Rationality and Capitalist Schooling

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Abstract

In the field of philosophy of mind, the concepts of rational behavior, rational choice theory, and instrumental rationality (the "practical reasoning" version of rationality) are important in trying to make statements and conclusions about human thinking and behavior in general. Rational choice theory is also considered a normative but not a descriptive or positive theory. Much of economic theory is based on the principle that economic agents usually or always behave rationally in maximizing the benefits and/or minimizing the costs of their decisions. Developments in behavioral economics over the last several decades have begun to question this principle with much of the questioning about rationality and rational behavior centering on whether individuals can correctly and adequately assess probabilities and risk/reward. The inability to correctly assess risk/reward limits rational behavior and can yield sub-optimal outcomes for economic agents. This exploratory paper examines the linkages between schooling in a capitalist society and limits on rationality in a monopoly capital economic system.

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Introduction

  Jaworski (2011) writes that "intentionality and rationality are central to a public conception of mental phenomena" (page 30) and that "[T]o describe people's behavior in terms of their beliefs, desires, and other intentional mental states is to classify that behavior as something that is explainable by appeal to reasons" (page 31). One who acts consistently with his/her beliefs, desires, and other intentional mental states are thought or deemed to be behaving rationally. Irrational behavior is when one does not act consistently with his/her beliefs, desires, or attitudes (BDA) or acts contrary to her/his beliefs or goals.

  In the field of economics, rationality is an important concept to many economists in that rationality is used to explain the actions of agents/participants in different markets at the microeconomic (individual market) and macroeconomic (aggregate markets) levels. The MIT Dictionary of Modern Economics states,

> **Rationality.** Behavior by an economic agent (consumer, producer, government, etc.) which is consistent with a set of rules governing preferences. In consumer demand theory, for example, the rules, or axioms, would include the axioms of completeness, transitivity, and selection. Additional axioms are necessary to establish a testable theory of rational economic behavior. (page 360).

And to go along with this, there is the definition or concept of "economic man/woman" in which each person is assumed to maximize his/her *utility* (happiness) subject to such constraints as income, available information for decision making, and his/her preferences. An economic person is rational by maximizing his/her utility subject to his/her constraints, although if one does not pursue utility maximization, the main point is that each individual pursues his/her goals in a consistent manner[1] (MIT Dictionary of Modern Economics 1989). This concept is applied

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[1] One can moderate her/his utility maximization by acts of charity or altruism. However, if this gives one happiness and helps to maximize her/his happiness, then it can be considered utility maximization for that individual. Also, actions of moral hazard (reckless actions) should not be confused with irrational behavior since those who behave

to consumers, producers, managers, political leaders, and all participants in a market economy. By each person pursuing his/her own utility maximization, an entire society is made better off in as many ways possible along the lines of Adam Smith's notion of each person pursuing his/her self-interest, and this in turn increases societal wealth (Smith 2000).

But whether one looks at rationality from a philosophy of mind point of view or from the discipline of economics point of view, there exists a debate about whether humans act rationally, and if they do act rationally, do they act sufficiently rational? In other words, the latter point refers to the question of how rational is rational enough, or to what degree should rationality be evaluated and held to be consistent. That is, if we believe that most people act and behave rationally, should the rationality of human behavior hold 100% of the time, 90% of the time, etc., and how can or how should rationality be evaluated? Should it be evaluated according to humans never making mistakes or never appearing to do or say things contrary to their BDA, or should it be evaluated according to humans mostly never making mistakes, etc.? Should incorrectly estimating the probabilities of the occurrences of certain events be considered irrational, or is this something to be considered rational within certain reasons or bounds? Should one's preferences be allowed to change, or is this a sign of inconsistency, and thus a sign of irrationality? Is one's *trying* to think, act and behave rationally and consistently sufficient for rationality, or should a higher standard hold for rationality? In surveying the literature on rationality, the answers to these questions are not entirely clear, although economics is criticized

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in a morally hazardous way often do so because they know someone will come to their rescue despite their reckless behavior. Acting under conditions of asymmetric information is also not considered irrational behavior in that under conditions of asymmetric information one is at a disadvantage in an exchange with another party due to his/her having less information than the other party. For example, in buying a used car, one cannot know everything about the car's past history and performance whereas the original owner would. For this reason, many laws have been enacted that require used car dealerships to give the name and number of a previous owner to a prospective buyer in order to correct for asymmetries in information between buyers and sellers.

as assuming that most or all market participants act with either full or bounded rationality, assumptions which some argue are not realistic. This is especially true, according to the critics, when one considers the educational backgrounds of different economic agents. This paper discusses the assumption of rationality and how it is influenced in a capitalist society through an educational system challenged by class differences and poverty.[2]

The Debate or "War" Over Rationality

In reviewing the literature on the so-called rationality debate, most of the controversy appears to center around the path-breaking work of the psychologists Daniel Kahneman and Amos Tversky (Kahneman and Tversky 1979, Kahneman, Slovic, and Tversky 1982, Kahneman 2003, Kahneman 2011) as well as to a lesser but still important degree the work of the economist Richard Thaler (2015).[3] Neoclassical economics has always argued that most human agents think and act in a rational manner as the MIT Dictionary definition cited above indicates. This is different from heterodox economics views of human thinking and behavior. Karl Marx and Frederick Engels (1932) are credited with seeing human action and thought as mostly being influenced and dominated by a society arranged according to social class where societal values and norms are those of the wealthiest and most powerful political class. In contrast to economists who subscribed to full rationality, the iconoclastic economist Thorstein Veblen rejected the idea of a calculating robot as an economic person and thought a better view of human thinking and behavior was mostly along the lines of humans engaging in pragmatic action and having habits and instincts which were strongly influenced by human and societal

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[2] This paper will mostly focus on the theme of rationality at the level of the individual with some discussion of collective action.

[3] Kahneman won the Nobel Prize in Economics in 2002, and Thaler won it in 2017. Tversky did not receive an award because he passed away in 1996.

institutions (Yilmaz 2007, Brette, Lazaric, and da Silva 2017). In the field of macroeconomics, John Maynard Keynes (1936) is noted for his concept of "animal spirits" in which investors and industry leaders can act either too cautiously (bearish behavior) or too optimistically (bullish behavior) when such behavior is not warranted or even irrational from a rational agent's perspective. Herbert Simon's (1978 and 1997) concept of bounded rationality modifies the concept of full rationality or perfect rationality by stating that agents in complex situations often do not have all of the information, time, or cognitive abilities needed to make the best decisions possible, and so reaching optimal decisions is often illusive. Therefore, most agents choose to "satisifice" in their decision making regarding their goals and pursuits. That is, and for example, instead of trying to attain profit maximization, private sector managers will often try to attain a satisfactory level of profits given their organization's constraints, competitors, etc.

Despite Veblen's, Keynes', Simon's and other non-mainstream economists' appeals to realism in rationality, they have mostly been ignored. In Simon's concept of bounded rationality, the economics profession is accused of celebrating the idea (Simon won a Nobel Prize in Economics in 1978) but mostly ignoring it by continuing to teach and practice the concept of full rationality in its models and theories because using the concept of bounded rationality complicates many of these models which center around optimization and an attempt to make economics as similar to physics as possible (Thaler 2015, pages 5 and 23).[4]

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[4] While the author was in a graduate school economics program, most of the textbooks and instructors pretty much followed the assumption of full or nearly full rationality regarding the behavior of economic agents. Keynesianism was on its way out, and rational expectations was at full strength in macroeconomics, and in microeconomics, utility curves and revealed preferences always assumed rationality, which was basically full rationality. If questions were raised about whether people are fully rational or not, the general and usual response was that it does not matter. The main assumption was that people are *trying* to behave or act with full rationality, although the outcomes or results of their behavior may not always reflect it. In reviewing the two of the main books used by the author in graduate school for advanced microeconomics, Nicholson (1989) and Varian (1992), there is no mention of Simon or bounded rationality. The emphasis of each book is on full rationality.

The work of Kahneman and Tversky, as well as the subsequent work of Thaler, created quite a stir in the rationality debate and especially in the field of economics. These men are considered pioneers in the field of behavioral economics. Kahneman and Tversky (1979) developed the concept of "prospect theory", which in general held that people set the framework for a decision according to their past experiences and the outcomes of those past experiences (Barberis 2013). This helps to make the decision-making process easier and helps one to understand the degree of risk and uncertainty in a situation according to his/her "heuristics and biases." They showed in their experiments that most people have a great degree of difficulty in assessing the probability of certain events, and people often used simple heuristics and biases in making a decision. That is, people tended to make decisions based on how they made decisions in the past using certain rules of thumb or experience and according to the outcomes of those past decisions. Perhaps more importantly, the successful outcome (a subjective matter) of the decisions may not have been based so much on the practicality or rationality of the heuristic or bias but in some cases due to chance.

Additionally, they found that the alternatives that one faces in making a decision are analyzed according to 1) whether there will be gains or losses in reference to one's present state of wealth or income; 2) one's attitude toward risk where it is usually found in experiments that most people are risk averse and fear potential losses much more than potential gains whereas neoclassical (mainstream) economic theory predicts that most people should be neutral toward risk and weigh gains and losses equally; 3) probability estimates of future events wherein most participants in experiments tend to overestimate low probabilities and underestimate high probabilities of events whereas mainstream theory would contend that such probabilities should

be estimated with a high degree of accuracy;[5] and 4) how much the gain or loss is relative to one's income or wealth since experiments show that the greater one's wealth or income, one has decreasing sensitivity to gains or losses whereas mainstream theory indicates that wealth or income levels should not matter. Yet Kahneman and Tversky show research where two people have the same level of wealth and income, yet one has less utility or overall happiness than the other, all else held constant, because one has just suffered a loss of income whereas the other has just enjoyed a gain or raise in his/her income or wealth. Mainstream theory would indicate that their levels of utility would be the same, although behavioral economists would say that the levels of utility are not equal even though their levels of wealth/income are the same.[6] In experiments and games that Thaler conducted, people were much more generous in giving money to others than what standard orthodox theory would have predicted.

(Insert Figure 1 around here)

Figure 1 is a replica of a diagram commonly used in the literature to represent Kahneman's and Tversky's thinking and brings the ideas listed in points 1 to 4 together. Essentially, in reading from left to right and from the bottom to the top of the diagram, one's expected utility of making a decision increases and at an increasing rate (increasing utility and convexity) as his/her risk of loss decreases (smaller negative utility numbers on the vertical axis in going from bottom to top and smaller probabilities of loss on the horizontal axis in going from left to right), yet when it comes to gains, one's expected utility only increases at a decreasing rate

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[5] Kahneman and Tversky found that most people are not very good at estimating probabilities. But is this really so surprising when so many people have trouble balancing their checkbooks (which is a matter of arithmetic).

[6] However, the concept of utility could cover this anomaly by indicating that the individual who has just suffered the loss was at a higher level at one time compared to the other person and now has sunk to a lower level. The other has enjoyed a gain, and so now they are equal in total utility. One has from a higher to a lower indifference curve, and the other has gone from a lower to higher indifference curve. Losses and gains are indicated by these movements.

(concavity in the utility function to the right of the origin) as the probability of gain goes up. Neoclassical/mainstream theory would argue that since most people are risk neutral in their decision making (gains and losses are evaluated equally), the figure below should have a straight line passing through the origin at a 45-degree angle according to Jacob Bernoulli's theory of expected utility (Kahneman 2011). Risk neutrality is supposed to be rational, not risk aversion or risk loving behavior.

An example from the Kahneman and Tversky research can explain this phenomenon. If people are asked if they prefer either 1) $500 given to him/her with certainty or 2) a coin flip which has a 50% probability of giving them zero dollars or a 50% probability of $1200, they almost always choose the $500 with certainty even though the expected payoff (and expected utility) from the gamble is $600 (=0.50 * 0 + 0.50 * $1000). Hence, smaller gains with certainty are preferred to larger ones with greater degrees of uncertainty. Conversely, if asked whether one prefers to lose $500 with certainty versus taking a flip of the coin wherein one can 1) lose zero dollars with 50% probability or 2) lose $1000 with 50% probability, most will choose flip of the coin. People prefer avoiding losses more than obtaining gains. Since no money is actually involved in these experiments, Kahneman and Tversky have been criticized for writing about lab results and not actual real-life events, yet they contend that their results accurately reflect how people would actually behave in reality (Kahneman 2003, Kahneman 2011).

Heuristics and biases appear to mostly be used when the consequences or costs of making a decision are low and are routine and if a decision needs to be made fairly soon. For example, people often buy certain things at a particular retailer because they believe the quality of the items may be better there than at other retailers when in fact the quality may or may not be that different from similar retailers. That is, shoppers do not often engage in systematic research and

instead rely upon past experiences to make future decisions especially if using past experiences save them time in decision making and if the costs are inconsequential. The demand for the retailer's services and products by such types of individuals can also be deemed to be inelastic in that not much thought is given by many of the customers' decisions to shop there. On the other hand, when given more time and when making a large purchase decision, such as buying a home, people seek more information and do more research in addition to perhaps using some of their heuristics and biases from past experiences. Their demand becomes more elastic, and they become more fastidious and judicious in making a decision. The concept of elasticity in economics is a traditional, mainstream one, but is tempered by behavioral economics findings that often people make mis-estimations in their calculations and decision making. For example, most would claim that the demand for an adequate retirement is inelastic. That is, everyone should try to save as much money as possible given his/her budget constraints for retirement.

Yet, as behavioral economics points out, many do not do this because of not correctly estimating their future needs or overestimating their future earnings because many people are not good at estimating probabilities or weighing gains and losses.[7] Additionally, there are those who continue to live in a particular home or stay in his/her current occupation because of costs incurred in the past to obtain and keep the home or occupation, or people are risk averse to moving or changing occupations even if to do so would be an improvement for them financially perhaps (Clark and Lisowski 2017). These are sunk costs which neoclassical economists say should not and do not matter to people, yet the behavioral economists in their experiments find that people find these relevant in decision making. This is another way in which people are sometimes irrational, and according to Thaler (2015, pages 93-94) markets often do not

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[7] This paper argues that this is also a symptom of income and wealth inequality, which is a societal and not necessarily an individual problem.

encourage rationality but instead encourage a certain degree of irrationality due to hype, greed, and exuberance.   Finally, behavioral economics also shows that even after committing an error in decision making, people often continue to commit the same error by using their same set of heuristics and biases.

Samuels, Stich and Bishop (2002) mention that the evolutionary psychologists point out that in experiments where respondents are asked to estimate probabilities of the occurrences of certain events using frequencies rather than probabilities, the portion of respondents getting an answer correct is much higher than using decimal numbers or percentages for probabilities. The evolutionary psychologists claim that this is so because our primordial ancestors learned how to assess probability from experiences and encounters with repeated and similar situations/events, an aspect of our evolutionary learning which would be based on frequencies and not decimal numbers or percentages. That is, an anthropoid who saw one of his/her hunting mates attacked after ten hunting excursions would think that the chances of his/her being attacked during the next expedition are 1 in 10, not 10% or 0.10, and this estimate is based on his/her learned experience. To give someone a problem involving a single case situation, such as the probability of someone having an inherited disease based on a stated, percentage probability value, is something that most of us cannot calculate or resolve very well because we are not programmed as such by evolution.[8]

In contrast to Samuels, Stich, and Bishop, the philosopher Sturm (2012) claims that there are profound differences between the two sides of the rationality debate and that bounded

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[8] Sloman, Over, Slovak and Stibel (2003) claim that the reason why people perform better with frequencies is illusory in that stating a problem in terms of frequencies is just another way of framing a problem or situation in terms of "nested sets", which in turn makes the problem under consideration more transparent. That is, in general it is easier for most people to visualize 1 out of 1000 people as having a disease as opposed to 0.1% of a thousand people because things such as Venn or Euler diagrams can be drawn or imagined by someone trying to work a problem. .

rationality is distinct from irrational behavior. He does not see people making errors in estimating probabilities or clinging to sunk costs as forms of irrational behavior because people are still attempting to weigh costs and benefits when making decisions, although their calculations may be imperfect. Sturm agrees with other critics of the heuristics and biases approach that the reason why people make mistakes in the Kahneman and Tversky research are what he calls "experimental artifacts"—particular wording of the problems, no use of outside sources to help subjects to work problems, etc. Sturm mostly favors the bounded rationality approach to decision making, although he sees problems with this approach as well. He sees the key difference between the two schools of thought, one seeing more rational behavior among people than the other, revolving around their normative assumptions with heuristics and biases assuming irrationality, and bounded rationality assuming mostly rational, albeit weakly rational, behavior and decision making.

Schooling and Rationality

(Insert Table 1 here)

According to some literature, educational and income levels affect risk taking behavior (the higher one's level of age, wealth and income, the more risk averse one is), and the greater one's education, the more risk loving one is and the greater one's ability to be able to correctly estimate probabilities (Gächter, Johnson, and Herrmann 2007, Booij, van Praag, and van de Kuilen 2009, Kim, Kim, Syngioo, Booyuel, Pop-Eleches 2018).   In analyzing data from the General Social Survey (GSS) from the National Opinion Research Center (NORC) at the University of Chicago it appears that education matters in estimating probabilities.   See Table 1. Using a Chi-square test, it appears that one's level of education is statistically significant and related to one's being able to answer questions regarding probability regardless of how the

question is worded. This indicates that education and learned abilities are important in decision

making, and hence, people perhaps can be educated to be more "rational." This is a line of

thought that does not appear to be explored that much in the behavioral economics literature.

These findings also raise questions regarding social class and rationality as well. In

Table 2, again using GSS data from 2016, the higher one's self-identified social class, the better

one is at estimating odds. The results are statistically significant at an alpha of 5% using the

Pearson Chi-square test. Yet, the behavioral economists, although critical of neoclassical

economists regarding rationality, never really challenge the neoclassical economists on how

education and social class may influence rationality, although Thaler (2015) notes that many

public policies need to be re-examined due to the fact that there exists less rationality and

rational behavior among the general public than what is commonly assumed by policy makers.

He lists as examples policies on retirement, social security, and consumer lending.

(Insert Table 2 around here)

In looking at Table 3, there appears to be a pattern between poverty levels and

mathematical achievement by seniors in US high schools since 2005. High school seniors who

participated in the Free/Reduced Lunch Program because of their families' low income levels

scored lower on standardized mathematics exams than their peers who did not participate in the

program because of their higher household income levels. Part B of Table 3 shows these

differences to be statistically significant. People in general may be bad overall in estimating

probabilities, but if a symptom of poor decision making is incorrect mathematical calculations,

then the bulk of those making errors could be from poor and less educated backgrounds. If those

who are deficient in math skills make poorer decisions on average than others with better skills,

they may be considered "irrational" in their decision making, but their irrationality could be driven by class and income considerations.

<center>(Insert Table 3 around here)</center>

Monopoly Capital and Capitalist Schooling

In heterodox economics, there has always been the complaint against the neoclassical/mainstream/orthodox economics assumption of full rationality in most if not all microeconomic and macroeconomic models. Many non-mainstream economists would contend that Kahneman, Tversky and Thaler in their experiments simply supported what many heterodox economists already knew about and assumed regarding flaws in rationality and rational behavior theory in economics. Heterodox economists have mostly assumed that individuals think and act with bounded rationality while being influenced by societal and environmental factors (Sen 1977, Wolozin 2004, Marnet 2005, Pressman 2006, Lee 2009, Markey-Tolwer 2017). Markey-Towler (2017) claims that the best view of rationality in economics is one that is more similar to weak artificial intelligence, which is closest to a form of bounded rationality.

Additionally, Tversky, Kahneman, and Thaler only consider things from an atomistic/individualistic point of view, which is a severe weakness. As Tables 1 to 3 show, it appears that one's level of education and social class are statistically significant and related to one's being able to answer questions regarding probability regardless of how the question is worded. This indicates that education and learned abilities are important in decision making, and hence, in this way people can probable be educated to be more rational and to make better decisions.

So why are more people not educated to be more rational? Perhaps one answer lies in the analysis of schooling in the United States by the authors Samuel Bowles and Herbert Gintis

(1976 and 2002) as well in the writings of Baran and Sweezy (1966) on the prevailing social and economic climate that exists in the United States. Bowles and Gintis have argued that public schools in the United States have never really been designed or funded to be successful, and so bad to mediocre results are tolerated by US school systems despite periodic "school reform" efforts. Instead, they write that US public schools reflect the interests of the dominant capitalist class in conditioning students as future workers to be accepting of workplace conditions where hierarchies of authority exist. Schools are set up as hierarchies with strict rules which mirror many workplace settings in which employees do not question managerial authority just as students do not question school authority. A system of rewards and punishments (e.g., good grades versus bad grades, recognition for good students) instills a notion of meritocracy in the thinking of students, which more easily allows them to accept social inequality when they join the workforce. Most of all, learning technical and knowledge skills on the part of the students is not as important as students learning personal skills which help them in the workplace to get along with managers and fellow employees. Although learning math and communication skills are emphasized as important by school leaders, the personal skills are more important. Finally, poor and low-income students usually live in poor and underfunded school districts. Since school districts are mostly locally funded, inequality is allowed to persist in the poorer ones.

According to Baran and Sweezy (1966), a main tenet of their theory of monopoly capital is that there is a lot of waste in capitalistic economic system, and much of the waste is funneled into government spending on the military and public infrastructure which supports and perpetuates urban sprawl. Additionally, there is wasteful business spending on advertising, promotions, product packaging, and financing. Although the state, local, and federal governments in the US spend billions of dollars annually on public elementary, middle and high

schools as well as welfare and other social programs, these forms of spending are not considered as effective forms of public investment since too much spending on education and social programs can lead to a less compliant labor force and working class, an argument similar to that of Bowles and Gintis. Therefore, spending is never adequate for these types of government programs, and so public schools in the US lag behind their private school counterparts which are mostly patronized by upper income families and students. The underfunding of public schools reinforces class differences among the different social classes in the United States, and for this reason most never rise above the socioeconomic status of their parents. Educational "tracks" within public schools classify students according to their academic abilities, which are basically a reflection of their socioeconomic status (see Baran and Sweezy, 1966, Chapter 10, "On the Quality of Monopoly Capitalist Society). Along the lines of the monopoly capital school of thought, O'Connor (1973) believes that one effect of so little spending on public schooling is to provide the more competitive sectors of the US economy (restaurants, retail stores, cleaning services, etc.) with a sufficient number of low-skilled and less educated workers. An ample supply of such workers permits this sector to pay low wages when compared to other industries which need a greater number of more highly skilled and educated workers who are often college graduates.

The notion that less education leads to less rational behavior or decisions not in the decision maker's interest is indirectly argued by behavioral economists by their showing how some respondents in their surveys mis-estimate probabilities, something which is supposed to indicate less than rational decision making. If this is the case, then we would expect those with less education and lower socioeconomic status to perhaps more frequently make decisions against their own interests than those with more education or greater status. Table 4 shows GSS

data that indicates that although a higher percentage of lesser educated (and probably lower income) individuals agree that the government should do something to lessen inequality to a greater degree than their more educated peers, there are still some among the lesser educated who think the government should not do anything. These responses could be indicative of a healthy skepticism of government action by some lesser educated individuals, or they could be indicative of acting against one's self-interest by incorrectly estimating the benefits or expected payoff/utility of supporting greater government action to reduce inequality. Also, recall that Kahneman and Tversky claim that most people are risk averse. Given the results of Tables 1 and 2, and in using the logic of the behavioral economists, one could conclude that an irrational response is being indicated in the responses of the lesser educated survey participants.

<div align="center">(Insert Table 4 around here)</div>

Conclusion

Kahneman, Tversky and Thaler should be congratulated for pointing out inconsistencies in mainstream theories, and they offer reasons why people are so inconsistent and make errors in decision making. They argue that sub-optimal decision-making warrants better public policies, such as not cutting or eliminating a government program such as Social Security, because most people cannot rationally plan for retirement. However, they do not consider the inequalities in a capitalist system which give rise to many not being able to adequately save for retirement, which is perhaps a bigger factor in the need for Social Security. In this way their analysis is incomplete, which is often the case with the neoclassical school of thought that they criticize. If educational and socioeconomic factors matter significantly in the rationality debate, then these need to be examined and discussed more by all researchers of rationality.

This paper has tried to emphasize the role that education and class can possibly play in rational decision making if one uses the assumption that correctly estimating probabilities and outcomes is important to better decision making on the part of economic agents and households. As the behavioral economists point out, the implications of poor decision making on the part of many presents challenges not only to mainstream economic theory but also to policy making. Perhaps if the US educational system is somehow improved, better decision making on the part of the public will result, although this may result in a threat to the existing economic and social order in the US in that more members of the public could become more aware of the economic alternatives they face and their likely outcomes.

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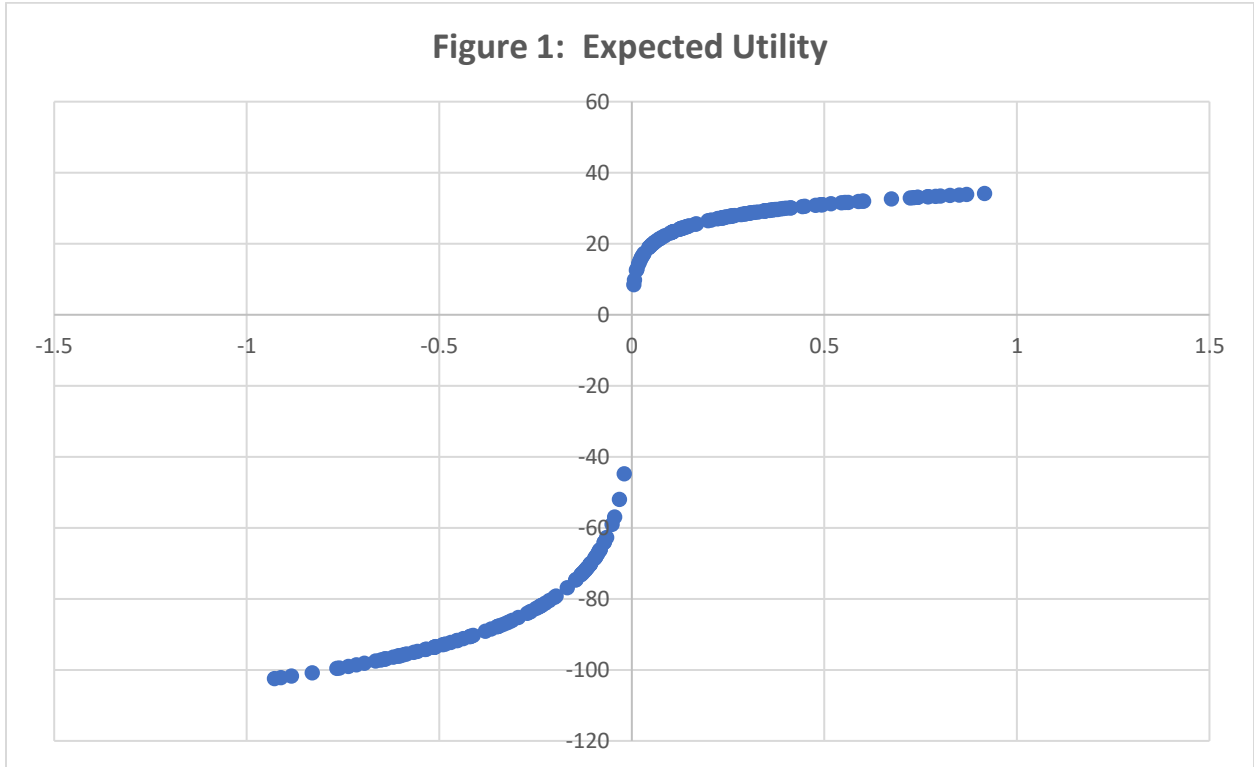
Figure 1: Expected Utility

Table 1—Estimating Odds by Educational Levels

"Now, think about this situation. A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited illness. Does this mean that if their first child has the illness, the next three will not have the illness?"

Correct Answer: No

Degree	Yes	No	Total
Less than High School	34	117	151
High School	91	563	654
Junior College	6	101	107
Bachelor	21	234	255
Graduate	8	139	147
Total	**160**	**1,154**	**1,314**

Pearson chi-square (4) = 31.1996   Prob.=0

"Now, think about this situation. A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited illness. Does this mean that each of the couple's children will have the same risk of suffering from the illness?"

Correct Answer: Yes

Degree	No	Yes	Total
Less than High School	57	102	159
High School	169	489	658
Junior College	27	82	109
Bachelor	46	207	253
Graduate	18	128	146
Total	**317**	**1,008**	**1,325**

Pearson chi-square (4) = 28.9542   Prob. = 0

(Source: Smith, et al, 1972-2016, General Social Survey, National Opinion Research Center, 2016 data).

Table 2—Estimating Odds by Class Identification

"Now, think about this situation. A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited illness. Does this mean that if their first child has the illness, the next three will not have the illness?"

Correct Answer: No

Answer	Lower Class	Working Class	Middle Class	Upper Class	Total
Yes	23	81	55	2	161
No	101	510	490	42	1,143
Total	**124**	**591**	**545**	**44**	**1,304**

Pearson chi-square (3) = 10.4503   Prob. = 0.015

"Now, think about this situation. A doctor tells a couple that their genetic makeup means that they've got one in four chances of having a child with an inherited illness. Does this mean that each of the couple's children will have the same risk of suffering from the illness?"

Correct Answer: Yes

Answer	Lower Class	Working Class	Middle Class	Upper Class	Total
No	42	145	113	12	312
Yes	81	456	430	34	1,001
Total	**123**	**601**	**543**	**46**	**1,313**

Pearson chi-square (3) = 10.1143   Pr = 0.018

(Source: Smith, et al, 1972-2016, General Social Survey, National Opinion Research Center, 2016 data).

Table 3--Average scale scores for grade 12 Mathematics, by National School Lunch Program eligibility, 2015, 2013, 2009, and 2005

Part A;

Year	Eligible	Not Eligible
2015	137.559	159.8385
2013	138.8755	161.4239
2009	136.8584	159.0997
2005	131.6057	154.4975

Part B:

t-Test: Two-Sample Assuming Equal Variances		
	Eligible	*Not Eligible*
Mean	136.2246671	158.7149091
Variance	10.18128701	8.845372254
Observations	4	4
Pooled Variance	9.513329632	
Hypothesized Mean Difference	0	
df	6	
t Stat	-10.31199882	
P(T<=t) one-tail	2.42995E-05	
t Critical one-tail	1.943180281	
P(T<=t) two-tail	0.00004860	
t Critical two-tail	2.446911851	

(SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005, 2009, 2013, and 2015 Mathematics Assessments).

Table 4—Education, Opinions on Income Differences, and Social Class

Part A: Education by Degree and Response to Question "On the whole, do you think it should or should not be the government's responsibility to . . . Reduce income differences between the rich and poor?"

Highest Education	Definitely Should	Probably Should	Probably Should Not	Definitely Should Not	Total
Less than High School	58	57	26	20	161
High School	178	183	175	124	660
Junior College	29	31	26	24	110
Bachelor Degree	61	71	63	64	259
Graduate Degree	39	40	48	19	146
Total	**365**	**382**	**338**	**251**	**1,336**

Pearson chi2(12) = 29.5695 Pr = 0.003

Part B: Education Level of Respondents by Class Self-Identification.

Highest Degree/Diploma	Lower Class	Working Class	Middle Class	Upper Class	Total
Less than High School	68	171	77	9	325
High School	172	807	453	19	1,451
Junior College	18	114	79	2	213
Bachelor	20	175	319	19	533
Graduate	8	61	215	31	315
Total	**286**	**1,328**	**1,143**	**80**	**2,837**

Pearson chi2(12) = 417.9719 Pr = 0.000

(Source: Smith, et al, 1972-2016, General Social Survey, National Opinion Research Center, 2016 data).