
EHT8	0.158	0.0786	2.01	0.044	0.00409	0.312	1.171
EHT9	0.0466	0.0776	0.60	0.548	-0.105	0.199	1.048
EHT0	0.0959	0.0806	1.19	0.234	-0.0620	0.254	1.101
NIN1	-0.0352	0.0789	-0.45	0.655	-0.190	0.119	0.965
NIN3	-0.0512	0.0762	-0.67	0.502	-0.201	0.0982	0.950
NIN4	-0.163	0.0641	-2.54	0.011	-0.288	-0.0369	0.850
NIN6	-0.0927	0.0610	-1.52	0.128	-0.212	0.0268	0.911
NIN8	-0.0515	0.0590	-0.87	0.383	-0.167	0.0641	0.950
TWO2	-0.0708	0.0819	-0.86	0.387	-0.231	0.0897	0.932
TWO4	-0.00642	0.0831	-0.08	0.938	-0.169	0.156	0.994
TWO6	-0.103	0.0660	-1.56	0.118	-0.232	0.0262	0.902
/cut 1	-2.267415	0.054584			-2.374398	-2.160432	
/cut 2	0.4882834	0.0526313			0.3851279	0.5914388	

Table B. Ordered Logit Regression: Happiness on Educational Attainment With Demographics (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(33) =	2376.07	
					Prob > chi2 =	0.0000	
Log likelihood =	-28431.661				Pseudo-R2 =	0.0401	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.494	0.0417	-11.85	0.000	-0.575	-0.412	0.610
DIPLOMA	-0.300	0.0384	-7.81	0.000	-0.375	-0.225	0.741
COLLEGE	-0.154	0.0400	-3.85	0.000	-0.232	-0.0756	0.857
GRAD	0.063	0.0487	1.29	0.195	-0.0324	0.159	1.065
WIDOW	-1.022	0.0459	-22.27	0.000	-1.112	-0.932	0.360
DIVORCE	-1.096	0.0340	-32.27	0.000	-1.163	-1.0297	0.334
NOTMAR	-0.724	0.0344	-21.07	0.000	-0.792	-0.657	0.485
CHILDS	-0.019	0.00727	-2.59	0.010	-0.0331	-0.00455	0.981
AGE	0.008	0.000813	9.91	0.000	0.00646	0.00965	1.008
MALE	-0.160	0.0230	-6.96	0.000	-0.205	-0.115	0.852
WHITE	0.402	0.0312	12.89	0.000	0.341	0.463	1.495
SVN2	-0.317	0.0696	-4.55	0.000	-0.453	-0.180	0.728
SVN3	-0.0707	0.0701	-1.01	0.314	-0.208	0.0668	0.932
SVN4	-0.0130	0.0706	-0.18	0.854	-0.151	0.125	0.987
SVN5	-0.152	0.0699	-2.17	0.030	-0.289	-0.0150	0.859
SVN6	-0.0731	0.0698	-1.05	0.295	-0.210	0.0637	0.930
SVN7	-0.00757	0.0700	-0.11	0.914	-0.145	0.130	0.992
EHT0	-0.100	0.0707	-1.42	0.156	-0.239	0.0384	0.905
EHT2	-0.113	0.0663	-1.71	0.088	-0.243	0.0167	0.893
EHT4	-0.00449	0.0710	-0.06	0.950	-0.144	0.135	0.996
EHT5	-0.213	0.0687	-3.10	0.002	-0.348	-0.0786	0.808
EHT7	-0.0899	0.0663	-1.36	0.175	-0.220	0.0400	0.914
EHT8	0.105	0.0796	1.32	0.186	-0.0507	0.261	1.111
EHT9	-0.067	0.0786	-0.85	0.396	-0.221	0.0874	0.935
NIN0	0.00938	0.0816	0.11	0.908	-0.151	0.169	1.009
NIN1	-0.118	0.0800	-1.47	0.142	-0.274	0.0392	0.889
NIN3	-0.124	0.0773	-1.60	0.109	-0.275	0.0276	0.884
NIN4	-0.238	0.0648	-3.67	0.000	-0.365	-0.111	0.788
NIN6	-0.104	0.0617	-1.69	0.091	-0.225	0.0166	0.901
NIN8	-0.0733	0.0597	-1.23	0.219	-0.190	0.0436	0.929
TWO2	-0.0892	0.0828	-1.08	0.281	-0.251	0.0731	0.915
TWO4	-0.0528	0.0841	-0.63	0.530	-0.217	0.112	0.949
TWO6	-0.0968	0.0668	-1.45	0.147	-0.228	0.0341	0.908
/cut 1	-2.243	0.0728			-2.386	-2.1006	
/cut 2	0.660	0.0715			0.5199	0.8001	

Table C. Ordered Logit Regression: Happiness on Educational Attainment With Demographics and Labor Force Status (BCHLR not included), Controlling for Year

Ordered logistic regression					Number of obs =	31295	
					LR chi2(34) =	2511.25	
					Prob > chi2 =	0.0000	
Log likelihood =	-28364.073				Pseudo-R2 =	0.0424	
HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.470	0.0417	-11.28	0.000	-0.552	-0.389	0.625
DIPLOMA	-0.285	0.0385	-7.41	0.000	-0.361	-0.210	0.752
COLLEGE	-0.150	0.0400	-3.74	0.000	-0.228	-0.0714	0.861
GRAD	0.0589	0.0488	1.21	0.227	-0.0366	0.1545	1.061
WIDOW	-1.0187	0.0460	-22.17	0.000	-1.109	-0.929	0.361
DIVORCE	-1.0790	0.0340	-31.72	0.000	-1.146	-1.0123	0.340
NOTMAR	-0.698	0.0344	-20.27	0.000	-0.766	-0.631	0.497
CHILDS	-0.0191	0.00728	-2.62	0.009	-0.0333	-0.00482	0.981
AGE	0.00752	0.000815	9.23	0.000	0.00593	0.00912	1.008
MALE	-0.140	0.0231	-6.08	0.000	-0.185	-0.0950	0.869
WHITE	0.396	0.0312	12.68	0.000	0.334	0.457	1.485
UNEMPLY	-0.790	0.0678	-11.66	0.000	-0.923	-0.657	0.454
SVN2	-0.311	0.0697	-4.46	0.000	-0.447	-0.174	0.733
SVN3	-0.0690	0.0702	-0.98	0.325	-0.207	0.0685	0.933
SVN4	0.000556	0.0707	0.01	0.994	-0.138	0.139	1.001
SVN5	-0.135	0.0699	-1.94	0.053	-0.273	0.00161	0.873
SVN6	-0.0541	0.0698	-0.77	0.438	-0.191	0.0827	0.947
SVN7	-0.00330	0.0700	-0.05	0.962	-0.140	0.134	0.997
EHT0	-0.0941	0.0707	-1.33	0.184	-0.233	0.0446	0.910
EHT2	-0.0931	0.0664	-1.40	0.161	-0.223	0.0370	0.911
EHT4	0.00363	0.0710	0.05	0.959	-0.136	0.143	1.004
EHT5	-0.208	0.0688	-3.03	0.002	-0.343	-0.0735	0.812
EHT7	-0.0901	0.0664	-1.36	0.175	-0.220	0.0400	0.914
EHT8	0.110	0.0797	1.38	0.167	-0.0461	0.266	1.116
EHT9	-0.0705	0.0787	-0.90	0.370	-0.225	0.0837	0.932
NIN0	0.00893	0.0817	0.11	0.913	-0.151	0.169	1.009
NIN1	-0.112	0.0801	-1.40	0.162	-0.269	0.045	0.894
NIN3	-0.116	0.0773	-1.50	0.135	-0.267	0.036	0.891
NIN4	-0.228	0.0648	-3.52	0.000	-0.355	-0.101	0.796
NIN6	-0.0987	0.0618	-1.60	0.110	-0.220	0.0224	0.906
NIN8	-0.0713	0.0597	-1.19	0.232	-0.188	0.0457	0.931
TWO2	-0.0714	0.0828	-0.86	0.389	-0.234	0.0910	0.931
TWO4	-0.0343	0.0842	-0.41	0.683	-0.199	0.131	0.966
TWO6	-0.0850	0.0668	-1.27	0.203	-0.216	0.0460	0.918
/cut 1	-2.180	0.0584			-2.295	-2.0660	
/cut 2	0.731	0.0568			0.620	0.842	

Table D. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, and Health (BCHLR not included), Controlling for Year

Ordered logistic regression — Number of obs = 31295; LR chi2(35) = 4400.55; Prob > chi2 = 0.0000; Log likelihood = -27419.22; Pseudo-R2 = 0.0743

HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.137	0.0429	-3.19	0.001	-0.221	-0.0527	0.872
DIPLOMA	-0.127	0.0391	-3.25	0.001	-0.204	-0.0503	0.881
COLLEGE	-0.0461	0.0406	-1.13	0.257	-0.126	0.0335	0.955
GRAD	0.0322	0.0494	0.65	0.514	-0.0647	0.129	1.033
WIDOW	-1.00207	0.0463	-21.66	0.000	-1.0928	-0.911	0.367
DIVORCE	-1.0426	0.0342	-30.46	0.000	-1.110	-0.975	0.353
NOTMAR	-0.660	0.0348	-18.96	0.000	-0.728	-0.592	0.517
CHILDS	-0.0151	0.00736	-2.06	0.040	-0.0296	-0.000715	0.985
AGE	0.0147	0.000843	17.45	0.000	0.0131	0.0164	1.015
MALE	-0.175	0.0234	-7.49	0.000	-0.221	-0.129	0.839
WHITE	0.318	0.0315	10.1	0.000	0.257	0.380	1.375
UNEMPLY	-0.741	0.0684	-10.83	0.000	-0.875	-0.607	0.477
HEALTH	-0.655	0.0153	-42.66	0.000	-0.685	-0.625	0.520
SVN2	-0.344	0.0705	-4.87	0.000	-0.482	-0.205	0.709
SVN3	-0.0712	0.0710	-1.00	0.315	-0.210	0.068	0.931
SVN4	-0.00946	0.0715	-0.13	0.895	-0.150	0.131	0.991
SVN5	-0.152	0.0708	-2.14	0.032	-0.290	-0.013	0.859
SVN6	-0.0557	0.0706	-0.79	0.430	-0.194	0.083	0.946
SVN7	-0.0153	0.0709	-0.22	0.829	-0.154	0.124	0.985
EHT0	-0.0846	0.0716	-1.18	0.238	-0.225	0.0558	0.919
EHT2	-0.113	0.0670	-1.68	0.093	-0.244	0.0188	0.894
EHT4	-0.00231	0.0719	-0.03	0.974	-0.143	0.139	0.998
EHT5	-0.227	0.0695	-3.27	0.001	-0.363	-0.0910	0.797
EHT7	-0.136	0.0671	-2.03	0.043	-0.267	-0.00441	0.873
EHT8	0.102	0.0808	1.26	0.209	-0.0569	0.260	1.107
EHT9	-0.111	0.0798	-1.40	0.163	-0.268	0.0451	0.895
NIN0	-0.00872	0.0828	-0.11	0.916	-0.171	0.153	0.991
NIN1	-0.112	0.0810	-1.38	0.167	-0.271	0.0468	0.894
NIN3	-0.125	0.0781	-1.60	0.109	-0.278	0.028	0.883
NIN4	-0.249	0.0655	-3.80	0.000	-0.377	-0.121	0.780
NIN6	-0.111	0.0625	-1.77	0.076	-0.233	0.0116	0.895
NIN8	-0.0873	0.0604	-1.45	0.148	-0.206	0.0311	0.916
TWO2	-0.0608	0.0838	-0.73	0.468	-0.225	0.103	0.941
TWO4	-0.0262	0.0851	-0.31	0.758	-0.193	0.141	0.974
TWO6	-0.0648	0.0676	-0.96	0.337	-0.197	0.0676	0.937
/cut 1	-3.241	0.0778			-3.393	-3.088	
/cut 2	-0.181	0.0748			-0.328	-0.0349	

Table E. Ordered Logit Regression: Happiness on Educational Attainment With Demographics, Labor Force Status, Health, and Income (BCHLR not included), Controlling for Year

Ordered logistic regression — Number of obs = 31295; LR chi2(36) = 4479.28; Prob > chi2 = 0.0000; Log likelihood = -27380.060; Pseudo-R2 = 0.0756

HAPPYR	COEF.	STD. ERR.	z	P > |z|	[95% Confidence Interval]		Marginal Odds [exp(β)]
HIGH	-0.0378	0.0444	-0.85	0.394	-0.125	0.0491	0.963
DIPLOMA	-0.0645	0.0398	-1.62	0.105	-0.143	0.0135	0.937
COLLEGE	0.00791	0.0496	0.16	0.873	-0.0893	0.105	1.008
GRAD	0.00780	0.0496	0.16	0.875	-0.0893	0.105	1.008
WIDOW	-0.928	0.0470	-19.73	0.000	-1.0199	-0.836	0.395
DIVORCE	-0.976	0.0350	-27.84	0.000	-1.0442	-0.907	0.377
NOTMAR	-0.592	0.0356	-16.62	0.000	-0.662	-0.522	0.553
CHILDS	-0.0166	0.00737	-2.25	0.024	-0.0311	-0.00216	0.984
AGE	0.0148	0.000844	17.5	0.000	0.0131	0.0164	1.015
MALE	-0.192	0.0235	-8.19	0.000	-0.238	-0.146	0.825
WHITE	0.297	0.0316	9.38	0.000	0.235	0.359	1.346
UNEMPLY	-0.719	0.0685	-10.5	0.000	-0.854	-0.585	0.487
HEALTH	-0.638	0.0155	-41.31	0.000	-0.669	-0.608	0.528
CONINC	0.00000358	0.000000404	8.86	0.000	0.00000279	0.00000437	1.000
SVN2	-0.312	0.0707	-4.42	0.000	-0.451	-0.174	0.732
SVN3	-0.0496	0.0711	-0.70	0.485	-0.189	0.0897	0.952
SVN4	0.0139	0.0717	0.19	0.846	-0.127	0.154	1.014
SVN5	-0.124	0.0709	-1.75	0.081	-0.263	0.0152	0.884
SVN6	-0.0209	0.0708	-0.29	0.768	-0.160	0.118	0.979
SVN7	-0.00763	0.0710	-0.11	0.914	-0.147	0.131	0.992
EHT0	-0.0743	0.0717	-1.04	0.300	-0.215	0.0663	0.928
EHT2	-0.0864	0.0671	-1.29	0.198	-0.218	0.0452	0.917
EHT4	0.0234	0.0720	0.33	0.745	-0.118	0.165	1.024
EHT5	-0.207	0.0696	-2.98	0.003	-0.344	-0.0707	0.813
EHT7	-0.120	0.0672	-1.79	0.074	-0.252	0.0117	0.887
EHT8	0.118	0.0810	1.46	0.144	-0.0403	0.277	1.126
EHT9	-0.0978	0.0798	-1.22	0.221	-0.254	0.0587	0.907
NIN0	-0.00114	0.0829	-0.01	0.989	-0.164	0.161	0.999
NIN1	-0.0832	0.0811	-1.03	0.305	-0.242	0.0758	0.920
NIN3	-0.115	0.0782	-1.48	0.140	-0.269	0.0378	0.891
NIN4	-0.233	0.0656	-3.55	0.000	-0.362	-0.105	0.792
NIN6	-0.104	0.0626	-1.66	0.097	-0.227	0.0188	0.901
NIN8	-0.0806	0.0605	-1.33	0.183	-0.199	0.0380	0.923
TWO2	-0.0727	0.0839	-0.87	0.386	-0.237	0.0918	0.930
TWO4	-0.0318	0.0852	-0.37	0.709	-0.199	0.135	0.969
TWO6	-0.0581	0.0677	-0.86	0.390	-0.191	0.0745	0.944
/cut 1	-2.986	0.0828			-3.149	-2.824	
/cut 2	0.0773	0.0804			-0.0802	0.235	