AP Seminar- Summer Work Directions

1. Read each of the sources in the packet.
    a. "Have You Renounced Pleasure?" from The Book of Joy by His Holiness the Dalai Lama and Archbishop Desmond Tutu, with Douglas Abrams
    b. "On Virtue and Happiness," from Utilitarianism by John Stuart Mill
    c. "High income improves evaluation of life but not emotional well-being," from Proceedings of the National Academy of Sciences USA (PNAS)
    d. "Big Daddy's Last Dance" video
    e. "Genes, Economics, and Happiness" from Journal of Neuroscience, Psychology, and Economics
    f. "Sweat" by Zora Neale Hurston
    g. "The Happiness Project," from T: The New York Times Style Magazine by Andrew O'Hagan
2. Annotate each source as you read.
    a. Highlight key words and phrases
    b. Make notes in the margins
        i. Claims the author makes
        ii. Evidence he/she uses to support their claims
        iii. Make connections between another source
3. Complete a RAVEN worksheet (attached) for EACH source.
4. When all the sources are annotated, complete the writing assignment (attached).

All digital copies of the readings and worksheets will be added to the *AP Seminar Summer Work 25-26* Schoology Group.

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

RAVEN SUMMER READING

Directions: Annotate each of the materials in the packet. Then, complete the chart below. You may answer in bullets, however be sure to answer all parts of the questions for full credit.

Title:		
	Characteristics	**Evaluation**
Reputation	What do you know about the reputation of the author, the sources, and the publication? Is the sources reputation harmed at all due to any past actions (which would make it less reliable)? Is the author/source/publication in a position of authority?	
Ability to Observe	Is the author in a position that allows him/her access to reliable evidence? If the article is about an event, did the author actually observe the event?	
Vested Interest	Does the author have a personal stake in the topic or event? Would the author gain anything by lying? Would the author gain anything by telling the truth?	
Expertise	Does the author have specialized knowledge on the topic or event? Does the evidence come from a source that has expertise on the topic or event?	
Neutrality	Is the author neutral about the issue or is bias evident? Is the source of the evidence neutral or biased?	

Summer Reading Writing Assignment

Directions: Read the sources carefully, focusing on a theme or issue that connects them and the different perspective each represents. Then, write a logically organized, well-reasoned, and well-written argument that presents your own perspective on a theme or issue you identified. You must incorporate at least two of the sources provided and link the claims in your argument to supporting evidence. You may also use the other provided sources or draw upon your own knowledge. In your response, refer to the provided sources as Source A, B, C, etc., or by the author's name. Include your answer in the box below.

The directions are asking you to do the following:

- Read the following sources carefully, paying attention to their perspectives, implications, and limitations.
- Identifies a theme that runs across at least two of the works
- Create an original argument using a theme that runs in at least 2 arguments.
- **Synthesizes** evidence from two sources effectively for relevance and credibility of the evidence each presents
- Make sure the argument
    - Is fully developed and well organized
    - Integrates the evidence effectively (set-up)
    - Cites the evidence correctly
    - Is edited well

Have You Renounced Pleasure?

From *The Book of Joy: Lasting Happiness in a Changing World* by His Holiness the Dalai Lama and Archbishop Desmond Tutu, with Douglas Abrams

Most religions have a strong conviction that we cannot discover lasting happiness through our senses. So while temporary enjoyment can come through our senses, it is inevitably fleeting and not the source of enduring satisfaction. There is a Buddhist saying that trying to seek happiness through sensory gratification is like trying to quench your thirst by drinking saltwater. But what exactly is the relationship between joy and pleasure and between what the Dalai Lama has called happiness at the physical level and happiness at the mental level?

"Your Holiness, many believe that as a monk you have renounced pleasure or enjoyment."

"And sex," the Dalai Lama added, although that was not exactly where I was going.

"What?" the Archbishop said.

"Sex, sex," the Dalai Lama repeated.

"Did you just say that?" the Archbishop said incredulously.

"Oh, oh," the Dalai Lama said with a laugh, noticing the Arch-

© 2020 College Board

bishop's surprise, and then reached over to reassure him, which caused the Archbishop to erupt in a gleeful cackle.

"So aside from sex," I said, trying to bring us back, "have you renounced pleasure and enjoyment? I sat next to you at lunch, and it looked like you were really enjoying the wonderful food. What is the role for you of enjoying the pleasures of life?"

"I love food. Without food, my body can't survive. You also," he said, turning to the Archbishop, "can't just think *God, God, God.* I cannot just think about *compassion, compassion, compassion.* Compassion will not fill my stomach. But, you see, each meal we have to develop the ability to consume the meal without attachment."

"Huh?" the Archbishop asked, not quite following how the Dalai Lama was using the Buddhist term *attachment*, and perhaps also not quite following how anyone could not be attached to one's food.

"Not eating out of greed," the Dalai Lama explained. "Eating only for the survival of the body. One must think about the deeper value of nourishing the body."

At one of our meals the Dalai Lama had showed me his bowl of Tibetan rice and yogurt pudding and said, "This is typical Tibetan monk's food—I love this." He was eating with relish. There was something deeply relieving about knowing that holiness didn't require a rejection of the simple joys of life, like a good meal and especially pudding.

I felt pretty sure that he had gotten some significant amount of pleasure out of eating that dessert. He was clearly experiencing some joy through his senses. I wondered about the boundary between enjoyment and greed. Was it the second or third helping, and therefore a matter of portion size, or was it a matter of attitude

© 2020 College Board

toward each bite? Jinpa shared with me a well-known Tibetan Buddhist prayer that often is said before a meal: "Viewing this meal as a medicine, I shall enjoy it without greed or anger, not out of gluttony nor out of pride, not to fatten myself, but only to nourish my body." Perhaps the Dalai Lama was saying that eating to nourish the body did not require one to deny the enjoyment and satisfaction of the experience.

"So now to your question," the Dalai Lama said. "When we speak of experiencing happiness, we need to know that there are actually two different kinds. The first is the enjoyment of pleasure through our senses. Here, sex, the example I cited, is one such experience. But we can also experience happiness at the deeper level through our mind, such as through love, compassion, and generosity. What characterizes happiness at this deeper level is the sense of fulfillment that you experience. While the joy of the senses is brief, the joy at this deeper level is much longer lasting. It is true joy.

"A believer develops this deeper level of joy through faith in God, which brings inner strength, inner peace. For a nonbeliever or a nontheist like me, we must develop this deeper level of joy through training the mind. This kind of joy or happiness comes from within. Then the pleasures of the senses become less important.

"Over the last several years, I have discussed with scientists this distinction between the sensory level of pleasure and pain and the deeper level of mental happiness and suffering. Now if we look at today's materialistic life people seem mainly concerned with sensory experiences. So that's why their satisfaction is very limited and brief, since their experience of happiness is so dependent on external stimuli. For example, so long as the music is playing, they feel happy." He tilted his head to the side with a smile as if appreci-

© 2020 College Board

ating the music. "When something good is happening, they are happy. Good food, they are happy. When these things stop, then they feel bored, restless, and unhappy. Of course this is nothing new. Even in the time of the Buddha, people would fall into the trap of thinking that sensory experience would bring them happiness.

"So when joy arises at the level of your mind and not just your senses, you can maintain a deep sense of satisfaction for a much longer period of time—even for twenty-four hours.

"So I always say to people, you have to pay more attention to the mental level of joy and happiness. Not just physical pleasure, but satisfaction at the level of mind. This is true joyfulness. When you are joyful and happy at the mental level, physical pain doesn't matter very much. But if there is no joy or happiness at the mental level, too much worrying, too much fear, then even physical comforts and pleasure will not soothe your mental discomfort."

"Many of our readers," I said, "will understand what physical pleasure is, or the physical dimension of joy and happiness. They know how a good meal or a good song makes them feel. But what is this mental happiness or mental pleasure that you're talking about that lasts for twenty-four hours?"

"A genuine sense of love and affection," the Dalai Lama said.

"Do you wake up with this joy?" I asked. "Even before coffee?"

"If you develop a strong sense of concern for the well-being of all sentient beings and in particular all human beings, this will make you happy in the morning, even *before* coffee.

"This is the value of compassion, of having compassionate feelings for others. Even, you see, ten minutes or thirty minutes of meditating on compassion, on kindness for others, and you will see its effects all day. That's the way to maintain a calm and joyous mind.

© 2020 College Board

HAVE YOU RENOUNCED PLEASURE?

"Everyone has had the experience of being in a good mood and some trouble comes, and you feel okay. When your mood is really bad, even when your closest friend comes, you still feel unhappy."

"Did you feel that way when I came?" the Archbishop said, playfully.

"That is exactly why I came to the airport to receive you—so I could feel more unhappy . . . and make trouble for you!"

Science has a term for the unsatisfactory nature of pursuing pleasure alone: the *hedonic treadmill*, named for the Greek school of thought that believed pleasure to be the ultimate good. Throughout history, hedonism has had its advocates, back to the birth of written culture. In the Gilgamesh tale, Siduri, the female divinity of fermentation (in other words, alcohol), admonishes, "Fill your belly. Day and night make merry. Let days be full of joy. Dance and make music day and night . . . These things alone are the concern of men." Even in the deeply spiritual culture of ancient India, the source of much of the Dalai Lama's Tibetan tradition, there was a hedonistic school known as Charvaka. In many ways, hedonism is the default philosophy of most people and certainly has become the dominant view of consumer "shop till you drop" culture.

Yet scientists have found that the more we experience any pleasure, the more we become numb to its effects and take its pleasures for granted. The first bowl of ice cream is sublime, the second bowl tasty, and the third causes indigestion. It is like a drug that must be taken in ever-greater quantities to produce the same high. But there does seem to be one thing in the literature that powerfully and lastingly changes our sense of well-being. It is what the Dalai

© 2020 College Board

Lama and the Archbishop had been advocating throughout our first day: our relationships, and specifically, our expression of love and generosity to others in our life.

Richard Davidson, the neuroscientist with whom I had lunch in San Francisco, has drawn together the neuroimaging research into a unified theory of the happy brain. I was so fascinated by what he was saying that I could not pay attention to my spring rolls, and those spring rolls were really good, at least on the physical level.

There are four independent brain circuits that influence our lasting well-being, Davidson explained. The first is "our ability to maintain positive states." It makes sense that the ability to maintain positive states or positive emotions would directly impact one's ability to experience happiness. These two great spiritual leaders were saying that the fastest way to this state is to start with love and compassion.

The second circuit is responsible for "our ability to recover from negative states." What was most fascinating to me was that these circuits were totally independent. One could be good at maintaining positive states but easily fall into an abyss of a negative state from which one had a hard time recovering. That explained a lot in my life.

The third circuit, also independent but essential to the others, is "our ability to focus and avoid mind-wandering." This of course was the circuit that so much of meditation exists to develop. Whether it was focusing on one's breath, or a mantra, or the analytic meditation that the Dalai Lama did each morning, this ability to focus one's attention was fundamental.

The fourth and final circuit is "our ability to be generous." That was amazing to me: that we had an entire brain circuit, one of four, devoted to generosity. It is no wonder that our brains feel so good

© 2020 College Board

when we help others or are helped by others, or even witness others being helped, which Ekman had described as the elevation that is one dimension of joy. There was strong and compelling research that we come factory equipped for cooperation, compassion, and generosity.

John Bargh, one of the world's leading experts on the science of the unconscious, describes it as one of three innate (and often unconscious) goals: to survive, to reproduce, and to cooperate. In lab experiments where eighteen-month-old children were shown dolls facing each other, they were more cooperative than those who were shown dolls who were facing away from each other. This unconscious prime, which can be turned on or off, Bargh argues, is one interesting example that cooperation is a deep evolutionary drive that exists from our earliest development.

Perhaps more sobering, it has also hardwired us to cooperate with and be kind to those who look like our caregivers, who presumably kept us safe. We are more wary of others who look different: these are the unconscious roots of prejudice. Our empathy does not seem to extend to those who are outside our "group," which is perhaps why the Archbishop and the Dalai Lama are constantly reminding us that we are, in fact, one group—humanity. Nonetheless, the ability and desire to cooperate and to be generous to others is there in our neural circuits, and it can be harnessed personally, socially, and globally.

© 2020 College Board

On Virtue and Happiness
by John Stuart Mill

From *Utilitarianism*, 1863

The utilitarian doctrine is, that happiness is desirable, and the only thing desirable, as an end; all other things being only desirable as means to that end. What ought to be required of this doctrine,what conditions is it requisite that the doctrine should fulfill, to make good its claim to be believed?

The only proof capable of being given that an object is visible, is that people actually see it. The only proof that a sound is audible, is that people hear it; and so of the other sources of our experience. In like manner, I apprehend, the sole evidence it is possible to produce that anything is desirable, is that people do actually desire it. If the end which the utilitarian doctrine proposes to itself were not, in theory and in practice, acknowledged to be an end, nothing could ever convince any person that it was so. No reason can be given why the general happiness is desirable, except that each person, so far as he believes it to be attainable, desires his own happiness. This, however, being a fact, we have not only all the proof which the case admits of, but all which it is possible to require, that happiness is a good, that each person's happiness is a good to that person, and the general happiness, therefore, a good to the aggregate of all persons. Happiness has made out its title as one of the ends of conduct, and consequently one of the criteria of morality.

But it has not, by this alone, proved itself to be the sole criterion. To do that, it would seem, by the same rule, necessary to show, not only that people desire happiness, but that they never desire anything else. Now it is palpable that they do desire things which, in common language, are decidedly distinguished from happiness. They desire, for example, virtue, and the absence of vice, no less really than pleasure and the absence of pain. The desire of virtue is not as universal, but it is as authentic a fact, as the desire of happiness. And hence the opponents of the utilitarian standard deem that they have a right to infer that there are other ends of human action besides happiness, and that happiness is not the standard of approbation and disapprobation.

© 2020 College Board

But does the utilitarian doctrine deny that people desire virtue, or maintain that virtue is not a thing to be desired? The very reverse. It maintains not only that virtue is to be desired, but that it is to be desired disinterestedly, for itself. Whatever may be the opinion of utilitarian moralists as to the original conditions by which virtue is made virtue, however they may believe (as they do) that actions and dispositions are only virtuous because they promote another end than virtue, yet this being granted, and it having been decided, from considerations of this description, what is virtuous, they not only place virtue at the very head of the things which are good as means to the ultimate end, but they also recognize as a psychological fact the possibility of its being, to the individual, a good in itself, without looking to any end beyond it; and hold, that the mind is not in a right state, not in a state conformable to Utility, not in the state most conducive to the general happiness, unless it does love virtue in this manner—as a thing desirable in itself, even although, in the individual instance, it should not produce those other desirable consequences which it tends to produce, and on account of which it is held to be virtue.

This opinion is not, in the smallest degree, a departure from the Happiness principle. The ingredients of happiness are very various, and each of them is desirable in itself, and not merely when considered as swelling an aggregate. The principle of utility does not mean that any given pleasure, as music, for instance, or any given exemption from pain, as for example health, is to be looked upon as means to a collective something termed happiness, and to be desired on that account. They are desired and desirable in and for themselves; besides being means, they are a part of the end. Virtue, according to the utilitarian doctrine, is not naturally and originally part of the end, but it is capable of becoming so; and in those who love it disinterestedly it has become so, and is desired and cherished, not as a means to happiness, but as a part of their happiness.

To illustrate this farther, we may remember that virtue is not the only thing, originally a means, and which if it were not a means to anything else, would be and remain indifferent, but which by association with what it is a means to, comes to be desired for itself, and that too with the utmost intensity. What, for example, shall we say of the love of money? There is nothing originally more desirable about money than about any heap of glittering pebbles. Its worth is solely that of the things which it will buy; the desires for other things than itself, which it is a means of gratifying. Yet the love of money is not only one of the strongest moving forces of human life, but money is, in many cases, desired in and for itself; the desire to possess it is often stronger than the desire to use it, and goes on increasing when all the desires which point to ends beyond it, to be compassed by it, are falling off. It may, then, be said truly, that money is desired not for the sake of an end, but as part of the end.

© 2020 College Board

From being a means to happiness, it has come to be itself a principal ingredient of the individual's conception of happiness. The same may be said of the majority of the great objects of human life:power, for example, or fame; except that to each of these there is a certain amount of immediate pleasure annexed, which has at least the semblance of being naturally inherent in them—a thing which cannot be said of money. Still, however, the strongest natural attraction, both of power and of fame, is the immense aid they give to the attainment of our other wishes; and it is the strong association thus generated between them and all our objects of desire, which gives to the direct desire of them the intensity it often assumes, so as in some characters to surpass in strength all other desires. In these cases the means have become a part of the end, and a more important part of it than any of the things which they are means to. What was once desired as an instrument for the attainment of happiness, has come to be desired for its own sake.

In being desired for its own sake it is, however, desired as part of happiness. The person is made, or thinks he would be made, happy by its mere possession; and is made unhappy by failure to obtain it. The desire of it is not a different thing from the desire of happiness, any more than the love of music, or the desire of health. They are included in happiness. They are some of the elements of which the desire of happiness is made up. Happiness is not an abstract idea, but a concrete whole; and these are some of its parts. And the utilitarian standard sanctions and approves their being so. Life would be a poor thing, very ill provided with sources of happiness, if there were not this provision of nature, by which things originally indifferent, but conducive to, or otherwise associated with, the satisfaction of our primitive desires, become in themselves sources of pleasure more valuable than the primitive pleasures, both in permanency, in the space of human existence that they are capable of covering, and even in intensity.

Virtue, according to the utilitarian conception, is a good of this description. There was no original desire of it, or motive to it, save its conduciveness to pleasure, and especially to protection from pain. But through the association thus formed, it may be felt a good in itself, and desired as such with as great intensity as any other good; and with this difference between it and the love of money, of power, or of fame—that all of these may, and often do, render the individual noxious to the other members of the society to which he belongs, whereas there is nothing which makes him so much a blessing to them as the cultivation of the disinterested love of virtue. And consequently, the utilitarian standard, while it tolerates and approves those other acquired desires, up to the point beyond which they would be more injurious to the general happiness than promotive of it, enjoins and requires the cultivation of the love of virtue up to the greatest strength possible, as being above all things important to the general happiness.

© 2020 College Board

It results from the preceding considerations, that there is in reality nothing desired except happiness. Whatever is desired otherwise than as a means to some end beyond itself, and ultimately to happiness, is desired as itself a part of happiness, and is not desired for itself until it has become so. Those who desire virtue for its own sake, desire it either because the consciousness of it is a pleasure, or because the consciousness of being without it is a pain, or for both reasons united; as in truth the pleasure and pain seldom exist separately, but almost always together—the same person feeling pleasure in the degree of virtue attained, and pain in not having attained more. If one of these gave him no pleasure, and the other no pain, he would not love or desire virtue, or would desire it only for the other benefits which it might produce to himself or to persons whom he cared for.

We have now, then, an answer to the question, of what sort of proof the principle of utility is susceptible. If the opinion which I have now stated is psychologically true—if human nature is so constituted as to desire nothing which is not either a part of happiness or a means of happiness, we can have no other proof, and we require no other, that these are the only things desirable. If so, happiness is the sole end of human action, and the promotion of it the test by which to judge of all human conduct; from whence it necessarily follows that it must be the criterion of morality, since a part is included in the whole.

© 2020 College Board

PNAS PNAS PNAS

High income improves evaluation of life but not emotional well-being

Daniel Kahneman[1] and Angus Deaton

Center for Health and Well-being, Princeton University, Princeton, NJ 08544

Contributed by Daniel Kahneman, August 4, 2010 (sent for review July 4, 2010)

Recent research has begun to distinguish two aspects of subjective well-being. Emotional well-being refers to the emotional quality of an individual's everyday experience—the frequency and intensity of experiences of joy, stress, sadness, anger, and affection that make one's life pleasant or unpleasant. Life evaluation refers to the thoughts that people have about their life when they think about it. We raise the question of whether money buys happiness, separately for these two aspects of well-being. We report an analysis of more than 450,000 responses to the Gallup-Healthways Well-Being Index, a daily survey of 1,000 US residents conducted by the Gallup Organization. We find that emotional well-being (measured by questions about emotional experiences yesterday) and life evaluation (measured by Cantril's Self-Anchoring Scale) have different correlates. Income and education are more closely related to life evaluation, but health, care giving, loneliness, and smoking are relatively stronger predictors of daily emotions. When plotted against log income, life evaluation rises steadily. Emotional well-being also rises with log income, but there is no further progress beyond an annual income of ~$75,000. Low income exacerbates the emotional pain associated with such misfortunes as divorce, ill health, and being alone. We conclude that high income buys life satisfaction but not happiness, and that low income is associated both with low life evaluation and low emotional well-being.

life evaluation | emotional experience | household income | satiation | happiness

The question of whether "money buys happiness" comes up frequently in discussions of subjective well-being in both scholarly debates and casual conversation. The topic has been addressed in a vast and inconclusive research literature (for a selection of recent reviews, see refs. 1–4). No single article can settle this complex question definitively, but data recently collected by the Gallup Organization in the Gallup-Healthways Well-Being Index (GHWBI) provide a rich source of observations, as well as an unusually detailed measurement of well-being. We analyze the responses of more than 450,000 US residents surveyed in 2008 and 2009 to several questions about their subjective well-being. The results suggest a rather complex answer to our opening question.

A discussion of subjective well-being must recognize a distinction between two concepts that are often confounded (5–8). Emotional well-being (sometimes called hedonic well-being or experienced happiness) refers to the emotional quality of an individual's everyday experience—the frequency and intensity of experiences of joy, fascination, anxiety, sadness, anger, and affection that make one's life pleasant or unpleasant. Life evaluation refers to a person's thoughts about his or her life. Surveys of subjective well-being have traditionally emphasized life evaluation. The most commonly asked question in these surveys is the life satisfaction question: "How satisfied are you with your life as a whole these days?" The GHWBI survey is unusual in its attempt to distinguish and capture both aspects of subjective well-being. Emotional well-being is assessed by questions about the presence of various emotions in the experience of yesterday (e.g., enjoyment, happiness, anger, sadness, stress, worry). Life evaluation is measured using Cantril's Self-Anchoring Scale, which has the respondent rate his or her current life on a ladder scale in which 0 is "the worst possible life for you" and 10 is "the best possible life for you." We find that emotional well-being and life evaluation have different correlates in the circumstances of people's lives. In particular, we observe striking differences in the relationship of these aspects of well-being to income. (For related observations in the Gallup World Poll, see ref. 9.)

Confusion abounds in discussions of our question. For an example, consider the statement that "a lasting marriage. . .is estimated to be worth $100,000 a year" (10). This correct statement of a research finding is likely to be misunderstood, because many readers will interpret it by imagining the pleasure of a change of this magnitude in their income. The pleasure of a raise is likely to be transient, however, due to a phenomenon known as adaptation. Because of adaptation, the difference in well-being between two random individuals whose income differs by $100,000 is far less impressive than the joy and misery that these individuals would immediately experience were they to trade places. Because the observed effects of long-established income differences are much smaller than intuitively expected, they are sometimes described as inconsequential, but this too is misleading. When entered in multiple regression model to predict well-being along with other aspects of life circumstances (marital status, age, education), the effects of household income are almost invariably both statistically significant and quantitatively important. We report that household income matters for both emotional well-being and life evaluation, and that there are circumstances under which it matters for the latter when it does not matter for the former.

Some of the confusion regarding the effects of income on well-being can be traced to incorrect analysis. Psychologists and sociologists often plot measures of subjective well-being against income in dollars, but a strong argument can be made for the logarithm of income as the preferred scale. The logarithmic transformation represents a basic fact of perception known as Weber's Law, which applies generally to quantitative dimensions of perception and judgment (e.g., the intensity of sounds and lights). The rule is that the effective stimulus for the detection and evaluation of changes or differences in such dimensions is the *percentage* change, not its absolute amount. In the context of income, a $100 raise does not have the same significance for a financial services executive as for an individual earning the minimum wage, but a doubling of their respective incomes might have a similar impact on both. The logarithmic transformation reveals an important regularity of judgment that risks being masked when a dollar scale is used.

Plots of subjective well-being against income in dollars invariably yield a strongly concave function. Although concavity is entailed by the psychophysics of quantitative dimensions, it often has been cited as evidence that people derive little or no psychological benefit from income beyond some threshold. Although this conclusion has been widely accepted in discussions of the relationship between life evaluation and gross domestic product (GDP) across nations (11–14), it is false, at least for this

Author contributions: D.K. and A.D. designed research; performed research; analyzed data; and wrote the paper.

The authors declare no conflict of interest.

Freely available online through the PNAS open access option.

[1]To whom correspondence should be addressed. E-mail: kahneman@princeton.edu.

© 2020 College Board

aspect of subjective well-being. In accordance with Weber's Law, average national life evaluation is linear when appropriately plotted against log GDP (15); a doubling of income provides similar increments of life evaluation for countries rich and poor. As this example illustrates, the statement that "money does not buy happiness" may be inferred from a careless reading of a plot of life evaluation against raw income—an error avoided by using the logarithm of income. In the present study, we confirm the contribution of higher income to improving individuals' life evaluation, even among those who are already well off. However, we also find that the effects of income on the emotional dimension of well-being satiate fully at an annual income of ~$75,000, a result that is, of course, independent of whether dollars or log dollars are used as a measure of income.

The aims of our analysis of the GHWBI were to examine possible differences between the correlates of emotional well-being and of life evaluation, focusing in particular on the relationship between these measures and household income.

Results

Some observations were deleted to eliminate likely errors in the reports of income. The GHWBI asks individuals to report their monthly family income in 11 categories. The three lowest categories—0, <$60, and $60–$499—cannot be treated as serious estimates of household income. We deleted these three categories (a total of 14,425 observations out of 709,183), as well as those respondents for whom income is missing (172,677 observations). We then regressed log income on indicators for the congressional district in which the respondent lived, educational categories, sex, age, age squared, race categories, marital status categories, and height. Thus, we predict the log of each individual's income by the mean of log incomes in his or her congressional district, modified by personal characteristics. This regression explains 37% of the variance, with a root mean square error (RMSE) of 0.67852. To eliminate outliers and implausible income reports, we dropped observations in which the absolute value of the difference between log income and its prediction exceeded 2.5 times the RMSE. This trimming lost 14,510 observations out of 450,417, or 3.22%. In all, we lost 28.4% of the original sample. In comparison, the US Census Bureau imputed income for 27.5% of households in the 2008 wave of the American Community Survey (ACS). As a check that our exclusions do not systematically bias income estimates compared with Census Bureau procedures, we compared the mean of the logarithm of income in each congressional district from the GHWBI with the logarithm of median income from the ACS. If income is approximately lognormal, then these should be close. The correlation was 0.961, with the GHWBI estimates about 6% lower, possibly attributable to the fact that the GHWBI data cover both 2008 and 2009.

We defined positive affect by the average of three dichotomous items (reports of happiness, enjoyment, and frequent smiling and laughter) and what we refer to as "blue affect"—the average of worry and sadness. Reports of stress (also dichotomous) were analyzed separately (as was anger, for which the results were similar but not shown) and life evaluation was measured using the Cantril ladder. The correlations between the emotional well-being measures and the ladder values had the expected sign but were modest in size (all <0.31). Positive affect, blue affect, and stress also were weakly correlated (positive and blue affect correlated –0.38, and –0.28, and 0.52 with stress.) The results shown here are similar when the constituents of positive and blue affect are analyzed separately.

As in other studies of well-being, we found that most people were quite happy and satisfied with their lives. About 85% of respondents experienced much positive affect (the average of smiling, enjoyment, and happiness) each day. Blue affect (sadness and worry) was reported by 24%, and stress was reported by 39%. The average of the Cantril ladder score was 6.76. Compared with about 150 other countries for which we have corresponding data from the Gallup World Poll, these results indicate that the US population ranks high on the ladder (ninth after the Scandinavian countries, Canada, The Netherlands, Switzerland, and New Zealand), and also does well in terms of happiness (fifth), smiling (33rd), and enjoyment (10th), but much less well on worry (89th from best), sadness (69th from best), and anger (75th). Americans report very high levels of stress (fifth among 151 countries).

Table 1 presents regressions of the four well-being measures on a set of demographic variables, which provide context for interpreting these measures. All of the predictors are dichotomous. The first row of the table shows the regression coefficient for an indicator of high income, defined as reporting a monthly income of at least $4,000, which corresponds to the top 58% of the population. These coefficients cannot be compared across the row, because the outcomes have different scales. The entries in other rows are ratios normalized by the coefficient on the high-income indicator, thus representing the estimated effect relative to the effect of increasing income by approximately 4-fold. The sign of each ratio is positive if its regression coefficient has the same sign as the coefficient for income (positive for positive affect, negative for blue affect, etc.). A coefficient >1 indicates an effect larger

Table 1. Life evaluation, emotional well-being, income, and the income-normalized effects of other correlates

	Positive affect	Blue affect	Stress	Ladder
Regression coefficient				
High income	0.03	−0.06	−0.03	0.64
Ratio of coefficient to log income coefficient				
High income	1.00	1.00	1.00	1.00
Insured	0.40	0.92	1.19	0.59
Old	0.79	0.93	6.28	0.50
Graduate	0.03	0.01	−1.93	0.48
Religious	1.16	−0.02	1.21	0.35
Female	0.16	−0.60	−1.89	0.29
Married	0.66	0.45	0.66	0.32
Weekend	1.13	0.72	4.83	0.01
Children	0.08	−0.37	−2.47	−0.11
Caregiver	−0.49	−1.02	−2.99	−0.25
Obese	−0.38	−0.14	−0.42	−0.31
Divorced	−0.38	−0.27	−0.88	−0.32
Health condition	−1.36	−1.22	−3.15	−0.48
Headache	−4.45	−3.41	−9.82	−0.78
Alone	−7.13	−2.10	−3.73	−0.75
Smoker	−1.01	−0.84	−2.85	−0.70

All correlates are dichotomous. The first row reports the coefficient of an indicator for high income in regressions of the ladder, positive affect, blue affect, and stress on all correlates. Note that the four outcomes are on different scales. High income is the 58% of the sample whose monthly income is at least $4,000/mo. The subsequent rows give the regression coefficients on the other correlates divided by the regression coefficient on the high-income indicator, and thus show the estimated effect relative to the effect of increasing income by approximately 4-fold. Income has a beneficial effect on all outcomes, so the ratios in rows other than the first are positive when the correlate is associated with a good effect on the outcome and negative otherwise. "Insured" indicates that the respondent has health insurance. "Old" is age 60 y or above. "Graduate" indicates a college degree. "Religious" indicates that the respondent reports that religion is an important part of his or her daily life. "Weekend" indicates that the day reported on was a Saturday or a Sunday; this is the previous day for stress and for positive and blue affect, and the day of the interview for the ladder. "Children" is 1 if there are children living in the household, and "caregiver" is 1 if the respondent currently helps care for an elderly or disabled family member, relative, or friend. "Obese" is 1 if body mass index (based on self-reported height and weight) is ≥30. "Health condition" is 1 if the respondent reports ever having been diagnosed by a doctor or nurse with one or more of the following: high blood pressure, high cholesterol, diabetes, myocardial infarction, asthma, cancer, or other chronic condition. "Alone" is 1 if the respondent reports zero social time with friends or family yesterday, including telephone and e-mail contact.

© 2020 College Board

than that of the income dichotomy. Because higher incomes are always associated with better outcomes, positive ratios indicate that the predictor is associated with better outcomes, and negative ratios indicate the opposite.

With few exceptions, the various predictors have the same sign for all four well-being measures, but their relative sizes vary considerably. As might be expected, weekends are associated with improved affect, especially with reduced stress. Physical illness, headaches, spending a day alone, and caring for an adult all have relatively larger adverse effects on emotional well-being than on life evaluation. Headaches and being alone, like emotional well-being, are measured for yesterday, which may enhance their importance in the regressions. At the other extreme, being a college graduate is associated with high life evaluation but has only a small association with positive and blue affect and a (perhaps) counterintuitive relation with stress; all other factors being equal, college graduates report more stress than nongraduates. The Gallup World Poll found high levels of stress in high-GDP countries (16).

Religion has a substantial influence on improving positive affect and reducing reports of stress, but no effect on reducing sadness or worry. Females report slightly higher positive affect and life evaluation, but also more blue affect and much more stress. The presence of children at home is associated with significant increases in stress, sadness, and worry (6). As reported recently, older people enjoy greater emotional well-being, most notably a pronounced reduction in the experience of stress and anger (17). Smoking is an impressively strong predictor of low well-being—especially its emotional dimensions—even when income and education are controlled for. A propensity to smoke is in part genetically determined (18) and is a known indicator of a tense personality (19, 20).

Fig. 1 and Table 2 characterize the relationship between the dimensions of subjective well-being and household income. Fig. 1 presents averages over eight income groups for the three aspects of emotional well-being and for the Cantril ladder measure of life evaluation. Here blue affect and stress are converted to their complements, not blue and stress-free, so that higher values in the figure always refer to better psychological outcomes. Income is converted to an annual basis and plotted on a log scale. (The midpoints of each income range, used only in the figure, are imputed assuming that the underlying distribution of income is lognormal; the figure shows vertical lines for the top three interval limits.) Stress is the average of a yes/no response to the question: "Did you experience a lot of stress yesterday?" Thus, Fig. 1 shows the percentage of the population in each income group who did not report experiencing this emotion on the previous day. Not blue is 1 minus the average of the percentage reporting sadness and worry. The right-hand axis shows the average score on the ladder, with values ranging from 0 to 11.

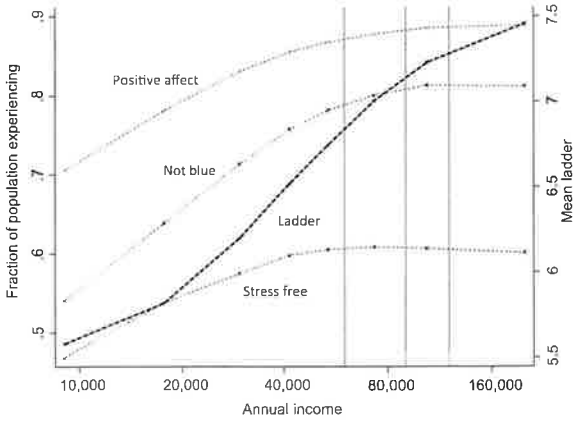


Fig. 1. Positive affect, blue affect, stress, and life evaluation in relation to household income. Positive affect is the average of the fractions of the population reporting happiness, smiling, and enjoyment. "Not blue" is 1 minus the average of the fractions of the population reporting worry and sadness. "Stress free" is the fraction of the population who did not report stress for the previous day. These three hedonic measures are marked on the left-hand scale. The ladder is the average reported number on a scale of 0–10, marked on the right-hand scale.

Table 2. Tests for income satiation of life evaluation and emotional well-being

	Positive affect	Blue affect	Stress	Ladder
Top vs. second	0.0035	0.0013	0.0055	0.2264
t value	(1.9)	(0.6)	(1.5)	(19.4)
Second vs. third	0.0082	−0.0131	0.0016	0.2268
t value	(4.4)	(5.7)	(0.4)	(19.7)
Observations				
Top group	72,744	73,104	73,109	73,068
Second group	40,136	40,291	40,301	40,283
Third group	88,887	89,278	89,290	89,245

The coefficients reported are the differences in mean outcomes between the two indicated income categories. The top category is >$10,000/mo, the second category is $7,500–$9,999/mo, and the third category $5,000–$7,499/mo. SEs are corrected for spatial clustering within zip codes.

Table 2 reports a formal test of satiation for the four measures, showing how the second-to-top income group (annual income $90,000–$120,000) differs from the group immediately below it ($60,000–$90,000) and from the group immediately above it (> $120,000). Positive affect, blue affect, and Cantril ladder score are all significantly improved in the first comparison with the exception of stress, which appears to satiate at a lower income level, roughly $60,000. In comparisons of the top two categories, only the ladder score shows a significant improvement with higher income. The small *t* values are remarkable in these very large samples. We conclude that lack of money brings both emotional misery and low life evaluation; similar results were found for anger. Beyond ~$75,000 in the contemporary United States, however, higher income is neither the road to experienced happiness nor the road to the relief of unhappiness or stress, although higher income continues to improve individuals' life evaluations.

Below $75,000, many factors become gradually worse, at least on average. For example, the emotional pain associated with ill health depends on income; for those reporting a monthly income of at least $3,000 (about two-thirds of households), the fractions reporting blue affect with and without headaches are 38% and 19%, respectively, a difference of 19 percentage points. The corresponding values for those with a monthly income of <$1,000 (about 10% of households) are 70% and 38%, a difference of 32%. Table 3 shows that the pain of some of life's misfortunes, including asthma, divorce, and being alone, is significantly exacerbated by poverty; even the benefits of the weekend are less for the poor. Similar results apply to stress and positive affect.

© 2020 College Board

Table 3. Poverty exacerbates the effect of adverse circumstances: Average percentage of people reporting a lot of sadness and worry yesterday, by income group and condition

	Income <$1,000/mo			Income ≥$3,000/mo		
	No	Yes	Difference	No	Yes	Difference
Weekend	46.6	44.5	−2.1	22.3	17.1	−5.2
Divorced	44.3	50.5	6.2	20.5	24.4	3.9
Alone	44.0	58.9	14.9	20.5	31.5	11.0
Headache	38.0	69.5	31.6	18.9	38.4	19.5
Asthma	33.1	40.8	7.8	18.0	21.6	3.6

Approximately 10% of US households have a monthly income <$1,000, and around two-thirds have a monthly income of ≥$3,000. The reported figures are unadjusted for covariates. For the asthma variable, to control for persons with multiple conditions, who are more common at low incomes, the comparison is between those with asthma and no other health conditions and those reporting no health conditions at all. The difference in the third column is statistically different from the difference in the sixth column in each case; the t values range from 23.9 (headache) to 3.1 (asthma.)

Discussion

The data for positive and blue affect provide an unexpectedly sharp answer to our original question. More money does not necessarily buy more happiness, but less money is associated with emotional pain. Perhaps $75,000 is a threshold beyond which further increases in income no longer improve individuals' ability to do what matters most to their emotional well-being, such as spending time with people they like, avoiding pain and disease, and enjoying leisure. According to the ACS, mean (median) US household income was $71,500 ($52,000) in 2008, and about a third of households were above the $75,000 threshold. It also is likely that when income rises beyond this value, the increased ability to purchase positive experiences is balanced, on average, by some negative effects. A recent psychological study using priming methods provided suggestive evidence of a possible association between high income and a reduced ability to savor small pleasures (21).

When interpreting our findings, it is essential to distinguish changes from differences. Our data speak only to differences; they do not imply that people will not be happy with a raise from $100,000 to $150,000, or that they will be indifferent to an equivalent drop in income. Changes of income in the high range certainly have emotional consequences. What the data suggest is that above a certain level of stable income, individuals' emotional well-being is constrained by other factors in their temperament and life circumstances.

We observe a qualitative difference between our measures of emotional well-being and of life evaluation—the former satiates with high income, whereas the latter does not. This observation underscores the importance of the distinction between the judgments individuals make when they think about their life and the feelings that they experience as they live it. As might be expected, the former is sensitive to socioeconomic status, whereas the latter is sensitive to circumstances that evoke positive and negative emotions, such as spending time with others and caring for a sick relative.

Several authors have commented on a related difference between two questions that are often used in surveys of subjective well-being: "How satisfied are you with your life?" and "How happy are you these days?" (8, 22, 23). The common conclusion is that income is more strongly related to satisfaction than to happiness, but the difference that we found in the present study is unusually sharp. We speculate that the Cantril ladder of life is a purer measure of life evaluation than the life satisfaction question, which has an emotional aspect, and that the reports of the emotions of yesterday provide a purer measure of emotional well-being than the standard happiness question. If both aspects of subjective well-being are considered important, then the separation of the measures is an advantage.

The relevance of subjective well-being as a guide to policy is a contentious issue, on which we do not take a position. If measures of well-being are to be used to assess human welfare and to guide policy, the present findings raise the question of whether life evaluation or emotional well-being is better suited to these aims. The Cantril ladder is a serious contender for the best tool for measuring the degree to which individuals view themselves as achieving their goals, both material and other. But emotional well-being also is clearly important for individuals and for policy, and here there are choices as well. Not everyone will agree that enhancing the happiness experienced by those who are already quite happy is a legitimate policy objective. The policy goal of reducing suffering is likely to raise fewer objections, and measures of emotional pain may be useful for that purpose. This topic merits serious debate.

Materials and Methods

The survey involved a telephone interview using a dual-frame random-digit dial methodology that included cell phone numbers from all 50 US states. Interviews were conducted between 9:00 AM and 10:00 PM (local time), with most done in the evening. Up to five callbacks were made in the case of no answer. Spanish language interviews were conducted when appropriate. Approximately 1,000 interviews were completed daily from January 2 through December 30, 2009.

The questionnaire covered many topics of interest to the Gallup Organization and Healthways Corporation, including basic demographic information, participants' opinions about the current economic climate and their personal financial situation, information about past diseases, and other topics.

Life evaluation was assessed using Cantril's Self-Anchoring Scale (the ladder), worded as follows: "Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you, and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?" (15). Questions about emotional well-being had yes/no response options and were worded as follows: "Did you experience the following feelings during a lot of the day yesterday? How about _____?" Each of several emotions (e.g., enjoyment, stress) was reported separately. The positive affect score was the average of the reports of enjoyment and happiness and of a dichotomous question about the frequency of smiling: "Did you smile or laugh a lot yesterday?" The blue affect score was the average of worry and sadness.

To broaden coverage and representativeness, cell phones were part of the sampling design. Relative to land lines, the response rate for cell phones was typically lower. Of all calls that resulted in contacts with an eligible candidate, 31% of the candidates agreed to be interviewed; of these, 90% completed the entire interview. Despite the sampling limitations, available evidence suggests that the estimates of population parameters were not compromised; for example, the survey predicted recent election results within an acceptable margin of error.

ACKNOWLEDGMENTS. We thank Carol Graham, Richard Nisbett, Norbert Schwarz, and Arthur Stone for their comments. Special thanks to James Harter, one of the authors of the Gallup-Healthways Well-Being Index, for his contribution to the research and for his comments on this report. We thank the Gallup Organization and Healthways Corporation for access to the survey results. This work was supported by the Gallup Organization and by National Institute on Aging Grant AG024928-06.

1. Diener E, Biswas-Diener R (2002) Will money increase subjective well-being? *Soc Indic Res* 57:119–169.
2. Headey B, Muffels R, Wooden M (2008) Money does not buy happiness: Or does it? A reassessment based on the combined effects of wealth, income and consumption. *Soc Indic Res* 87:65–82.
3. Clark AE, Frijters P, Shields M (2008) Relative income, happiness and utility: An explanation for the Easterlin paradox and other puzzles. *J Econ Lit* 46:95–144.
4. Clark AE, Kristensen N, Westergaard-Nielsen N (2009) Economic satisfaction and income rank in small neighbourhoods. *J Eur Econ Assoc* 7:519–527.
5. Diener E (1984) Subjective well-being. *Psychol Bull* 95:542–575.
6. Kahneman D, Krueger AB, Schkade DA, Schwarz N, Stone AA (2004) A survey method for characterizing daily life experience: The day reconstruction method. *Science* 306:1776–1780.
7. Kahneman D, Riis J (2005) *The Science Of Well-Being*, eds Huppert FA, Baylis N, Keverne B (Oxford Univ. Press, Oxford), pp 285–304.

© 2020 College Board

Big Daddy's Last Dance

The reverence and revelry of a New Orleans jazz funeral procession

Drawing from West African, Haitian and European colonial influences, jazz funerals are a tradition almost entirely exclusive to New Orleans, and as culturally rich and multifaceted as the city itself. The processions generally open with a brass band performing solemn marches and dirges as family and friends accompany the deceased to a burial. Eventually, the band breaks out into more upbeat and swinging numbers, allowing mourners cathartic release in music and dance, and onlookers to form a 'second line' and join the festivities. In what director Caitlyn Greene describes as 'a love letter to New Orleans', *Big Daddy's Last Dance* captures the arc of a jazz funeral, in all its reverent, jubilant glory.

Directors: Caitlyn Greene, Jon Kasbe

10 July, 2017

The video can be viewed at the link below.

https://aeon.co/videos/the-reverence-and-revelry-of-a-new-orleans-jazz-funeral-procession

© 2020 College Board

Journal of Neuroscience, Psychology, and Economics
2012, Vol. 5, No. 4, 193–211

© 2012 American Psychological Association
1937-321X/12/$12.00 DOI: 10.1037/a0030292

Genes, Economics, and Happiness

Jan-Emmanuel De Neve
University College London and Centre for Economic Performance

Nicholas A. Christakis
Harvard University

James H. Fowler
University of California, San Diego

Bruno S. Frey
Warwick Business School and Zeppelin University

We explore the influence of genetic variation on subjective well-being by employing a twin design and genetic association study. In a nationally representative twin sample, we first show that ~33% of the variation in life satisfaction is explained by genetic variation. Although previous studies have shown that baseline happiness is significantly heritable, little research has considered molecular genetic associations with subjective well-being. We study the relationship between a functional polymorphism on the serotonin transporter gene (*5-HTTLPR*) and life satisfaction. We initially find that individuals with the longer, transcriptionally more efficient variant of this genotype report greater life satisfaction (n = 2,545; p = .012). However, our replication attempts on independent samples produce mixed results, indicating that more work needs to be done to better understand the relationship between this genotype and subjective well-being. This work has implications for how economists think about the determinants of utility, and the extent to which exogenous shocks might affect individual well-being.

Keywords: life satisfaction, twin study, genetic association, serotonin transporter gene, 5-HTTLPR, rs2020933

Supplemental materials: http://dx.doi.org/10.1037/a0030292.supp

Happiness research has become one of the liveliest subjects in economics in recent years.[1] Its main goal is to explain the determinants of individual life satisfaction or subjective well-being (often loosely called happiness). Economists have mainly dealt with economic influ-

Jan-Emmanuel De Neve, School of Public Policy, University College London, and Centre for Economic Performance (CEP), London School of Economics; Nicholas A. Christakis, Harvard Medical School, Harvard University; James H. Fowler, Department of Medicine and Department of Political Science, University of California, San Diego; Bruno S. Frey, Warwick Business School, and Department of Economics, Zeppelin University.

This article expands on De Neve (2011)—a research note that reports on the genetic association result in the Add Health discovery sample. The authors thank the anonymous reviewers and Dan Benjamin, Chris Chabris, Chris Dawes, Pete Hatemi, David Laibson, Andrew Oswald, Richard Layard, Jaime Settle, Albert Vernon Smith, and Piero Stanig. De Neve benefited from the generous hospitality of the Institute for Empirical Research in Economics (IEW) at the University of Zurich and CREMA. Research was supported by National Institute on Aging Grant P-01 AG-031093 and National Science Foundation Grant SES0719404. This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

Correspondence concerning this article should be addressed to Jan-Emmanuel De Neve, School of Public Policy, University College London, 29/30 Tavistock Square, London WC1H 9QU, United Kingdom. E-mail: jdeneve@post.harvard.edu

© 2020 College Board

ences; in particular, income and its distribution, labor market regulation, unemployment, and inflation. For example, Di Tella, MacCulloch, and Oswald (2001) used happiness surveys to determine the welfare costs of inflation and unemployment, showing that unemployment depresses reported well-being more than does inflation. In fact, their longitudinal study of life satisfaction self-reports enabled these authors to estimate that people would trade off a 1 percentage-point increase in the unemployment rate for a 1.7 percentage-point increase in the inflation rate. Systematic influences on life satisfaction have also been found for sociodemographic factors (age, gender, race, marital status, children, and social networks), as well as for political and cultural factors (such as democracy, decentralization, and religiosity). While variables like socioeconomic status, income, marriage, education, and religiosity are significantly associated with individual happiness, none typically accounts for more than 3% of the variation (Frey, 2008; Layard, 2005). Moreover, changes in these variables appear to yield only short-term changes to happiness. For example, the "Easterlin Paradox" (Clark et al., 2008; Easterlin, 1974) suggests that increases in real income either have no lasting effect on happiness, or only a quite small one (Stevenson & Wolfers, 2008). A reason appears to be that happiness levels tend to revert toward what psychologists describe as a "set point" or "baseline" of happiness that is partly shaped by personality and genetic predispositions (Diener & Lucas, 1999; Kahneman, Diener, & Schwarz, 1999). This in turn has implications for how economists think about the determinants of utility, and the extent to which exogenous shocks might affect an individual's well-being.

Although previous studies have shown that baseline happiness is significantly heritable (Lykken & Tellegen, 1996), little research has considered molecular genetic associations with subjective well-being. Here, we first corroborate the earlier work showing that happiness is significantly influenced by genetic variation in a nationally representative twin sample, and subsequently, we present mixed evidence for a candidate gene association with life satisfaction. In our discovery sample. we initially found that individuals with a transcriptionally more efficient version of the serotonin transporter gene (*SLC6A4*, more commonly referred to as 5-HTT or SERT for the protein it encodes) are significantly more likely to report higher levels of life satisfaction. However, our replication efforts on independent samples produce mixed results. This combination of economics and genetics is of rising salience (Beauchamp et al., 2011; Benjamin et al., 2012; Benjamin et al., 2007).

Before we detail our genetic association approach and results, we explore the general influence that genes may have on happiness through a twin study design. A growing number of studies use twin research techniques to gauge the relative importance of genetic and environmental influences on economic behaviors (e.g., Cesarini, Dawes, Johannesson, Lichtenstein, & Wallace, 2009; Fowler, Dawes, & Christakis, 2009). We estimate the heritability of subjective well-being at 33%, indicating that about one-third of the variance in individual life satisfaction can be attributed to genetic influences.

Although twin studies are an important step in establishing the influence of genes in subjective well-being, they do not identify the specific genes involved. The increasing availability of genotypic information now allows us to test hypotheses about targeted genes and their effects. One place to start the search for such genes is among those that have already been shown to account for variation in emotional states. Among these, 5-HTT is a prime candidate. The 5-HTT gene encodes a transporter in the cell wall that absorbs serotonin into the presynaptic neuron in parts of the brain that influence mental states (Bertolino et al., 2005; Canli & Lesch, 2007; Hariri et al., 2002; Heinz et al., 2005). 5-HTT has been studied for more than 20 years, and much is known about the way different versions of this gene influence transcription, metabolism, and signal transfers between neurons, all of which may influence personality. In particular, less transcriptionally efficient variants of this gene have been shown to moderate the influence of life stress on de-

[1] Books are, for example, Kahneman et al. (1999); Graham and Pettinato (2002); Frey and Stutzer (2002a), Van Praag and Ferrer-I-Carbonell (2004); Layard (2005), or Frey (2008); articles are for example, Easterlin (1974); Clark and Oswald (1996); Frey and Stutzer (2002b); Di Tella, MacCulloch, & Oswald (2003); Luttmer (2005); Di Tella and MacCulloch (2006); Rayo and Becker (2007); Dolan et al. (2008); Fowler and Christakis (2008); Urry et al. (2004) or Clark, Frijters, & Shields (2008).

© 2020 College Board

pression (Caspi et al., 2003), and the more transcriptionally efficient alleles have been linked to optimism (Fox, Ridgewell, & Ashwin, 2009). As a result, economists have specifically identified 5-HTT as a candidate gene for further study (Benjamin et al., 2007).

Using data from two independent sources, the National Longitudinal Study of Adolescent Health (Add Health) and the Framingham Heart Study (FHS), we analyze the relationship between variants of 5-HTT and life satisfaction. We find some evidence of significant association in both data sets, suggesting that the 5-HTT gene may play a role in explaining life satisfaction, yet more work needs to be done to verify and better understand the relationship between this genotype and subjective well-being. We do not claim that 5-HTT determines happiness, nor do we exclude the likely possibility that several other genes may play a role in accounting for the influence of genes on happiness.

The Add Health Data

This research is based on genetic and survey data collected as part of Add Health. The study was initially designed to explore the health-related behavior of adolescents in Grades 7 through 12, but it has been employed widely across disciplines and has made recent contributions in economics (Alcott, Karlan, Mobius, Rosenblat, & Szeidl, 2007; Echenique & Fryer, 2007; Echenique, Fryer, & Kaufman, 2006; Norton & Han, 2008). In the first wave of the Add Health study (1994–1995), 80 high schools were selected from a sampling frame of 26,666 based on their size, school type, census region, level of urbanization, and percentage of the population that was white. Participating high schools were asked to identify junior high or middle schools that served as feeder schools to their school. This resulted in the participation of 145 middle, junior high, and high schools. From those schools, 90,118 students completed a 45-min questionnaire, and each school was asked to complete at least one School Administrator questionnaire. This process generated descriptive information about each student, the educational setting, and the environment of the school. From these respondents, a core random sample of 12,105 adolescents in Grades 7–12 were drawn, along with several oversamples, totaling more than 27,000 adolescents. These students and their parents were administered in-home surveys in the first wave.

Wave II (1996) was comprised of another set of in-home interviews of more than 14,738 students from the Wave I sample and a follow-up telephone survey of the school administrators. Wave III (2001–02) consisted of an in-home interview of 15,170 Wave I participants. Finally, Wave IV (2008) consisted of an in-home interview of 15,701 Wave I participants. The result of this sampling design is that Add Health is a nationally representative study. Women make up 49% of the study's participants, Hispanics 12.2%, Blacks 16. 0%, Asians 3.3%, and Native Americans 2.2%. Participants in Add Health also represent all regions of the United States.

In Wave I of the Add Health study, researchers created a sample of sibling pairs including all adolescents that were identified as twin pairs, half-siblings, or unrelated siblings raised together. Twin pairs were sampled with certainty. The sibling-pairs sample is similar in demographic composition to the full Add Health sample (Jacobson & Rowe, 1998). The number of identical (monozygotic) and nonidentical (dizygotic) twins who participated in Wave III was 1,098 (434 MZ and 664 DZ), with 872 twins (434 MZ and 438 DZ) in same-sex pairs. The Add Health data has been widely used for twin studies (Fowler, Baker, & Dawes, 2008; Harris, Halpern, Smolen, & Haberstic, 2006).

Allelic information for a number of genetic markers was collected for 2,574 individuals as part of Wave III. The candidate genotypes were chosen for inclusion in the study because they are known to affect brain development, neurotransmitter synthesis and reception, and hormone regulation. Details of the DNA collection and genotyping process are available at the Add Health website (Add Health Biomarker Team, 2007). These candidate genes include markers that identify alleles (variants) of the serotonin transporter gene or 5-HTT. The promotor region of 5-HTT contains a variable number tandem repeat (VNTR) sequence that influences transcriptional activity—the "long" 528 base-pair allele is associated with a higher basal activity than the "short" 484 base-pair allele. This functional polymorphism on the 5-HTT gene is commonly referred to as 5-HTTLPR (5-HTT-linked polymorphic region). Allele frequency for the short allele is 43% and for the long allele is 57%.

© 2020 College Board

In 2012, Add Health released a second batch of genotypical data that extended to almost all Wave III participants and included the 5-HTTLPR genotype. The distributional frequencies of this new sample (used here for replication purposes) closely align with the earlier discovery sample.

In Wave III, subjects were asked "How satisfied are you with your life as a whole?" Answer categories ranged from very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, to very satisfied. Alternative answers were "refused" or "don't know," and these were discarded for the purpose of this study (<1% of interviewees gave such a response). This question-and-answer formulation is standard in the economics of happiness literature (Di Tella et al., 2001, 2003; Frey, 2008; Kahneman & Krueger, 2006). The distribution of answers to the life satisfaction question is shown in the Appendix. In line with the happiness literature, a large majority of respondents report being satisfied or very satisfied (Frey & Stutzer, 2002a). That most people, in fact, report a positive level of subjective well-being is the object of an article by Diener and Diener (1996), where the authors find this distribution to be representative in a wide cross-national analysis.

Twin Design

Method

Twin studies compare the traits, behaviors, and other outcomes (called "phenotypes") of twins who share 100% of their genetic material (identical or *monozygotic* [MZ] twins) to those who share 50% of their genetic material (fraternal or *dizygotic* [DZ] twins) to estimate the relative importance of genetic and environmental influences (Ashenfelter & Krueger, 1994; Taubman, 1976). Following Benjamin et al. (2012), if we assume that the residual factors covary equally MZ and DZ twins (informally called the "equal environments" assumption), and there are no gene–environment interactions, then the variance in happiness can be decomposed into additive genetic effects (A), common or shared environmental influences (C), and unshared or unique environmental influences (E). The ACE model does not allow us to observe environmental and genetic influences directly, but it does allow us to estimate these effects by observing the covariance across MZ and DZ twins.

Although the assumptions underlying the ACE model are strong, the method produces results that have been validated in numerous other studies. For example, studies of twins reared apart generate similar heritability estimates to those generated by studies of twins raised together (Bouchard, 1998). More recently, Visscher et al. (2006) utilize the small variance in percentage of shared genes among DZ twins to estimate heritability without using any MZ twins, and they are able to replicate findings from studies of MZ and DZ twins reared together. Moreover, personality and cognitive differences between MZ and DZ twins persist even among twins whose zygosity has been miscategorized by their parents, indicating that being mistakenly treated as an identical twin by ones parents is not sufficient to generate a difference in concordance (Kendler, Neale, Kessler, Heath, & Eaves, 1993; Scarr & Carter-Saltzman, 1979; Xian et al., 2000).

The ACE model can be formally expressed as:

$$y_{ij} = \mu + A_{ij} + C_j + E_{ij}$$

where y is the measure of the phenotype, j denotes the family, i denotes the individual twin in the family, μ is the mean of this phenotype across all observations, $A_{ij} \sim N(0, \sigma_A^2)$ is the additive genetic component, $C_j \sim N(0, \sigma_C^2)$ is the shared environment component, and $E_{ij} \sim N(0, \sigma_E^2)$ is the unshared environment component. Notice that these assumptions imply:

$$Var(y) = \sigma_A^2 + \sigma_C^2 + \sigma_E^2.$$

If we further assume that the unshared environment is uncorrelated between twins ($COV(E_{1j}, E_{2j}) = 0$), that genes are perfectly correlated between MZ twins ($COV_{MZ}(A_{1j}, A_{2j}) = \sigma_A^2$), and the covariance between DZ twins who share half their genes on average is half that of identical twins $\left(COV_{DZ}(A_{1j}, A_{2j}) = \frac{1}{2}\sigma_A^2\right)$, then we have two additional equations

$$COV_{MZ}(y_{1j}, y_{2j}) = \sigma_A^2 + \sigma_C^2,$$

$$COV_{DZ}(y_{1j}, y_{2j}) = \frac{1}{2}\sigma_A^2 + \sigma_C^2.$$

© 2020 College Board

The covariance equations reflect the fact that DZ twins share on average 50% of their genes whereas MZ twins share all of their genes. Based on these equations, we can estimate the ACE model via a random effects regression model with the 2 × 2 variance-covariance matrix specified as:

$$\Omega_j = \begin{bmatrix} \sigma_A^2 + \sigma_C^2 + \sigma_E^2 & R_j\sigma_A^2 + \sigma_C^2 \\ R_j\sigma_A^2 + \sigma_C^2 & \sigma_A^2 + \sigma_C^2 + \sigma_E^2 \end{bmatrix}$$

where R is the genetic relatedness of the twin pair equaling 1 for MZ twins and $\frac{1}{2}$ for DZ twins. We use the variances of the random effects to generate estimates of heritability, common environment, and unshared environment.[2]

To generate the ACE estimates, we use the structural equation modeling program *OpenMx* developed by Neale, Boker, Xie, & Maes, (2010). In addition to estimating ACE models, we estimate all of the possible submodels to compare model fit. These include an AE model, which assumes only genes and unshared environment influence the phenotype (C = 0), a CE model which assumes only common and unshared environment influence the phenotype (A = 0), and an E model (A = 0 and C = 0). If a submodel fits better than the general ACE model, this suggests the parameters left out of the submodel are not significantly contributing to model fit. To compare the submodels, we use the Akaike Information Criterion (AIC) in maximum likelihood estimation, where smaller values indicate better fit.

Twin Results

When assessing the role of genetic influences, the first step is to compare the correlation in phenotype among MZ twin pairs with that of DZ twin pairs. For life satisfaction, the correlation coefficient for MZ twins is 0.334 and for DZ twins is 0.132. The difference in correlations is significant (p = .013, one-sided). These correlations show that identical twins are significantly more similar in their level of happiness than fraternal twins, which suggests that genetic factors might play a role in this trait.

In Table 1, we report results from several variance decomposition models described earlier. Note that the ACE model yields a heritability estimate of 33% (SE = 0.044), and the estimate for unshared environment is 67% (SE = 0.029), while a null estimate is returned for common environment. In other words, about a third of the variance in happiness in our sample can be attributed to variance in genetic factors. We also examine the submodels and find that the models with lowest AIC all include A, suggesting that the finding that happiness is heritable is robust to different model specifications.[3]

Compared with previous studies of happiness, our heritability estimate of 33% is on the lower end of reported estimates. In fact, the seminal paper by Lykken and Tellegen (1996) estimated heritability at about 50%, and subsequent estimates ranged from 38% (Stubbe, Posthuma, Boomsma, & De Geus, 2005) to 36%–50% (Bartels & Boomsma, 2009) to 42%–56% (Nes, Roysamb, Tambs, Harris, & Reichborn-Kjennerud, 2006). However, the Add Health study includes other questions that suggest the heritability of happiness rises as people age. The standard life satisfaction question used in this article is only asked of Add Health subjects in Wave III (2001–20002), but in other interview waves the following question is asked of participants: "How often was the following true during the past seven days? You felt happy." Answers range from "*never or rarely*" to "*most of the time or all of the time*." Figure 1 in Supplementary Online Material shows the MZ and DZ twin pair correlations of the time series that combines the "life satisfaction" and "You felt happy" questions. The basic heritability estimates that result from comparing MZ and DZ correlations range from 22% in Wave I (1994) to 54% in Wave IV (2008). This longitudinal analysis is consistent with a growing body of longitudinal twin research that shows that the heritability of a number of traits (e.g., intelligence) increases with age (Plomin, DeFries, McClearn, & McGuffin, 2008). It also shows

[2] They are defined as $\frac{\sigma_A^2}{\sigma_A^2+\sigma_C^2+\sigma_E^2}$, $\frac{\sigma_C^2}{\sigma_A^2+\sigma_C^2+\sigma_E^2}$, and $\frac{\sigma_E^2}{\sigma_A^2+\sigma_C^2+\sigma_E^2}$ respectively.

[3] When we split our twin sample by sex we find that there are significant differences between men and women. As in Table 1, the results given in Table 1 in Supplementary Online Material show that the AE models fit happiness best according to the AIC values. However, the heritability estimate for males is 39%, whereas for females it is 26%.

© 2020 College Board

Table 1
Summary of ACE Twin Model Results

	Life satisfaction			*Fit* statistics						
	a^2	c^2	e^2	ep	−2ll	*df*	Akaike Information Criterion	diff −2ll	diff *df*	*p*
ACE	0.331	0.000	0.669	4	1878.9	795	288.9	—	—	—
AE	0.331	—	0.669	3	1878.9	796	286.9	0	1	1
CE	—	0.257	0.743	3	1882.9	796	290.9	4	1	0.05
E	—	—	1	2	1907.2	797	313.2	28.3	2	0

Note. The models consist of additive genetic factors (A), shared or common environmental factors (C), and unshared environmental factors (E). The model includes 217 monozygotic and 219 dizygotic same-sex twin pairs.

that the finding that happiness is heritable is robust to a variety of measures and time periods over the life course. These findings are generally taken to mean that genes and environment can play differing roles in explaining experience at different points in the life course.

Genetic Association

Twin studies are important because they allow us to gauge the relative influence of our genetic makeup on subjective well-being. However, twin studies do not give insight into which specific genes may be involved in explaining the heritability of traits. Because Add Health collected a number of specific genetic markers, it presents us with a unique opportunity to move beyond a twin design study. Below we introduce some basic concepts in genetics, our genetic association research design, and present discovery and replication results for our candidate gene study.

Basic Concepts in Genetics

Human DNA is composed of an estimated 21,000 genes that form the blueprint for molecules that regulate the development and function of the human body. Genes are distinct regions of human DNA that are placed in the 23 pairs of chains, or chromosomes that make up all human DNA. Almost all human cells contain the same DNA they inherited at the moment of conception.

Individuals inherit one-half of their DNA from each parent, with one copy of each gene coming from the mother and one copy from the father. Some genes come in different versions, known as "alleles"—for example, sickle cell disease results from a particular allele coding for abnormal rather than normal hemoglobin. Each parent has two separate copies of an allele at each "locus," or location, on the chromosome, but each sperm or egg cell contains only one of these alleles. Thus a child has a 50% chance of receiving a particular allele from a particular parent. For example, suppose that at a given locus there are two possible alleles, A and B. If both parents are "heterozygous" at that locus, meaning they each have an A and a B allele (AB or BA— order is irrelevant), then a given offspring has a 25% chance of being "homozygous" for A (AA), a 25% chance of being homozygous for B (BB) and a 50% chance of being heterozygous (AB or BA). If an individual is heterozygous at a locus, a "dominant" allele may impose itself on the "recessive" allele, and the expression of the latter allele will not be observed.

Genes transcribe proteins that begin a cascade of interactions that regulate bodily structure and function. Many of the observable traits and behaviors of interest, referred to as "phenotypes" are far downstream from the original "genotypes" present in the DNA. While in some cases, one allele can single-handedly lead to a disease (such as sickle cell anemia, Huntington's disease, or cystic fibrosis), the vast majority of phenotypes are "polygenic," meaning they are influenced by multiple genes (Mackay, 2001; Plomin et al., 2008) and are shaped by a multitude of environmental forces. As a result, association models between genotypes and phenotypes are an important first step, but they are not the end of the story. It is also important to investigate the extent to which genetic associations are moderated by environmental factors and other genes.

© 2020 College Board

5-HTTLPR, Serotonin, and Happiness

One strategy in behavioral genetics is to start with a "candidate" gene that is thought to influence behaviors or processes in the body that are related to the phenotype of interest. For subjective well-being, this means focusing on genes that affect brain development, neurotransmitter synthesis and reception, hormone regulation, and transcriptional factors (Benjamin et al., 2007; Damberg, Garpenstrand, Hallman, & Oreland, 2001).

We choose a candidate gene that has already received a great deal of attention by biologists and social scientists for its association with mental states. The 5-HTT gene is critical to the metabolism of serotonin in the brain. As shown in Figure 1, serotonin is a chemical that is released by a neuron and sensed by a receptor on the receiving neuron, passing an electric potential across a gap called a nerve synapse (the nerve that emits the serotonin is on the "presynaptic" side of the gap). Signals are carried throughout the body by the sequential release of a neurotransmitter by one neuron after another across these synapses. The 5-HTT gene codes for the serotonin transporters that are placed in the cell wall and reabsorb the neurotransmitter serotonin from the synaptic cleft. Most serotonin is recycled after use and the serotonin transporter allows serotonergic neurons to restock. The serotonin transporter gene has been studied extensively and much is known about the way different versions of this gene influence serotonergic neurotransmission which, in turn, is found to influence personality and mental health (Canli & Lesch, 2007; Hariri & Holmes, 2006; Hariri et al., 2002).

The 5-HTT gene contains a 44 base-pair variable-number tandem repeat (VNTR) polymorphism[4] in the promoter region[5] (5-HTTLPR) that is believed to be responsible for variation in transcriptional efficiency. The "long" (528 bp) and "short" (484 bp) polymorphism produce the same protein, but the long allele is associated with an approximately three times higher basal activity than the shorter allele. As a consequence, the long variant produces significantly more 5-HTT mRNA[6] and protein (Canli & Lesch, 2007; Glatz, Mössner, Heils, & Lesch, 2003; Heils et al., 1996; Lesch et al., 1996; Little et al., 1998). The long polymorphism thus results in increased gene expression and more serotonin transporters in the cell membrane. In turn, more serotonin is reintroduced into the presynaptic cell. This process is also shown in Figure 1.

Functional variation in the serotonin transporter gene is increasingly understood to exert influence on parts of the brain regulated by serotonergic neurotransmission. In particular, research shows increased amygdala activation to negative emotional stimuli among carriers of short alleles (Canli, Omura, Haas, Fallgatter, & Constable, 2005; Hariri et al., 2002; Heinz et al., 2005; Munafò, Brown, & Hariri, 2008; Pezawas et al., 2005). A morphometrical study of this genetic association reports reduced gray matter volume in short-allele carriers in limbic regions critical for processing of negative emotion, particularly perigenual cingulate and amygdala (Pezawas et al., 2005). These authors conclude that 5-HTTLPR induced variation in anatomy and function of an amygdala-cingulate feedback circuit critical for emotion regulation indicates one mechanism for a genetic susceptibility for depression (Pezawas et al., 2005). Another morphometrical study corroborates the finding that short-allele carriers show decreased volume in the affective division of the anterior cingulate and decreased gray matter density in its pregenual region (Canli et al., 2005). The same study also finds that the 5-HTTLPR polymorphism is associated with activation changes to positive stimuli, suggesting a general role in emotional regulation, rather than negative valence specifically (Canli et al., 2005).

Myriad behavioral studies also suggest that serotonin and 5-HTT play an important role in emotional regulation (Hariri & Holmes, 2006; Hariri et al., 2002; Heils et al., 1996). Specifically, variance in 5-HTTLPR was found to be associated with variation in mental health outcomes (Lesch et al., 1996), and subsequent studies report that about 10% of the variance in anxiety-related traits depends on variation in

[4] A VNTR polymorphism is a repeated segment of DNA that varies among individuals in a population.

[5] A promoter region is the regulatory region of DNA that tells transcription enzymes where to begin. These promoter regions typically lie upstream from the genes they control.

[6] Messenger RNA (mRNA) is a type of RNA that carries information from DNA to ribosomes. In turn, these ribosomes "read" messenger RNAs and translate their information into proteins.

© 2020 College Board

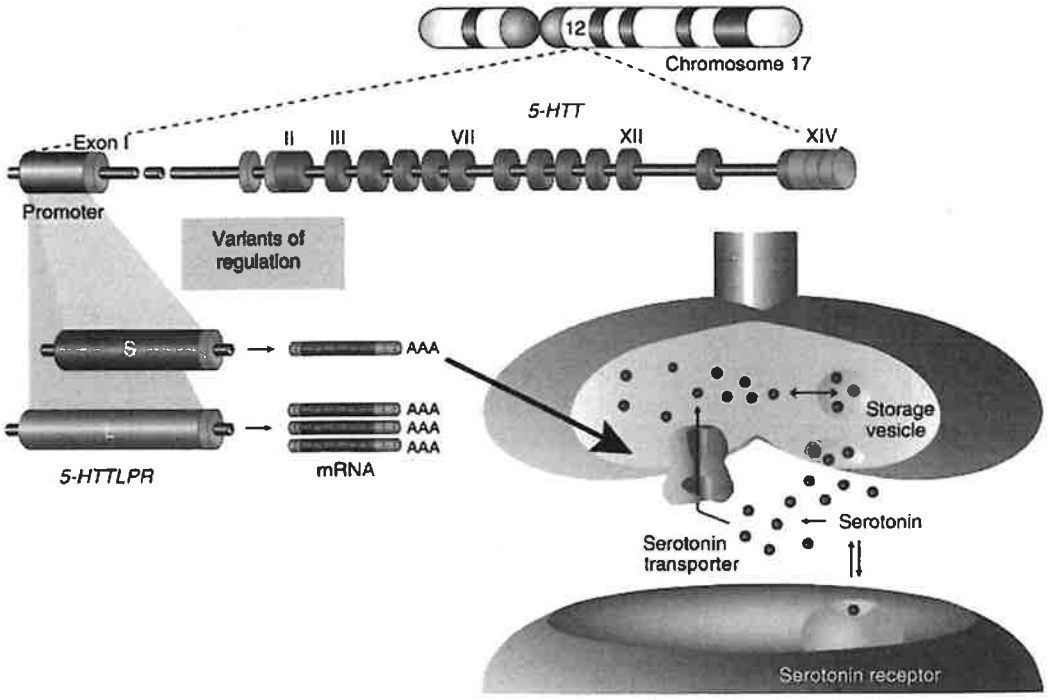


Figure 1. Representation of the long/short functional variant on the 5-HTT gene and the release, reception, and recycling of serotonin in neurons. Adapted from Canli and Lesch (2007), with permission from the Nature Publishing Group.

serotonin transporters (Munafò, Clark, & Flint, 2005; Sen, Burmeister, & Ghosh, 2004). A recent study by Fox et al. (2009) also suggests that 5-HTTLPR may influence optimism. The authors obtained DNA from about 100 participants and compared reaction times with pictures with positive, negative, and neutral emotional valence (replicating a common experiment in psychopathology research). The results show that individuals with the transcriptionally more efficient 5-HTTLPR alleles display a significant bias toward processing positive information and selectively avoiding negative information. This emotionally self-protective pattern does not obtain in individuals carrying one or both short alleles. It is important to note, however, that positive and negative emotions are not different sides to the same coin. A score of zero on a depression or anxiety scale may be indicative of the absence of such mental health issues, but it is not indicative of the presence of happiness (McGreal & Stephen, 1993).

Not all studies show a direct relationship between a gene variant and a phenotype. Instead, developmental or concurrent environments may moderate an association between genes and phenotypes. A study by Caspi et al. (2003) suggests a gene–environment interaction for the influence of life stress on depression. The authors find that individuals with short 5-HTTLPR alleles gene are more vulnerable to stress-induced depression. Among those individuals that had experienced a relatively large number of stressful life events, about 33% of the carriers of the less efficient short allele were cases of diagnosed depression compared with only 17% of the individuals that carried both long alleles. Thus, in the Caspi et al. (2003) study, the gene itself is not associated with depression. Rather, it is the combination of both gene and environment that yields a significant association. In this study we do not report on a gene-environment interaction, but the direct association between the number of long 5-HTTLPR alleles and life satisfaction.

It is important to highlight, however, that later studies often fail to replicate candidate gene discoveries. For example, a meta-analysis

© 2020 College Board

by Risch et al. (2009) that incorporated 14 studies yielded no evidence for a direct effect between 5-HTTLPR and depression nor an indirect effect moderated by stressful life events.

Association Methods

Genetic association studies test whether an allele or genotype occurs more frequently within a group exhibiting a particular phenotype than those without the phenotype. However, a significant association can mean one of three things: (a) The allele itself influences subjective well-being; (b) the allele is in "linkage disequilibrium" with an allele at another locus that influences subjective well-being; or (c) the observed association is a false-positive signal because of population stratification.[7]

Population stratification occurs because groups may have different allele frequencies because of their genetic ancestry. Subjective well-being in these groups may be the product of their environments, alleles other than the one of interest, or some unobserved reason. For example, two groups may not have mixed in the past for cultural reasons. Through the process of local adaptation or genetic drift, these groups may develop different frequencies of a particular allele. At the same time, the two groups may also develop divergent behaviors that are not influenced by the allele but solely by the environment in which they live. Once these two groups mix in a larger population, simply comparing the frequency of the allele to the observed behavior would lead to a spurious association.

There are two main research designs employed in association studies, case-control designs and family based designs. Case-control designs compare the frequency of alleles or genotypes among subjects that exhibit a phenotype of interest to subjects who do not. As a result, case-control designs are vulnerable to population stratification if either group is especially prone to selection effects. A typical way to control for this problem is to include controls for the race or ethnicity of the subject or to limit the analysis to a specific racial or ethnic group. Family based designs eliminate the problem of population stratification by using family members, such as parents or siblings, as controls. Tests using family data compare whether offspring exhibiting the trait receive a risk allele from their parents more often than would be expected by chance. This design is very powerful in minimizing Type I error but also suffers from much lower power in detecting a true association. Xu and Shete (2006) show, based on extensive simulation work, that a case-control association study using mixed-effects regression analysis outperforms family based designs in detecting an association while at the same time effectively limiting Type I error.

To test for genetic association we employ a mixed-effects ordinary least squares (OLS) regression model[8]:

$$Y_{ij} = \beta_0 + \beta_G G_{ij} + \beta_k Z_{kij} + U_j + \varepsilon_{ij}$$

where i and j index subject and family respectively. For the 5-HTT gene, $G = 2$ if the subject's genotype is LL, $G = 1$ for genotypes LS or SL, and $G = 0$ if the subject's genotype is SS (where L represents having a copy of a 528 base-pair "long" allele, and S represents having a copy of a 484 base-pair "short" allele). Z is a matrix of variables to control for the underlying population structure of the Add Health sample as well as potentially mediating factors such as age, gender, education, religiosity, marriage, job, welfare, or medication that may all influence subjective well-being. Finally, the variable U is a family random effect that controls for potential genetic and environmental correlation among family members, and ε is an individual-specific error.

To control for the effects of the underlying population structure, we include indicator variables for whether a subject self-reported as

[7] Given our data, we cannot differentiate between 1 and 2. To do so, we would need additional genetic information about loci in close proximity to the locus of interest. Thus, a significant association means that either a particular allele, or one likely near it on the same gene, significantly influences subjective well-being.

[8] The choice between OLS and ordered probit regression analysis rests on whether the categories of the life satisfaction are considered cardinal or ordinal. Economists typically consider these happiness scores as ordinal and have mainly opted for the ordered type of analysis. Psychologists and sociologists interpret happiness categories as cardinal and therefore use OLS. Ferrer-i-Carbonell and Frijters (2004) survey and test both empirical literatures to conclude that assuming cardinality or ordinality of happiness surveys makes little difference in studies where the dependent variable is measured at a single point in time. We opted for OLS, but other analyses using ordered probit reveal no meaningful differences in coefficients or significance.

© 2020 College Board

Black, Hispanic, or Asian (base category is White). Following the policy of the United States Census, Add Health allows respondents to mark more than one race. Since this complicates the ability to control for stratification, we exclude these individuals ($N = 117$), but a supplementary analysis including them yields substantively equal results. Population stratification is a pertinent challenge in our sample. The Hardy-Weinberg equilibrium (HWE) test indicates a significant deviation from the expected frequencies ($\chi^2 = 7.66$, $p = .005$). On the other hand, when considering the separate HWE test statistics by ethnicity there are no longer significant deviations from the expected HWE frequencies (see Table 6 in Supplementary Online Material). As such, introducing ethnicity controls and running a Whites-only case control test (Xu and Shete, 2006) may adequately control for population stratification.

Association Results: Add Health Discovery Sample

Table 2 shows the results of several specifications of the model to test the hypothesis that the 5-HTTLPR long allele is associated with subjective well-being in the original Add Health discovery sample.[9] Each of these specifications includes variables for age, gender, and race to control for population stratification. *Model 1* shows that the long allele is significantly associated with increased life satisfaction ($p = .012$). In Figure 2, we summarize the results for 5-HTTLPR by simulating first differences from the coefficient covariance matrix of *Model 1*. Holding all else constant and changing the 5-HTTLPR variant for all subjects from zero to one long allele would increase the reporting of being very satisfied with one's life in this population by about 8.5%. Similarly, changing the 5-HTTLPR variant from zero to two long alleles would increase the reporting of being very satisfied by about 17.3%.

Model 2 includes a number of socioeconomic factors that are known to influence subjective well-being. In particular, having a job, education, marriage, divorce, religiosity, welfare assistance, and being on medication. This model also suggests that there is a statistically significant association ($p = .005$) between the 5-HTTLPR long variant and the reporting of life satisfaction. Notice also that the coefficient actually increases a bit, suggesting that the association cannot be explained by a mediation effect this genotype may have on any other variables included in the model.[10]

Following Xu and Shete (2006), as a robustness test for population stratification, we also include *Model 3* that is a case-control association model for those subjects that uniquely identified themselves as being white. The coefficient on 5HTTLPR and its p value ($p = .017$) suggest that population stratification between self-reported racial categories is not driving the association between 5-HTTLPR and life satisfaction in the Add Health discovery sample.

Replication Studies

Specific genotypes usually only account for a very small amount of the variance in complex social behaviors, which means the tests often have low power. As a result, it is very important to replicate results in independent samples (Beauchamp et al., 2011; Benjamin et al., 2012). Such efforts to replicate a significant genetic association result, as well as increasing the sample sizes, are key in addressing the possibility that the original association would be a spurious result or false positive. Below we first report on our replication effort in the FHS. More recently, the release of new genotypical data for the Add Health data allowed for another replication effort which we also detail below. Although the association between functional variation on the 5-HTT gene and life satisfaction found in the Add Health discovery sample replicates in the Framingham sample it does not replicate in the new Add Health sample.

Replication Study 1: FHS. Here we utilize the FHS, a population-based, longitudinal, observational cohort study that was initiated in 1948 to prospectively investigate risk factors for cardiovascular disease. Since then, the FHS has come to be composed of four separate but related cohort populations: (a) the Original Co-

[9] This genetic association result in the Add Health discovery sample is also reported in De Neve (2011).

[10] We also report the results of association tests with 5-HTTLPR for each of these socioeconomic factors in the appendix. An association with medication is nearly significant ($p = .08$) but loses its significance ($p = .17$) when controlling for age, gender, and race. Hence, medication cannot be considered a mediating variable (Baron & Kenny, 1986).

© 2020 College Board

Table 2
OLS Models of Association Between 5-HTTLPR and Life Satisfaction (Discovery Sample)

	Model 1			Model 2			Model 3		
	Coefficient	*SE*	*p*	Coefficient	*SE*	*p*	Coefficient	*SE*	*p*
5-HTTLPR long	0.059	0.023	.012	0.065	0.023	.005	0.070	0.029	.017
Black	−0.111	0.048	.021	−0.114	0.049	.020			
Hispanic	0.198	0.117	.092	0.216	0.118	.067			
Asian	−0.196	0.073	.007	−0.221	0.071	.002			
Age	0.004	0.009	.705	−0.011	0.009	.262	−0.031	0.012	.008
Male	0.014	0.033	.682	0.028	0.033	.406	0.039	0.041	.341
Job				0.093	0.041	.024	0.104	0.057	.071
College				0.115	0.033	.001	0.238	0.042	.000
Married				0.232	0.041	.000	0.318	0.050	.000
Divorced				−0.313	0.153	.041	−0.310	0.155	.047
Religiosity				0.103	0.017	.000	0.082	0.023	.000
Welfare				−0.236	0.098	.017	−0.121	0.153	.432
Medication				−0.045	0.032	.162	−0.095	0.041	.021
Intercept	4.078	0.208	.000	4.096	0.210	.000	4.514	0.262	.000
N	2,545			2,528			1,446		
R^2	0.01			0.06			0.08		

Note. Variable definitions are in the Appendix. *SE*s and *p* values are also presented.

hort enrolled in 1948 (N = 5,209); (b) the Offspring Cohort (the children of the Original Cohort and spouses of the children) enrolled in 1971 (N = 5,124); (c) the Omni Cohort enrolled in 1994 (N = 508); and (d) the Generation 3 Cohort (the grandchildren of the Original Cohort) enrolled beginning in 2002 (N = 4,095). Published reports provide details about sample composition and study design for all these cohorts (Cupples & D'Agnostino, 1988; Kannel, Feinleib, McNamara, Garrison, & Castelli, 1979).

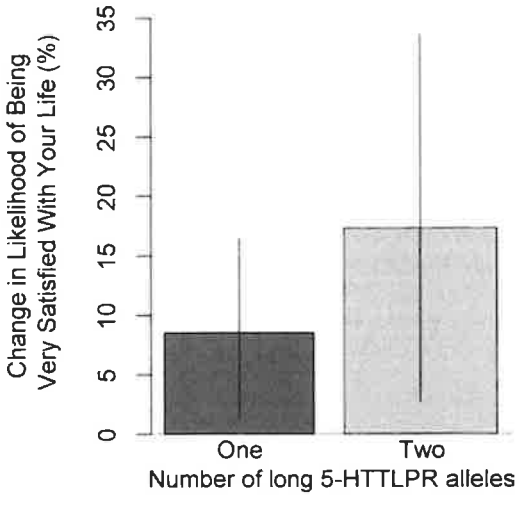


Figure 2. Increasing the number of "long," more efficient 5-HTTLPR alleles is associated with higher life satisfaction in the Add Health discovery sample. First differences based on simulations of *Model 1* parameters are presented along with 95% confidence intervals. All other variables are held at their means.

The FHS makes available genetic markers for its participants. Of the 14,428 members of the three main cohorts, a total of 9,237 individuals have been genotyped (4,986 women and 4,251 men) for single nucleotide polymorphisms (SNPs). These are specific locations on human DNA where a single pair of nucleotides varies for some part of the human population. FHS makes available a data set of expected genotypes for all 2,543,887 SNPs in the European ancestry HapMap sample that was computed from the 550,000 observed SNPs from an Affymetrix array using the program MACH (for information on how this data set was constructed, see De Bakker, 2008). Although this data does not contain the same VNTR polymorphism marker for 5-HTT that we analyze in Add Health, it does contain a nearby marker called "rs2020933," and the "A" allele of this marker is known to be associated with higher transcriptional efficiency of serotonin transporters (Fahad et al., 2010; Lipsky, Hu, & Goldman, 2009; Martin, Cleak, Willis-Owen, Flint, & Shifman, 2007; Wendland, Martin, Kruse, Lesch, & Mur-

© 2020 College Board

phy, 2006). It is also known to be in positive linkage disequilibrium with the long allele of 5-HTTLPR (Huezo-Diaz et al., 2009). The FHS also asked 3,460 participants in the offspring cohort a variant of the life satisfaction question: "Indicate where you think you belong between these two extremes ... satisfied with job or home life OR ambitious, want change." Respondents were given a 7-point scale to choose from, and we reverse-coded the scale so that higher values indicated greater satisfaction with life ($M = 4.7$, $SD = 1.7$). Although this question is not exactly like the one asked in Add Health, if there is a real association between 5-HTT and happiness, we expect it to show up in spite of variations in the way the question is asked.

We merged the gene and life satisfaction data and conducted an association test using a linear regression with a general estimating equations (GEEs) approach to account for within-family correlation of errors. As shown in Model 1 in Table 3, this association is significant ($p = .05$) and in the expected direction. In Model 2 we include additional controls for age and gender. We also include the first 10 principal components of a singular value decomposition of the subject-genotype matrix in the regression (see Appendix), which has been shown to effectively control for population stratification (Price et al., 2006). Once again, the association is significant ($p = .05$).

Replication Study 2: New Add Health Data. The staggered release of genotypical data by Add Health provides another opportunity to test the association between the 5-HTTLPR genotype and life satisfaction in an independent replication sample as well as the larger combined sample. Tables 4 (replication sample) and 5 (full sample) present results for association models that are identical to those run in the discovery sample and shown in Table 2. While all model specifications return coefficients on 5-HTTLPR that indicate a positive correlation between the long alleles of this genotype and life satisfaction, no model specification obtains statistical significance. We thus fail to replicate the original significant association result in the newly available Add Health data.

Discussion

Our main objective here has been to provide empirical evidence that genes matter for subjective well-being and to encourage economists to consider the importance of biological differences. The results we present ad-

Table 3
General Estimating Equations Models of Association Between rs2020933 and Life Satisfaction (Framingham Heart Study)

	Model 1			Model 2		
	Coefficient	*SE*	*p*	Coefficient	*SE*	*p*
rs2020933 "A" alleles	0.22	0.11	.05	0.21	0.11	.05
Age				0.04	0.00	.00
Male				−0.00	0.06	.99
Principal component 1				−0.88	1.57	.58
Principal component 2				0.04	6.43	.99
Principal component 3				−3.32	2.21	.13
Principal component 4				−1.08	2.33	.64
Principal component 5				−3.30	2.64	.21
Principal component 6				1.13	2.45	.65
Principal component 7				2.21	1.97	.26
Principal component 8				−2.10	2.21	.34
Principal component 9				−0.52	2.06	.80
Principal component 10				−1.82	2.26	.42
Intercept	4.68	0.04	.00	2.90	0.16	.00
N		2,843			2,831	
R^2		0.01			0.05	

Note. *SE*s and *p* values are also presented.

© 2020 College Board

Table 4
Replication Sample OLS Models of Association Between 5-HTTLPR and Life Satisfaction

	Model 1			Model 2			Model 3		
	Coefficient	*SE*	*p*	Coefficient	*SE*	*p*	Coefficeint	*SE*	*p*
5-HTTLPR long	0.003	0.012	.823	0.000	0.012	0.985	0.003	0.015	.827
Black	−0.127	0.022	.000	−0.117	0.023	0.000			
Hispanic	−0.067	0.033	.044	−0.067	0.033	0.042			
Asian	−0.081	0.034	.017	−0.093	0.034	0.007			
Age	0.002	0.005	.614	−0.010	0.005	0.030	−0.007	0.006	.249
Male	0.010	0.016	.542	0.024	0.017	0.154	−0.009	0.023	.680
Job				0.092	0.021	0.000	0.115	0.029	.000
College				0.200	0.017	0.000	0.238	0.042	.000
Married				0.237	0.022	0.000	0.278	0.028	.000
Divorced				−0.080	0.061	0.187	−0.056	0.071	.429
Religiosity				0.075	0.009	0.000	0.068	0.012	.000
Welfare				−0.112	0.043	0.009	−0.214	0.062	.001
Medication				−0.041	0.018	0.019	−0.046	0.025	.063
Intercept	4.119	0.102	.000	4.107	0.105	0.000	4.029	0.139	.000
N	10,163			10,030			5,335		
R^2	0.004			0.042			0.055		

Note. Variable definitions are in the Appendix. *SE*s and *p* values are also presented.

dress one possible source of the "baseline" or "set point" for happiness that prior work has identified (Graham, 2008; Kahneman et al., 1999). The existence of a baseline does not mean that the socioeconomic influences on happiness so far identified by researchers are unimportant. Rather, our results complement these studies and suggest a new direction for research.

As indicated by the R^2 values in Table 2—where the 5-HTTLPR genotype explains less than one percent of the variation in life satisfaction—genotype effect sizes tend to be very small. Still, contrary to a SNP, a func-

Table 5
Full Sample OLS Models of Association Between 5-HTTLPR and Life Satisfaction

	Model 1			Model 2			Model 3		
	Coefficient	*SE*	*p*	Coefficient	*SE*	*p*	Coefficent	*SE*	*p*
5-HTTLPR long	0.012	0.011	.249	0.012	0.011	.267	0.015	0.014	.287
Black	−0.127	0.020	.000	−0.120	0.021	.000			
Hispanic	−0.077	0.030	.010	−0.070	0.030	.018			
Asian	−0.102	0.032	.001	−0.114	0.032	.000			
Age	0.002	0.004	.599	−0.011	0.004	.013	−0.012	0.006	.029
Male	0.011	0.015	.440	0.024	0.015	.114	−0.000	0.020	.984
Job				0.091	0.019	.000	0.117	0.026	.000
College				0.181	0.015	.000	0.229	0.020	.000
Married				0.233	0.019	.000	0.283	0.025	.000
Divorced				−0.124	0.057	.031	−0.122	0.069	.076
Religiosity				0.085	0.008	.000	0.075	0.011	.000
Welfare				−0.136	0.040	.001	−0.198	0.058	.001
Medication				−0.045	0.032	.162	−0.060	0.022	.006
Intercept	4.122	0.092	.000	4.113	0.095	.000	4.134	0.124	.000
N	12,391			12,232			6,639		
R^2	0.004			0.044			0.058		

Note. Variable definitions are in the Appendix. *SE*s and *p* values are also presented.

© 2020 College Board

tional polymorphism such as the 5-HTTLPR variable number tandem repeat (VNTR) covers a broader fragment of the genome and is understood to have a potentially larger phenotypical influence (Can, Coe, & Eichler, 2011; Redon et al., 2006). Following on this, we also note that because the twin analysis suggests that all genes together account for about a third of the total variance that it is therefore highly likely that many other genes, in conjunction with environmental factors, help to explain how baseline happiness varies from one person to another.

Another use of work such as this is to address the problem of omitted variable bias (OVB). A missing variable might be linked to multiple parameters and thus bias the estimate of the causal effect of X on Y. To the extent that genetic attributes are a source of OVB, and to the extent that they can be added to models of economic outcomes and behaviors, accounting for such variables will improve causal estimates of other attributes.

While the Add Health study presents us with a valuable opportunity to explore a genetic basis of subjective well-being, we want to emphasize a limitation of the data. The Add Health sample is restricted to individuals who are 18–26 years old during Wave III, so our results apply only to the subjective well-being of young adults and not to people in different age categories. However, the strong similarity in the distribution of answers in the Add Health data compared with other life satisfaction surveys used in the happiness literature suggests that the age limits are not likely to gravely distort our results (Di Tella et al., 2001, 2003; Frey, 2008; Kahneman & Krueger, 2006). Our analyses in the FHS, which has a much wider age range, further suggests a degree of generalizability.

A second important limitation is that we use a case-control method that is vulnerable to population stratification. Because of limited mobility, local adaptation, and genetic drift, it is possible that people from different cultures have a different incidence of certain genotypes, which could lead to a spurious association between genotype and cultural attributes. We limit this potential threat to the validity of our results by including controls for race and limiting the analysis to a specific racial or ethnic group in Add Health. Our related association analysis in the FHS—that controls for the first 10 principal components of a singular value decomposition of the subject-genotype matrix—has been shown to effectively deal with the problem of population stratification (Price et al., 2006).

The estimates of the influence of sociodemographic, economic, and cultural covariates on life satisfaction in Table 2 corroborate the generally identified systematic effects of these variables in the literature (for a survey, see Dolan, Peasgood, & White, 2008). In particular, gender does not systematically affect happiness. Higher age has a negative, though not statistically significant effect (this is not surprising considering that our sample refers to young adults). African Americans and Asian Americans are systematically less happy than are Whites, while Latinos are somewhat happier, but not in a statistically significant way. Better educated and married individuals report having significantly higher life satisfaction, while divorced people are more unhappy. Having a job strongly raises life satisfaction. This reflects the psychic benefits of being occupied and integrated into society. At the same time it suggests that having an income raises life satisfaction. In contrast, persons on welfare are much less happy than those employed which reflects the psychic costs of unemployment. Religious individuals are significantly more happy than those without religious beliefs. Persons with less good health, as measured by the need to be on medication, are also less happy. As is the case with most research on happiness, these estimates identify correlations, not causality, given the difficulty in disentangling endogeneity. Once again, consistency with previous studies suggests that results using the Add Health data may generalize to other populations and a wider demography in terms of age.

The life satisfaction question and answer formulation used in Add Health is standard in the economics and psychology literatures (Diener & Diener, 1996; Di Tella et al., 2001; Frey, 2008; Kahneman & Krueger, 2006). This question has been cross-validated with alternative measures that gauge subjective well-being (Bartels & Boomsma, 2009; Kahneman & Krueger, 2006) and Oswald and Wu (2010) provide objective confirmation of life satisfaction as a measure of subjective well-being. Still, the life satisfaction question has been criticized for inducing a focusing illusion by drawing attention to people's rela-

© 2020 College Board

tive standing rather than moment-to-moment hedonic experience (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2006).

Conclusion

Our results corroborate prior research in suggesting that genetic factors significantly influence individual subjective well-being. Using twin study techniques we estimate that genetic variation explains about 33% of the variance in individual happiness. Moreover, using molecular genetic methods we studied the relationship between a functional polymorphism on the serotonin transporter gene (5-HTTLPR) and life satisfaction. Generally, our results provide mixed evidence for a positive association between the "long," more efficient 5-HTTLPR alleles and self-reported life satisfaction in a discovery sample and two replication samples. By moving beyond a twin study and focusing on specific genes, our analysis is among the first to consider pathways through which genes may influence happiness levels.

Given prior research linking the "short," less transcriptionally efficient, alleles of the 5-HTT gene to mood disorders, and the "long," more efficient alleles to optimism bias, we hypothesized that carriers of the "long" alleles would be more likely to report being satisfied with their lives. We find some support for this intuition in both the Add Health and FHS data, but more work needs to be done to better understand the relationship between this genotype and subjective well-being.

We have stressed that genetic factors complement, rather than substitute for, the existing studies showing the influence of sociodemographic, economic and cultural variables on life satisfaction. Future work could attempt to identify other genes or gene-environment interactions that are implicated in subjective well-being. Finding out which genes they are and what physical function they have will improve our understanding of the biological processes that underlie economic outcomes like well-being and may also shed light on their evolutionary origin (Fitzpatrick et al., 2005). While the 5-HTT gene may be a good candidate gene for further study, it is important to reemphasize that there is no single "happiness gene." Instead, there is likely to be a set of genes whose expression, in combination with environmental factors, influences subjective well-being.

More broadly, these results suggest that integrating the unique biology of each individual, in addition to studying experience and environment, may usefully complement existing models and increase their explanatory power (Caplin & Dean, 2008). We also believe that genetic association studies such as ours may be a new catalyst for two important lines of research. First, economics places a high premium on causal inference. Provided that robust genetic associations are available and that exclusion restrictions are met, genotypes could function as instrumental variables to disentangle the reverse causality in important relationships that have been plagued by endogeneity. First attempts at using genes as instruments have been tried on the link between health and educational attainment (Beauchamp et al., 2011; Fletcher & Lehrer, 2011; Norton & Han, 2008; O'Malley, Rosenquist, Zaslavsky, & Christakis, 2010; von Hinke Kessler Scholder et al., 2010). Second, integrating genetic variation and neuroscientific research may further advance our understanding of the biological underpinnings of individual behavior. For example, the work by Urry et al. (2004) presents neural correlates of subjective well-being. Some of the neurological variation they observe may result from differences in genotypes and could thus inform and stimulate new studies. Since genes are upstream from neurological processes, a better understanding of genetic variation may bring us closer to understanding the objective sources of subjective well-being.

References

Add Health Biomarker Team. (2007). Biomarkers in Wave iii of the Add Health Study. Retrieved from http://www.cpc.unc.edu/projects/addhealth/files/biomark.pdf

Alcott, H., Karlan, D., Mobius, M., Rosenblat, T., & Szeidl, A. (2007). Community size and network closure. *American Economic Review, 97,* 80–85.

Ashenfelter, O., & Krueger, A. B. (1994). Estimates of the economic return to schooling from a new sample of twins. *American Economic Review, 84,* 1157–1173.

Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical

© 2020 College Board

Sweat
by Zora Neale Hurston

It was eleven o'clock of a Spring night in Florida. It was Sunday. Any other night, Delia Jones would have been in bed for two hours by this time. But she was a wash-woman, and Monday morning meant a great deal to her. So she collected the soiled clothes on Saturday when she returned the clean things. Sunday night after church, she sorted them and put the white things to soak. It saved her almost a half day's start. A great hamper in the bedroom held the clothes that she brought home. It was so much neater than a number of bundles lying around.

She squatted in the kitchen floor beside the great pile of clothes, sorting them into small heaps according to color, and humming a song in a mournful key, but wondering through it all where Sykes, her husband, had gone with her horse and buckboard.

Just then something long, round, limp and black fell upon her shoulders and slithered to the floor beside her. A great terror took hold of her. It softened her knees and dried her mouth so that it was a full minute before she could cry out or move. Then she saw that it was the big bull whip her husband liked to carry when he drove.

She lifted her eyes to the door and saw him standing there bent over with laughter at her fright. She screamed at him.

"Sykes, what you throw dat whip on me like dat? You know it would skeer me--looks just like a snake, an' you knows how skeered Ah is of snakes."

"Course Ah knowed it! That's how come Ah done it." He slapped his leg with his hand and almost rolled on the ground in his mirth. "If you such a big fool dat you got to have a fit over a earth worm or a string, Ah don't keer how bad Ah skeer you."

"You aint got no business doing it. Gawd knows it's a sin. Some day Ah'm goin' tuh drop dead from some of yo' foolishness. 'Nother thing, where you been wid mah rig? Ah feeds dat pony. He aint fuh you to be drivin' wid no bull whip."

"You sho is one aggravatin' nigger woman!" he declared and stepped into the room. She resumed her work and did not answer him at once. "Ah done tole you time and again to keep them white folks' clothes outa dis house."

He picked up the whip and glared down at her. Delia went on with her work. She went out into the yard and returned with a galvanized tub and set it on the washbench. She saw that Sykes had kicked all of the clothes together again, and now stood in her way truculently, his whole manner hoping, praying, for an argument. But she walked calmly around him and commenced to re-sort the things.

"Next time, Ah'm gointer kick 'em outdoors," he threatened as he struck a match along the leg of his corduroy breeches.

Delia never looked up from her work, and her thin, stooped shoulders sagged further.

"Ah aint for no fuss t'night Sykes. Ah just come from taking sacrament at the church house."

He snorted scornfully. "Yeah, you just come from de church house on a Sunday night, but heah you is gone to work on them clothes. You ain't nothing but a hypocrite. One of them amen-corner Christians--sing, whoop, and shout, then come home and wash white folks clothes on the Sabbath."

He stepped roughly upon the whitest pile of things, kicking them helter-skelter as he crossed the room. His wife gave a little scream of dismay, and quickly gathered them together again.

"Sykes, you quit grindin' dirt into these clothes! How can Ah git through by Sat'day if Ah don't start on Sunday?"

"Ah don't keer if you never git through. Anyhow, Ah done promised Gawd and a couple of other men, Ah aint gointer have it in mah house. Don't gimme no lip neither, else Ah'll throw 'em out and put mah fist up side yo' head to boot."

Delia's habitual meekness seemed to slip from her shoulders like a blown scarf. She was on her feet; her poor little body, her bare knuckly hands bravely defying the strapping hulk before her.

"Looka heah, Sykes, you done gone too fur. Ah been married to you fur fifteen years, and Ah been takin' in washin' for fifteen years. Sweat, sweat, sweat! Work and sweat, cry and sweat, pray and sweat!"

"What's that got to do with me?" he asked brutally.

"What's it got to do with you, Sykes? Mah tub of suds is filled yo' belly with vittles more times than yo' hands is filled it. Mah sweat is done paid for this house and Ah reckon Ah kin keep on sweatin' in it."

She seized the iron skillet from the stove and struck a defensive pose, which act surprised him greatly, coming from her. It cowed him and he did not strike her as he usually did.

"Naw you won't," she panted, "that ole snaggle-toothed black woman you runnin' with aint comin' heah to pile up on mah sweat and blood. You aint paid for nothin' on this place, and Ah'm gointer stay right heah till Ah'm toted out foot foremost."

"Well, you better quit gittin' me riled up, else they'll be totin' you out sooner than you expect. Ah'm so tired of you Ah don't know whut to do. Gawd! how Ah hates skinny wimmen!"

A little awed by this new Delia, he sidled out of the door and slammed the back gate after him. He did not say where he had gone, but she knew too well. She knew very well that he would not return until nearly daybreak also. Her work over, she went on to bed but not to sleep at once. Things had come to a pretty pass!

She lay awake, gazing upon the debris that cluttered their matrimonial trail. Not an image left standing along the way. Anything like flowers had long ago been drowned in the salty stream that had been pressed from her heart. Her tears, her sweat, her blood. She had brought love to the union and he had brought a longing after the flesh. Two months after the wedding, he had given her the first brutal beating. She had the memory of his numerous trips to Orlando with all of his

wages when he had returned to her penniless, even before the first year had passed. She was young and soft then, but now she thought of her knotty, muscled limbs, her harsh knuckly hands, and drew herself up into an unhappy little ball in the middle of the big feather bed. Too late now to hope for love, even if it were not Bertha it would be someone else. This case differed from the others only in that she was bolder than the others. Too late for everything except her little home. She had built it for her old days, and planted one by one the trees and flowers there. It was lovely to her, lovely.

Somehow, before sleep came, she found herself saying aloud: "Oh well, whatever goes over the Devil's back, is got to come under his belly. Sometime or ruther, Sykes, like everybody else, is gointer reap his sowing." After that she was able to build a spiritual earthworks against her husband. His shells could no longer reach her. Amen. She went to sleep and slept until he announced his presence in bed by kicking her feet and rudely snatching the covers away.

"Gimme some kivah heah, an' git yo' damn foots over on yo' own side! Ah oughter mash you in yo' mouf fuh drawing dat skillet on me."

Delia went clear to the rail without answering him. A triumphant indifference to all that he was or did.

*****

The week was as full of work for Delia as all other weeks, and Saturday found her behind her little pony, collecting and delivering clothes.

It was a hot, hot day near the end of July. The village men on Joe Clarke's porch even chewed cane listlessly. They did not hurl the cane-knots as usual. They let them dribble over the edge of the porch. Even conversation had collapsed under the heat.

"Heah come Delia Jones," Jim Merchant said, as the shaggy pony came 'round the bend of the road toward them. The rusty buckboard was heaped with baskets of crisp, clean laundry.

"Yep," Joe Lindsay agreed. "Hot or col', rain or shine, jes ez reg'lar ez de weeks roll roun' Delia carries 'em an' fetches 'em on Sat'day."

"She better if she wanter eat," said Moss. "Syke Jones aint wuth de shot an' powder hit would tek tuh kill 'em. Not to huh he aint. "

"He sho' aint," Walter Thomas chimed in. "It's too bad, too, cause she wuz a right pritty lil trick when he got huh. Ah'd uh mah'ied huh mahseff if he hadnter beat me to it."

Delia nodded briefly at the men as she drove past.

"Too much knockin' will ruin any 'oman. He done beat huh 'nough tuh kill three women, let 'lone change they looks," said Elijah Moseley. "How Syke kin stommuck dat big black greasy Mogul he's layin' roun wid, gits me. Ah swear dat eight-rock couldn't kiss a sardine can Ah done throwed out de back do' 'way las' yeah."

"Aw, she's fat, thass how come. He's allus been crazy 'bout fat women," put in Merchant. "He'd a' been tied up wid one long time ago if he could a' found one tuh have him. Did Ah tell yuh 'bout him come sidlin' roun' mah wife--bringin' her a basket uh pecans outa his yard fuh a present? Yessir, mah wife! She tol' him tuh take 'em right straight back home, cause Delia works so hard ovah dat washtub she reckon everything on de place taste lak sweat an' soapsuds. Ah jus' wisht Ah'd a' caught 'im 'dere! Ah'd a' made his hips ketch on fiah down dat shell road."

"Ah know he done it, too. Ah sees 'im grinnin' at every 'oman dat passes," Walter Thomas said. "But even so, he useter eat some mighty big hunks uh humble pie tuh git dat lil 'oman he got. She wuz ez pritty ez a speckled pup! Dat wuz fifteen yeahs ago. He useter be so skeered uh losin' huh, she could make him do some parts of a husband's duty. Dey never wuz de same in de mind."

"There oughter be a law about him," said Lindsay. "He aint fit tuh carry guts tuh a bear."

Clarke spoke for the first time. "Taint no law on earth dat kin make a man be decent if it aint in 'im. There's plenty men dat takes a wife lak dey do a joint uh sugar-cane. It's round, juicy an' sweet when dey gits it. But dey squeeze an' grind, squeeze an' grind an' wring tell dey wring every drop uh pleasure dat's in 'em out. When dey's satisfied dat dey is wrung dry, dey treats 'em jes lak dey do a cane-chew. Dey throws em away. Dey knows whut dey is doin' while dey is at it, an' hates theirselves fuh it but they keeps on hangin' after huh tell she's empty. Den dey hates huh fuh bein' a cane-chew an' in de way."

"We oughter take Syke an' dat stray 'oman uh his'n down in Lake Howell swamp an' lay on de rawhide till they cain't say Lawd a' mussy.' He allus wuz uh ovahbearin' niggah, but since dat white 'oman from up north done teached 'im how to run a automobile, he done got too biggety to live--an' we oughter kill 'im," Old Man Anderson advised.

A grunt of approval went around the porch. But the heat was melting their civic virtue, and Elijah Moseley began to bait Joe Clarke.

"Come on, Joe, git a melon outa dere an' slice it up for yo' customers. We'se all sufferin' wid de heat. De bear's done got me!"

"Thass right, Joe, a watermelon is jes' whut Ah needs tuh cure de eppizudicks," Walter Thomas joined forces with Moseley. "Come on dere, Joe. We all is steady customers an' you aint set us up in a long time. Ah chooses dat long, bowlegged Floridy favorite."

"A god, an' be dough. You all gimme twenty cents and slice way," Clarke retorted. "Ah needs a col' slice m'self. Heah, everybody chip in. Ah'll lend y'll mah meat knife."

The money was quickly subscribed and the huge melon brought forth. At that moment, Sykes and Bertha arrived. A determined silence fell on the porch and the melon was put away again.

Merchant snapped down the blade of his jackknife and moved toward the store door.

"Come on in, Joe, an' gimme a slab uh sow belly an' uh pound uh coffee--almost fuhgot 'twas Sat'day. Got to git on home." Most of the men left also.

Just then Delia drove past on her way home, as Sykes was ordering magnificently for Bertha. It pleased him for Delia to see.

"Git whutsoever yo' heart desires, Honey. Wait a minute, Joe. Give huh two bottles uh strawberry soda-water, uh quart uh parched ground-peas, an' a block uh chewin' gum."

With all this they left the store, with Sykes reminding Bertha that this was his town and she could have it if she wanted it.

The men returned soon after they left, and held their watermelon feast.

"Where did Syke Jones git da 'oman from nohow?" Lindsay asked.

"Ovah Apopka. Guess dey musta been cleanin' out de town when she lef'. She don't look lak a thing but a hunk uh liver wid hair on it."

"Well, she sho' kin squall," Dave Carter contributed. "When she gits ready tuh laff, she jes' opens huh mouf an' latches it back tuh de las' notch. No ole grandpa alligator down in Lake Bell ain't got nothin' on huh."

*****

Bertha had been in town three months now. Sykes was still paying her room rent at Della Lewis'--the only house in town that would have taken her in. Sykes took her frequently to Winter Park to "stomps." He still assured her that he was the swellest man in the state.

"Sho' you kin have dat lil' ole house soon's Ah kin git dat 'oman outa dere. Everything b'longs tuh me an' you sho' kin have it. Ah sho' 'bominates uh skinny 'oman. Lawdy, you sho' is got one portly shape on you! You kin git anything you wants. Dis is mah town an' you sho' kin have it."

Delia's work-worn knees crawled over the earth in Gethsemane and up the rocks of Calvary many, many times during these months. She avoided the villagers and meeting places in her efforts to be blind and deaf. But Bertha nullified this to a degree, by coming to Delia's house to call Sykes out to her at the gate.

Delia and Sykes fought all the time now with no peaceful interludes. They slept and ate in silence. Two or three times Delia had attempted a timid friendliness, but she was repulsed each time. It was plain that the breaches must remain agape.

The sun had burned July to August. The heat streamed down like a million hot arrows, smiting all things living upon the earth. Grass withered, leaves browned, snakes went blind in shedding and men and dogs went mad. Dog days!

Delia came home one day and found Sykes there before her. She wondered, but started to go on into the house without speaking, even though he was standing in the kitchen door and she must either stoop under his arm or ask him to move. He made no room for her. She noticed a soap box beside the steps, but paid no particular attention to it, knowing that he must have brought it there. As she was stooping to pass under his outstretched arm, he suddenly pushed her backward, laughingly.

"Look in de box dere Delia, Ah done brung yuh somethin'!"

She nearly fell upon the box in her stumbling, and when she saw what it held, she all but fainted outright.

"Syke! Syke, mah Gawd! You take dat rattlesnake 'way from heah! You gottuh. Oh, Jesus, have mussy!"

"Ah aint gut tuh do nuthin' uh de kin'--fact is Ah aint got tuh do nothin' but die. Taint no use uh you puttin' on airs makin' out lak you skeered uh dat snake--he's gointer stay right heah tell he die. He wouldn't bite me cause Ah knows how tuh handle 'im. Nohow he wouldn't risk breakin' out his fangs 'gin yo' skinny laigs."

"Naw, now Syke, don't keep dat thing 'roun' heah tuh skeer me tuh death. You knows Ah'm even feared uh earth worms. Thass de biggest snake Ah evah did see. Kill 'im Syke, please."

"Doan ast me tuh do nothin' fuh yuh. Goin' roun' trying' tuh be so damn asterperious. Naw, Ah aint gonna kill it. Ah think uh damn sight mo' uh him dan you! Dat's a nice snake an' anybody doan lak 'im kin jes' hit de grit."

The village soon heard that Sykes had the snake, and came to see and ask questions.

"How de hen-fire did you ketch dat six-foot rattler, Syke?" Thomas asked.

"He's full uh frogs so he caint hardly move, thass how. Ah eased up on 'm. But Ah'm a snake charmer an' knows how tuh handle 'em. Shux, dat aint nothin'. Ah could ketch one eve'y day if Ah so wanted tuh."

"Whut he needs is a heavy hick'ry club leaned real heavy on his head. Dat's de bes 'way tuh charm a rattlesnake."

"Naw, Walt, y'll jes' don't understand dese diamon' backs lak Ah do," said Sykes in a superior tone of voice.

The village agreed with Walter, but the snake stayed on. His box remained by the kitchen door with its screen wire covering. Two or three days later it had digested its meal of frogs and literally came to life. It rattled at every movement in the kitchen or the yard. One day as Delia came down the kitchen steps she saw his chalky-white fangs curved like scimitars hung in the wire meshes. This time she did not run away with averted eyes as usual. She stood for a long time in the doorway in a red fury that grew bloodier for every second that she regarded the creature that was her torment.

That night she broached the subject as soon as Sykes sat down to the table.

"Syke, Ah wants you tuh take dat snake 'way fum heah. You done starved me an' Ah put up widcher, you done beat me an Ah took dat, but you done kilt all mah insides bringin' dat varmint heah."

Sykes poured out a saucer full of coffee and drank it deliberately before he answered her.

"A whole lot Ah keer 'bout how you feels inside uh out. Dat snake aint goin' no damn wheah till Ah gits ready fuh 'im tuh go. So fur as beatin' is concerned, yuh aint took near all dat you gointer take ef yuh stay 'roun' me."

Delia pushed back her plate and got up from the table. "Ah hates you, Sykes," she said calmly. "Ah hates you tuh de same degree dat Ah useter love yuh. Ah done took an' took till mah belly is full up tuh mah neck. Dat's de reason Ah got mah letter fum de church an' moved mah membership tuh Woodbridge--so Ah don't haf tuh take no sacrament wid yuh. Ah don't wantuh see yuh 'roun' me atall. Lay 'roun' wid dat 'oman all yuh wants tuh, but gwan 'way fum me an' mah house. Ah hates yuh lak uh suck-egg dog."

Sykes almost let the huge wad of corn bread and collard greens he was chewing fall out of his mouth in amazement. He had a hard time whipping himself up to the proper fury to try to answer Delia.

"Well, Ah'm glad you does hate me. Ah'm sho' tiahed uh you hangin' ontuh me. Ah don't want yuh. Look at yuh stringey ole neck! Yo' rawbony laigs an' arms is enough tuh cut uh man tuh death. You looks jes' lak de devvul's doll-baby tuh me. You cain't hate me no worse dan Ah hates you. Ah been hatin' you fuh years."

"Yo' ole black hide don't look lak nothin' tuh me, but uh passle uh wrinkled up rubber, wid yo' big ole yeahs flappin' on each side lak uh paih uh buzzard wings. Don't think Ah'm gointuh be run 'way fum mah house neither. Ah'm goin' tuh de white folks bout you, mah young man, de very nex' time you lay yo' han's on me. Mah cup is done run ovah." Delia said this with no signs of fear and Sykes departed from the house, threatening her, but made not the slightest move to carry out any of them.

That night he did not return at all, and the next day being Sunday, Delia was glad she did not have to quarrel before she hitched up her pony and drove the four miles to Woodbridge.

She stayed to the night service--"love feast"--which was very warm and full of spirit. In the emotional winds her domestic trials were borne far and wide so that she sang as she drove homeward.

"Jurden water, black an' col'
Chills de body, not de soul
An' Ah wantah cross Jurden in uh calm time."
She came from the barn to the kitchen door and stopped.
"Whut's de mattah, ol' satan, you aint kickin' up yo' racket?" She addressed the snake's box.
Complete silence. She went on into the house with a new hope in its birth struggles. Perhaps her threat to go to the white folks had frightened Sykes! Perhaps he was sorry! Fifteen years of misery and suppression had brought Delia to the place where she would hope anything that looked towards a way over or through her wall of inhibitions.

She felt in the match safe behind the stove at once for a match. There was only one there.

"Dat niggah wouldn't fetch nothin' heah tuh save his rotten neck, but he kin run thew whut Ah brings quick enough. Now he done toted off nigh on tuh haff uh box uh matches. He done had dat 'oman heah in mah house, too."

Nobody but a woman could tell how she knew this even before she struck the match. But she did and it put her into a new fury.

Presently she brought in the tubs to put the white things to soak. This time she decided she need not bring the hamper out of the bedroom; she would go in there and do the sorting. She picked up the pot-bellied lamp and went in. The room was small and the hamper stood hard by the foot of the white iron bed. She could sit and reach through the bedposts--resting as she worked.

"Ah wantah cross Jurden in uh calm time," she was singing again. The mood of the "love feast" had returned. She threw back the lid of the basket almost gaily. Then, moved by both horror and terror, she sprang back toward the door. There lay the snake in the basket! He moved sluggishly at first, but even as she turned round and round, jumped up and down in an insanity of fear, he began to stir vigorously. She saw him pouring his awful beauty from the basket upon the bed, then she seized the lamp and ran as fast as she could to the kitchen. The wind from the open door blew out the light and the darkness added to her terror. She sped to the darkness of the yard, slamming the door after her before she thought to set down the lamp. She did not feel safe even on the ground, so she climbed up in the hay barn.

There for an hour or more she lay sprawled upon the hay a gibbering wreck.

Finally, she grew quiet, and after that, coherent thought. With this, stalked through her a cold, bloody rage. Hours of this. A period of introspection, a space of retrospection, then a mixture of both. Out of this an awful calm.

"Well, Ah done de bes' Ah could. If things aint right, Gawd knows taint mah fault."

She went to sleep--a twitch sleep--and woke up to a faint gray sky. There was a loud hollow sound below. She peered out. Sykes was at the wood-pile, demolishing a wire-covered box.

He hurried to the kitchen door, but hung outside there some minutes before he entered, and stood some minutes more inside before he closed it after him.

The gray in the sky was spreading. Delia descended without fear now, and crouched beneath the low bedroom window. The drawn shade shut out the dawn, shut in the night. But the thin walls held back no sound.

"Dat ol' scratch is woke up now!" She mused at the tremendous whirr inside, which every woodsman knows, is one of the sound illusions. The rattler is a ventriloquist. His whirr sounds to the right, to the left, straight ahead, behind, close under foot--everywhere but where it is. Woe to him who guesses wrong unless he is prepared to hold up his end of the argument! Sometimes he strikes without rattling at all.

Inside, Sykes heard nothing until he knocked a pot lid off the stove while trying to reach the match safe in the dark. He had emptied his pockets at Bertha's.

The snake seemed to wake up under the stove and Sykes made a quick leap into the bedroom. In spite of the gin he had had, his head was clearing now.

"'Mah Gawd!" he chattered, "ef Ah could on'y strack uh light!"

The rattling ceased for a moment as he stood paralyzed. He waited. It seemed that the snake waited also.

"Oh, fuh de light! Ah thought he'd be too sick"--Sykes was muttering to himself when the whirr began again, closer, right underfoot this time. Long before this, Sykes' ability to think had been flattened down to primitive instinct and he leaped--onto the bed.

Outside Delia heard a cry that might have come from a maddened chimpanzee, a stricken gorilla. All the terror, all the horror, all the rage that man possibly could express, without a recognizable human sound.

A tremendous stir inside there, another series of animal screams, the intermittent whirr of the reptile. The shade torn violently down from the window, letting in the red dawn, a huge brown hand seizing the window stick, great dull blows upon the wooden floor punctuating the gibberish of sound long after the rattle of the snake had abruptly subsided. All this Delia could see and hear from her place beneath the window, and it made her ill. She crept over to the four-o'clocks and stretched herself on the cool earth to recover.

She lay there. "Delia. Delia!" She could hear Sykes calling in a most despairing tone as one who expected no answer. The sun crept on up, and he called. Delia could not move--her legs were gone flabby. She never moved, he called, and the sun kept rising.

"Mah Gawd!" She heard him moan, "Mah Gawd fum Heben!" She heard him stumbling about and got up from her flower-bed. The sun was growing warm. As she approached the door she heard him call out hopefully, "Delia, is dat you Ah heah?"

She saw him on his hands and knees as soon as she reached the door. He crept an inch or two toward her--all that he was able, and she saw his horribly swollen neck and his one open eye shining with hope. A surge of pity too strong to support bore her away from that eye that must, could not, fail to see the tubs. He would see the lamp. Orlando with its doctors was too far. She could scarcely reach the Chinaberry tree, where she waited in the growing heat while inside she knew the cold river was creeping up and up to extinguish that eye which must know by now that she knew.

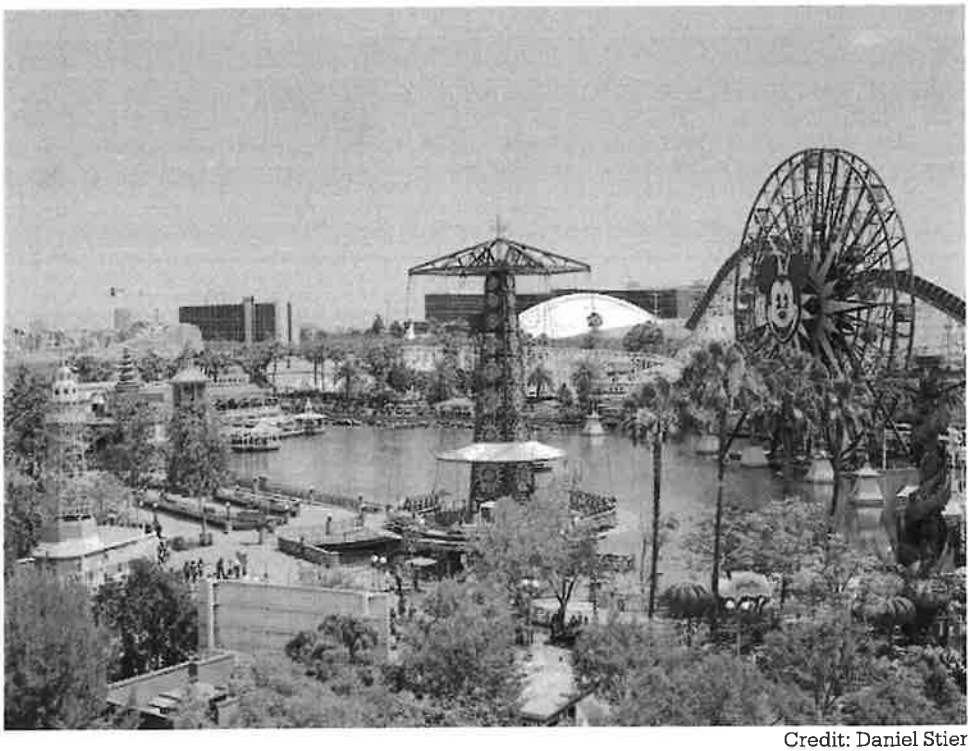
1926

The Happiness Project

By Andrew O'Hagan
from *T: The New York Times Style Magazine*

July 17, 2015

Walt Disney didn't just build a theme park for childhood fantasy. He created a world we believe in, and a journey to the land of the better self.



Credit: Daniel Stier

With Disneyland, Walt Disney fashioned an American nirvana in Anaheim, Calif.

A few years ago I was driving around Hollywood in a rental car I'd inherited from the folk singer Beth Orton. We were guests under the Hollywood sign, Beth had a small baby, and it was time for her to go back to London and I kept the car. People leave stuff behind in a car; you get to know them by their parking stubs and beverage stirrers. But Beth's an original: She left me a CD compilation of the best of the Disney songs, and I cried for two weeks as I drove up Santa Monica Boulevard or over Laurel Canyon or to the beach. I cried in Griffith Park and on the freeway to a shopping mall in Sherman Oaks. I wasn't sad; I was just, well, Disneyfied — enjoying the small tearful yearnings that come with those songs. One night I stopped at a beautiful edge on Mulholland Drive and looked at the twinkling lights of the city, the years seeming to roll back with Louis Armstrong's version of "When You Wish Upon a Star."

Fate is kind
She brings to those who love
The sweet fulfillment of
Their secret longing.

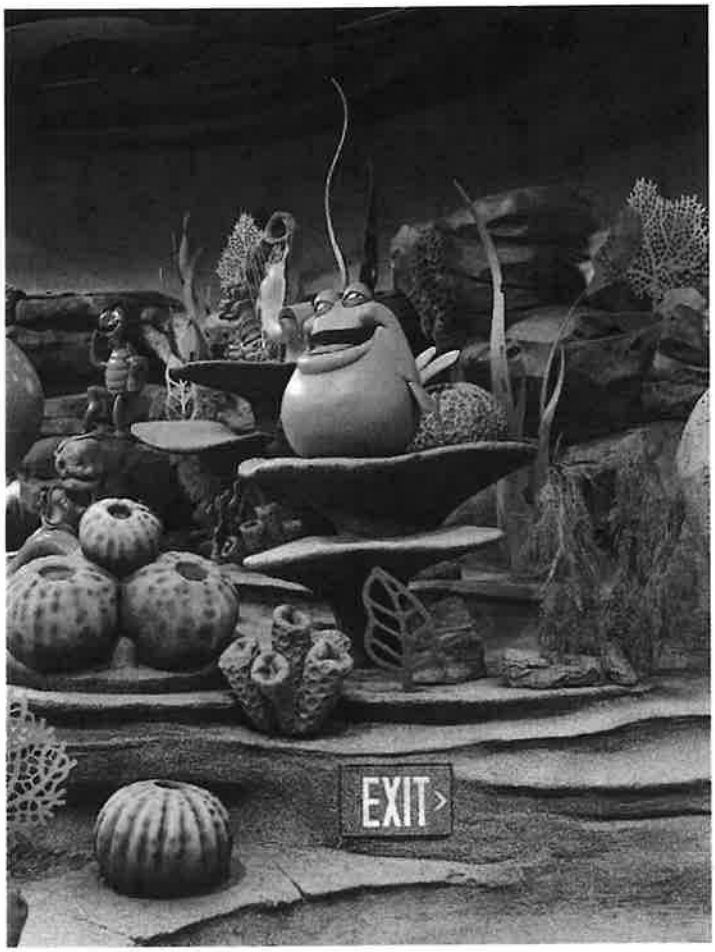
© 2020 College Board

If modern sentiment has an architecture, it was Disney that built it. Disney furnished the house and chose the curtains, Disney stocked the fridge. In time, the power of Disney came to light up your hall and your landing, its vapors making their way over your vacuumed carpets and into the minds of your children. Disney offers a hand to anybody who ever dreamed that the earth is all of heaven we shall ever know. To love color, to love style, to know yourself in an element of fantasy, is to think in the terms forged by Walt Disney. Driving the roads that summer on the West Coast, I understood the significance of an ideal that had never felt wrong or tired — it was the Disney aesthetic, a delicate passion ruled by hope, a sense of necessary invention, and yet a sense of loss always embedded at the root of every extravagance.

I first saw a Disney film in the Scottish industrial town of Kilmarnock, on a typically cold and wet day in the 1970s. When foreigners think of Scotland they often think of beautiful mountains and deep shadowy glens, apple-cheeked girls wearing tartan, men in kilts drinking whisky and staring bravely into the future. In other words: They think of "Brigadoon." But it's worth remembering that when Arthur Freed, the well-known producer of musicals at MGM, was scouting locations for that film, he came back from Scotland disappointed, complaining it didn't look "Scottish enough." So the town of Kilmarnock — despite being the place from where the great poet Robert Burns published his debut poems, the famous Kilmarnock edition — was a place where dreams had traditionally come crashing down. The cinema was half-empty, and I was young enough to need a booster seat, but I'll never forget it, the return of "Snow White and the Seven Dwarfs," which seemed to me like a vision of higher possibility.

Never for a second did it appear to me implausible. Never for a moment did it look unreal or exaggerated or in any way fake. If it was fabricated or designed, then it appeared so, to me, only in the way life was fabricated or designed: Snow White and her prince and her little friends were agents in a social-realist drama, a description of society and moral life that was fundamentally true and based on observed experience. I knew it was high end. I knew it was dreamy. But it was not impossible, and it seemed we all had an obligation to live as colorfully as that, if only the gods and the reality managers would allow it. My love affair with America started when a lady from old Europe looked in a magic mirror and saw a pretty girl. My entire sense of work and play, of domestic life and love, was informed by that film, and stamped American, not because I recognized it from life, but because I wanted to. I was too young to recognize the look — the German Expressionist aspect of that film, by way of Gustave Doré — but it seeped into my unconscious and expanded for all time my wish to transport myself. My father was beside me. He believed in the innate absurdity of human effort, and the habits of the dwarfs delighted him. It's all tangled up now — it always is, and that's how Disney captures you for life, by generating tenderness mingled with regret — but the singing of "Heigh-Ho" on the car journey home will always stay with me as part of the lost essence of my family.

© 2020 College Board



Credit: Daniel Stier

Most parents have lived with the characters of "The Little Mermaid," but to travel into their "world" is to join your child in an enchantment she never knew could be realized.

Walt Disney spent part of his childhood in Marceline, Mo., a railroad town and former prairie, 120 miles northeast of Kansas City. Its central street in the early 1900s, when Disney was a child, became a model for an idea of American happiness, and a version of it, Main Street, U.S.A., is the first thing you come across in Disneyland Park in California. Before he became king of the irresistible falsehood, Walt Disney was merely a child, and in his works we might understand what Freud viewed as the foolishness of American democracy. The Disney view of happiness — embodied in a perfect street, a cast of animals, a fairy-tale castle, a bunch of rides — might be foolish but it is also attuned to the habits of modern yearning. Freud was for bringing illusions to an end, whereas Walt Disney was for bringing them to fruition, and, in those two views of human progress, we might argue that Disney's was the more forgiving of the human condition. In the world of Disney, we feel homesick for a home that never really existed, yet everything we care about, whether being loved or feeling right or having fun or looking good, stems from a set of narcissistic compulsions that Disney embraced and built to graphic completion. That is his contribution, and, however foolish, however impossible in the end, it gives life to the notion that happiness is a creation, something made rather than

© 2020 College Board

inherited, a beautiful, necessary lie. A poet once said, "There are plenty of ruined buildings in the world but no ruined stones." But who can live in a world of stones? One might argue, along with Walt Disney, that the reality we love is the reality we bought into.

I brought my daughter, Nell, and her aunt Sophia. In the British way, Sophia isn't really her aunt, but she's helped bring Nell up, and is family. I was thinking as the plane took off about modern Disney's design for living and how expensive it is. If you ask a young Russian or an Iranian who love America why they love it, they believe it is a happiness mall. They believe you can pay your way to being anything you fancy and that it represents a kind of genius, possessed and managed by corporations. They speak of Apple and Disney, Coke or Ralph Lauren, all the entertainment, technology and fashion companies, as if they harvest the atoms of well-being and sell them to the world, and this, to young non-Americans directed by such dreams, is the meaning of freedom today. Especially Disney, because Disney usually comes with a song and a doll your child can take to bed. My daughter was excited for Disneyland, she said, because it was like going on a magic journey. She asked if the shops would be open all day and all night and whether the food was free. "Nothing is free, darling," I said, "but it is free to you and that's why it's a treat. We're going to have a wonderful time."

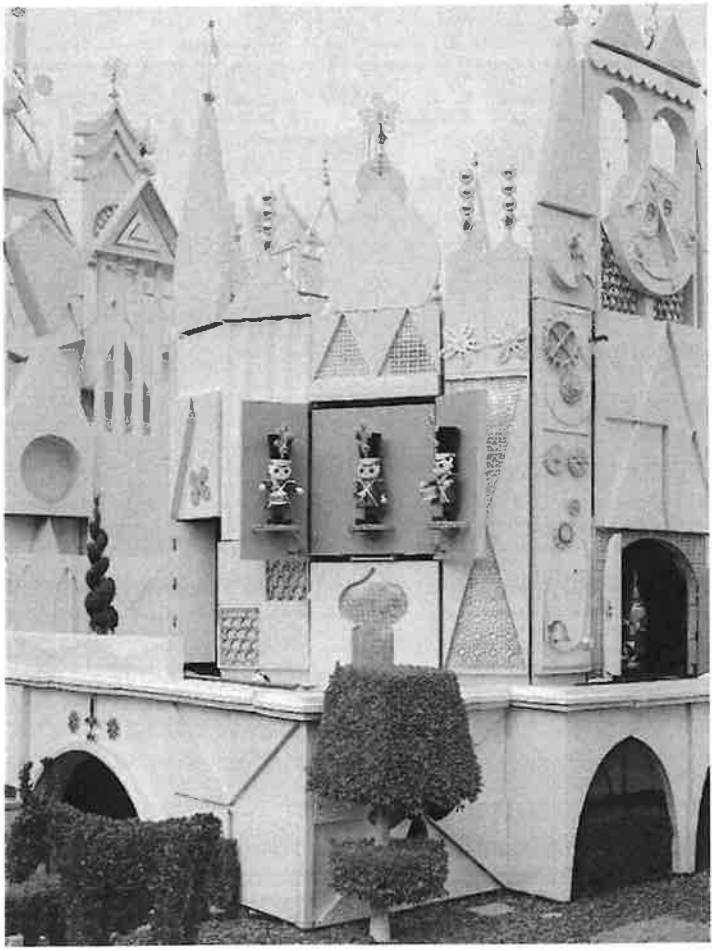
I think the gods of reality like revenge. They were watching us. Flying over the Atlantic, I woke up shivering and with swollen sinuses and a feeling of a coming flu like a gathering storm, a tempest in my happiness firmament, and I perceived from that moment a kind of Miltonic rebellion rising inside my head. A writer, you might say, is someone with an acute interest in oppositions, and our journey toward Disneyland was by necessity going to involve a certain conjuring with misery. My body did it by itself. And by the time we were standing at reception in Disney's Grand Californian Hotel & Spa, I was sneezy, I was dozy, I was happy but suffering a private existential crisis about what happiness meant. The hotel, to me, is a mountain chalet as imagined by Lewis Carroll and Charles Rennie Mackintosh. It is a riot of wooden balconies and iron flowers, which they say are inspired by the California Arts & Crafts movement. Disney music, that endless, tinkling sound of make-believe and mend, was playing through the universe — or was it just the street? — and I lay on the Disney bed and felt simply awful. And it felt like a crime. It felt like a crime against fantasy and against good times. We'd traveled all our lives to this spot of loveliness, and now I was roiling on the pillows and asking for the company doctor? As it happened, there wasn't one, and I was put through to a medical call center somewhere in Anaheim. Let me just say that a part of me will forever be lying bravely on that bed in Disneyland, with grinding bones and head of fire, while the music from "The Lion King" mocks me from the window.

© 2020 College Board

Nell came back that evening levitating with gladness. It was as if she'd met the world as it really should be, and it was bliss to see her so full of faith. Walt Disney wanted to build a place that would stand against the horrors of the known world, where rockets were Golden Zephyrs, not nuclear weapons, where trains could be any color of the rainbow, made for the transport of children, not prisoners. And where every fear came wrapped in a yelp of sheer delight. With Disneyland, Walt Disney felt he was giving America a better version of itself: "The idea of Disneyland is a simple one," he wrote in a prospectus for the park. "It will be a place for people to find happiness and knowledge. It will be a place for parents and children to share pleasant times in one another's company; a place for teacher and pupils to discover greater ways of understanding and education. Here the older generation can recapture the nostalgia of days gone by, and the younger generation can savor the challenge of the future." The press opening, on July 17, 1955, was a fiasco — there was no drinking water, many of the attractions closed early and the TV broadcast was wild and amateur — and one might argue that the design and the idea of Disneyland has a fear of disaster embedded in it. Happiness, after all, is like that. We can hardly live with happiness for the fear of it suddenly ending. In the days after I left Disneyland, I walked through Los Feliz looking, as it were, for the footprints of Walt Disney, the man. Some have said he was a person with demons, and perhaps creating his own small world was a kind of compensation. In any case, what he created was a new way of thinking about life and dreaming, a kind of American Eden linked from his day to ours by an unfailing investment of common belief and a love of invention and dollars.

He found a key in memory, and built, in Disneyland, a resort that both creates memories and indulges them. By going there as adults, we are visiting a part of our belief system that experience has failed to dull, and, for our children, we are creating a memory with the hope that the same thing will happen for them. Mr. Disney had a genius for bridging the gap between childhood and adult longing and he made a universal out of that, as well as a brand. Of the thousands of reviews left on TripAdvisor, one sums this up for me. It's from a woman called Kathryn in New Zealand, left on May 31, 2015, with the headline: "I felt like the best parent in the world": "My husband and I grew up watching Disney every Sunday night. For us, going to Disneyland had always been a dream.... We always knew we wanted to take our children there, and we got the opportunity last Christmas. When we walked in, I felt like crying with happiness, and over the three days we visited, that feeling never went away."

© 2020 College Board



Credit: Daniel Stier

If the real world is in some ways a daunting prospect for most children, then It's a Small World exists at their level. Created for the 1964 World's Fair, the boat ride takes passengers past singing dolls representing youngsters of many nationalities, all apparently within reach.

Nell came into our hotel room with a rasping love of the place that got me up from my philosophical sickbed. We went into the Disney California Adventure Park and found ourselves in a colored clamshell, entering the Little Mermaid: Ariel's Undersea Adventure, a ride in the Paradise Pier section. Lights and cold air gave us the illusion of floating underwater, and Nell looked up at me to see if I was believing. "This is awesome," I said.

"A bit awesome," she said.

"You mean, 'not really'?"

"I dunno. I like her face," she said. By this point in the ride Ariel was singing "Part of Your World" and every fiber in my sick being was saying "Yes. Yes, we are."

"I think Daddy likes it more than me," Nell said.

© 2020 College Board