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**Lost Pleasure of Life Analysis, Safety Incentive Values, and the
Value of Life Literature: Three Different Approaches to Hedonic
Damage Testimony**

Thomas R. Ireland*

Introduction

The 1988 decision in *Sherrod v. Berry*¹ introduced the term "hedonic damages" into the lexicon of the American legal system. Nine years later, the term "hedonic damages" has become synonymous with damages awarded in tort actions for the "lost enjoyment of life." After the early success of the concept in *Sherrod*, however, the predominant trend in reported court decisions has not favored the admissibility of hedonic damage testimony by economists except in New Mexico.² Nevertheless, hedonic damage testimony has been admitted at trial court levels frequently enough that it has been an issue of major significance in both legal and forensic economic publications.

Since the *Wall Street Journal* (Barrett, 1988) made the term "hedonic damages" well known on December 12, 1988, two significant confusions have arisen concerning the meaning of hedonic damage testimony and how it was to be presented in a court of law. The first confusion arose from the substitution of the term "hedonic damages" for the right of recovery for "loss of the enjoyment of life" in personal injury cases. Ironically, court decisions in several states have held that hedonic damages are recoverable, but that economists are not permitted to testify about such damages.³ Such decisions reflect the completeness with which the legal system has borrowed the term "hedonic damages" from economics and used it to replace references to "lost enjoyment of life." That confusion, however, is much less important than the

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fact that economists have provided three distinct types of testimony derived from the "value of life" literature in economics. These three types of testimony have quite different implications, but have been treated by the court system and by many forensic economists as being identical.

It is the purpose of this paper to explain the differences between these three types of testimony, and to describe some of the variations in methods used by practicing forensic economists within each of the basic types, particularly the type that involves generation of estimated annual values for lost enjoyment of tort victims. All three systems utilize the "value of life" literature, which is based on the "hedonic" technique of price disaggregation into "willingness-to-pay" values for various aspects of goods and services. The paper begins with a brief explanation of the fundamental methodology underlying the "value of life" literature. It then discusses the three different methods used to convert this literature into testimony by forensic economists in courts of law.⁴ This is a descriptive paper rather than an advocacy paper, though criticisms by proponents of one system of conclusions reached by proponents of other systems will be discussed as a part of explaining differences between the types of testimony.

The Methodology of the "Value of Life" Literature

Both proponents and opponents of all types of testimony based on the value of life literature agree that the best general review of that literature is contained in W. Kip Viscusi's 1993 article in the *Journal of Economic Literature*, "The Value of Risks to Life and Health." Perhaps the best short definition of the literature is the entry on "the value of life" by Thomas Schelling (1987) in *The New Palgrave Dictionary of Economics*. Essentially, this literature rests on inferring a value for saving a "statistical human life" from studies of either consumer purchases that have the effect of reducing risk of the loss of life, or of wage premiums paid to workers for accepting jobs that entail above average risk of death. The term "hedonic" in "hedonic damages" derives from the use of *hedonic* disaggregation techniques used in both types of studies to determine how much of either a consumer price or a wage payment represents a payment relating specifically to risk of death.

Once such prices are determined, they can be used to determine an overall "Willingness-to-Pay" (WTP) for risk reduction.⁵ A "value of life" measure emerges when the WTP measures for fatality risk reduction (or fatality risk increases with more dangerous types of jobs) are measured in terms of the number of statistical lives preserved for purposes of public expenditures on safety. The role of a "statistical life" in such calculations derives from the fact that when safety expenditures are made, all that can be

known is the number of lives that are expected to be saved as a result of the expenditures, but not the specific characteristics of any of those lives. To provide a simple example, suppose that an aggregate expenditure of \$100 million dollars on smoke detectors of a special type is estimated to save 40 lives next year, after which the smoke detectors wear out and must be replaced (this assumption is made to avoid discounting issues). This represents an aggregate safety expenditure of \$100 million divided by 40 lives, or \$2.5 million per statistical life saved. Nothing is known in advance about the health, age, gender or most other characteristics of the individual lives that will be saved, it is this anonymity that is implied by "statistical lives."

Viscusi (1993) reviews a number of different WTP consumer-purchase and wage-risk studies, as well as contingent valuation studies that also attempt to measure the value of statistical lives. Contingent valuation studies rely on surveys of consumers in an attempt to determine how much consumers are willing to pay for various safety components of goods. Strictly speaking, contingent valuation studies are not based on hedonic price disaggregation techniques, but are still usually included in surveys of studies of the "value of life." It is worthy of note that the term "hedonic" is not normally applied to "value of life" studies in non-litigative contexts. The term "hedonic price index" has been used in econometrics for at least the past four decades. The term is applied to any empirical study employing a regression equation that has the market price or wage as the dependent variable in the regression and measures of different utility characteristics of some good or service as right hand side independent variables. The regression equation is used to decompose a consumer price or labor wage rate into price-equivalent subcomponents based on utility derived from each subcomponent.

The Whole Value of Life Enjoyment Method

In the 1985 *Sherrod* case, Stan V. Smith presented the first testimony by an economist that relied significantly on the value of life literature. Smith used a type of testimony in *Sherrod* that is significantly different from the method he uses today. Judge Cummings described Smith's testimony as follows (at 163):

Smith told the jury that in the last 10 years economic literature showed some 15 studies "with respect to the value of life." There "was a study by Blomquist here in Illinois" which in turn considered all the other studies and found that there was a relationship somewhere in the dimension of three times up to 30 times their productive income. Smith expressed agreement with Blomquist's conclusions, considering

him an authoritative source of knowledge. At the end of Smith's testimony, which included extensive direct and intensive cross examination, this court asked Smith to define for the jury the word "hedonic" as it is used in the expression "the hedonic value of life." Smith said:

It derives from the word pleasing or pleasure. I believe it is a Greek word. It is distinct from the word economic. So it refers to the larger value of life, the life at the pleasure of society, if you will, the life--the value including economic, including moral, including all the value which you might hold life, is the meaning of the expression "hedonic value."

Paul M. Barrett (1988) offered this further description of Smith's testimony in the *Sherrod* case:

Mr. Smith took the stand to argue that these pleasures could be worth more than \$1.5 million, based on available academic and government data. The judge enthusiastically backed the approach, and the jury awarded hedonic damages of \$850,000 to Mr. Sherrod's estate. That was on top of \$300,000 for lost earnings and \$450,000 to his family for loss of "parental association."

Based on these accounts of the *Sherrod* testimony, several things are notable. First, Smith had apparently not yet begun to calculate an annual value for the enjoyment of life. Second, his estimate of the value of hedonic damages was apparently \$1.5 million for a young man who was 19 years of age at the time of his death on December 8, 1979. Third, Smith relied for authority on a survey that had been done by Glenn Blomquist rather than, as would later be the case, a survey done in 1989 by Ted R. Miller showing a range in the value of life from between \$1,000,000 and \$3,100,000 in 1985 after-tax dollars. A similar range was also shown in a 1990 paper by Miller that has also sometimes been cited in court cases. After 1989, Smith has generally interpreted the correct "whole" value of life at \$3.1 million, with a "net" value for lost enjoyment of life of \$2.3 million. This will be discussed further in the next section. Fourth, Smith provided an estimate of loss of society for Ronald Sherrod's parents as well as the estimated lost enjoyment of life by the decedent Ronald Sherrod, even though it was Smith's estimate of loss of enjoyment for the decedent that received most attention.

Smith's method for valuing lost enjoyment of life in *Sherrod*, but not including Smith's estimate for the loss of society by Sherrod's parents, is similar to the method employed by Richard A. Palfin and Brent B. Danninger in their 1990 book. There are, however, two important differences. Palfin and Danninger did not make a subtraction for human capital, nor did they

specify, even generally, the "correct" value of life from the "value of life" literature. In *Sherrod*, Smith had suggested that he thought \$1,500,000 as of 1985 was the "best" value of life from the range of values that he offered. Palfin and Danninger did not suggest a "best" value, but simply presented a range of values that a jury could consider as possible values for lost life enjoyment of a decedent. What Smith's method in *Sherrod* and Palfin and Danninger had in common was that the values presented were not adjusted for life expectancy, nor was there any testimony about an annual value for the enjoyment of life. Palfin and Danninger suggested a 1990 value range from \$1.5 million to \$3.0 million.

Both Smith in *Sherrod* and Palfin-Danninger treat these "value of life" proxies for "value of whole life enjoyment" numbers as additive to other types of loss. This was an approach Smith would change by 1989, but is still the approach Palfin continues to use at present.⁵ In *Sherrod*, Smith did suggest a general tailoring of the result to the productive capacity of an individual, citing Blomquist as the authority for suggesting that lost enjoyment of life was about 30 times a worker's productive capacity, but Smith's testimony introduced a value of life number ranging from \$66,000 to \$11.8 million in 1987 dollars,⁷ with a best estimate of \$1.5 million for Ronald Sherrod.

With this methodology, a value of life number or narrower range is selected from the broader range of all value of life numbers that had been produced to date, and the jury was offered that number as a possible proxy for the lost enjoyment of life for the decedent. There is no suggestion in the early materials for *Sherrod*, or in Palfin and Danninger (1990), or even in Brookshire and Smith (1990), that hedonic damage testimony could be used in a personal injury case in which the injured person was still alive. The method consisted of using whole life values as a proxy for the life enjoyment of an average person, unadjusted for life expectancy or any estimate for the lost human capital of an average person alive today.

While Smith moved to a new method after *Sherrod*, Palfin continues to use this method today and did so in the important *Hein vs. Merck & Co.* case in 1994. Palfin also uses materials developed by Danninger (1992) to strongly oppose the method now employed by Smith. Danninger had indicated that he does not consider the calculation of an annual value for the enjoyment of life, as now performed by Smith, to be legitimate economics.⁸ In Palfin's view, the presumption that the annual value of life enjoyment for an individual is unaffected by that person's age is without foundation.⁹ That assumption is a critical assumption for Smith's current method.

80 year old's and 20 year old's enjoy life equally in any given year. The next several sections will discuss how various practitioners, beginning with Smith, determine the annualized value of life enjoyment, how they apply this method to personal injury analysis, and how Smith applies this method to measurement of loss of society.

Determination of an Annual Value for the Enjoyment of Life.

Smith's current method is based on a presumed 1988 value of \$3.1 million as the statistical measure for a "whole" human life. Smith developed this figure in late 1987, based on a survey of value of life figures, but adjusted into 1988 dollars. After about 1990, Smith began to rely for authority on Ted Miller's 1989 and 1990 papers, which reached very similar conclusions, but Smith's testimony has always been based on his own survey of the literature and his independent determination of \$3.1 million as the correct 1988 value of life figure.¹³ Smith assumed that this value would properly apply to a person who had an average life expectancy for the living population of the United States in 1988 of 45 years. The determination of an annual life value of \$60,000 is developed in application to a person with an average life expectancy because it is only for a such a person that the \$3.1 million whole life value would fully apply. Because of shorter life expectancies, persons older than average would have smaller whole life values than \$3.1 million. For similar reasons, healthy persons younger than average would have greater whole life values than \$3.1 million.

Starting from \$3.1 million, the next step is to subtract \$800,000 for the present value of lost earnings plus lost household production of an average 38-year-old person. This leaves a net adjusted value of \$2.3 million. Smith assumed that the value of life would grow at an annual real rate of 0.75 percent, and that a real discount rate of 1.5 percent should be employed to reduce future streams to present value. Without going into details that are discussed in Brookshire and Ireland (1994), for a starting present value of \$2.3 million, a real growth rate of 0.75 percent, a real discount rate of 1.5 percent, and a 45 year payment period, the correct payment in the initial year is \$60,000. Actual values by year are shown in Table 1, which replicates the initial starting value of \$2.3 million for a 38 year old person with a 45 year life expectancy. The total in Table 1 is slightly too high, but this would be eliminated if a net discount rate of 0.75 percent were employed instead of gross rates of 0.75 percent and 1.50 percent.

Starting from a 1988 annual figure of \$60,000 per year,¹⁴ Smith has increased the annual value of life each year by the rate of growth of real productivity for the economy, and by increases in the Consumer Price Index, reasoning that enjoyment of life would increase at the rate of real

Noneconomists¹⁰ using the Whole Life Enjoyment Approach to hedonic damage testimony.

Robert Johnson, M.B.A., uses a variant of the *Sherrod-Palfin* approach. In several reports, Johnson refers to two published studies "among the many published studies" to establish his ranges for the value of life. The first is Ted Miller's 1990 study, "The Plausible Range for the Value of Life" and the second is a 1988 study by Michael Moore and W. Kip Viscusi, "The Quality-Adjusted Value of Life." In a 1997 report, Johnson says:

After deducting for the Human Capital Component and converting to before tax dollars, the appropriate range for the intangible Human Value of Life is from a low of \$1,800,000 to midpoint of \$6,200,000 in 1988 dollars or \$2,400,000 to \$8,200,000 in 1996 dollars.¹¹

Johnson indicates that the range from \$2,400,000 to \$8,200,000 is for 100 percent of the value of a human life. In an injury case, he calls upon the jury to determine the percent of that value that should be deducted for a given injury victim. Johnson also uses the same methodology to value loss of society by decedents in death cases, particularly where there is no right of recovery for lost enjoyment of life by decedents.

The Annualized Value of Life Method

The method currently used by Smith and, and with slight variation, by Michael Brookshire is only partly indicated in their jointly authored 1990 book. This method is used in three ways by Smith himself. The first involves use in death cases to determine the value of the loss of enjoyment of life by a decedent. The second involves use in personal injury cases where the injured person is still alive. The third involves use of the method to estimate the value of the loss of society with a decedent by survivors. Some practitioners use the Annualized Value of Life Enjoyment method only in personal injury cases, while others use it in both death and injury cases. However, it appears that only Smith uses this method to measure lost society.

All three uses of this method utilize the same basic structure. The first step is to derive an annual value for the enjoyment of living from the value of life literature. There are differences in how this is done by different practitioners, as will be described below. However, all persons using this method make the assumption that the annual value of life is a linear function that does not vary with age.¹² In other words, other than real growth factors,

productivity growth and that CPI adjustments are needed to maintain the real value of lost enjoyment. Thus, his starting value for a person killed today would be significantly higher than for a person killed in 1988, but the figure today is derived by real growth and CPI adjustments from the \$60,000 in 1988. For projecting into the future, Smith adds a real growth factor and discounts by a real rate over the life expectancy of a decedent to determine the total present value of lost enjoyment of life.¹³

At least one economist has used the Smith and Brookshire book as a data source for determining that the annual value for the enjoyment of human life has a value of \$60,000 per year. Dr. Joseph Perry was permitted to testify that the annual value of life was \$60,000 in 1996. Perry based this number exclusively on Smith's book, using Smith's \$60,000 per year for life enjoyment to perform a backward calculation to a figure of \$56,604 for life enjoyment in 1995.¹⁴ Based on a Georgia rule not allowing discounting of intangible damages, Perry increased his annual loss of enjoyment of life figure from \$60,000 in 1996 by a 6 percent growth factor, without discounting, to the end of the decedent's life expectancy. This is Smith's methodology without the adjustments Smith would have made for growth between 1988 and 1996. The lack of discounting in Perry's calculations is based on the plaintiff's interpretation of a legal rule, rather than any decision on Perry's part.

Mark Cohen follows a procedure that is similar to the Brookshire/Smith method, but directly relies on Ted Miller's 1988 survey¹⁵ for his base year, with after tax earnings starting at \$55,000 per year in 1988, rather than Smith's pre-tax earnings of \$60,000 in 1988. Cohen has only used hedonic damage testimony in personal injury cases.¹⁶ There are subtle factual differences between Miller's calculations and Smith's. Smith bases his calculation on a person having a life expectancy of 45 years, while Miller bases his calculation on a 38-year-old person.¹⁷ Smith is assuming that the average person in the United States in 1988 was 32 years old (for a 45 year life expectancy), whereas Miller explicitly assumes an average person is 38 years old. Miller finds a mean value in 1988 for a whole life net of human capital of \$2.2 million, whereas Smith determined a 1988 value of \$2.3 million. Miller estimates the average after tax value of lost future earnings at \$400,000. Smith estimates this figure at \$800,000. Miller also assumes, as noted above, that "pain and suffering" is included in loss of enjoyment values. Finally, Miller (1990) argues that part of the loss of life enjoyment is the loss of a sense of financial security, and he argues:

a sense of financial security is not lost if an injured person or the survivors in a wrongful death case will be compensated for their economic losses. The value of the loss in financial security associated

with the injury or death of a 38-year-old individual--roughly \$240,000 to \$380,000--should therefore also be subtracted from whole life costs to arrive at the value of lost enjoyment.

After making subtraction for both human capital and financial security factors, Miller finds an annual life value of \$55,000 for 1988, which Cohen uses as the starting point for his value of life calculations.

Using Miller's 1988 annual value of life estimates, Cohen adds CPI adjustments to obtain future values. This differentiates Cohen's method further from Smith's, who adds real increases as well as CPI adjustments to obtain annual lost pleasure of life values for years after 1988. Adding CPI adjustments maintains the annual enjoyment of life values in 1988 real dollars at \$55,000, whereas Smith has real increases occurring at an annual rate of approximately 0.75 percent per year.

Roy Gilbert relies on the 1988 study by Moore and Viscusi for his base annual value of life of \$175,000 in 1988 dollars, which he increases by CPI adjustment to the current year in testimony. Gilbert cites a number of reasons for preferring this study over all other studies, including other studies by Moore and Viscusi:¹⁸

A. Other studies make two simplifying assumptions: (1) potential losses from death are identical for all workers (i.e.; there is no adjustment for the age of the worker) and (2) omission of any adjustment for accident insurance arising from nonfatal injuries.

B. The database used is their study of the University of Michigan Quality of Employment Study. Major advantages of this data base over those used in other studies include: (1) detailed information on job characteristics, (2) identification of hourly wage rate (after tax), (3) provides more reliable measures of nonfatal risks of employment, and (4) provides worker information such as health status, work experience, age, sex, race, residence in the U.S. (i.e., North, South, etc.) and urban/rural.

C. The study uses three job risk variables: (1) death risk, (2) nonfatal lost workday accident risk and (3) the worker's subjective assessment of exposure to dangerous or unhealthy working conditions.

D. The study explicitly allows for workers' compensation benefits and the discounted value of expected annuity available to survivors.

Gilbert does not agree with the previous users of annual life values in two areas. First, he does not consider it appropriate to deduct human capital

or other components from the annual life value of \$175,000 in 1988 dollars. His explanation is as follows:²¹

The \$175,000 estimate is derived by projecting the tangent to the indifference curve to the point at which the probability of death equals one. The slope of the tangent is the partial derivative of the utility function with respect to the observed, average level of "risk of death" in the sample, holding other things constant—one of which would be the level of compensation [net of any premia for job related risk of fatal injury]. In economic terminology, the *ceteris paribus* assumption is the mathematical equivalent of partial differentiation in calculus. Accordingly, it would be theoretically incorrect to subtract out earnings.

Gilbert's second difference is that he argues that \$175,000 is already a discounted value so that it would be inappropriate to apply a further discount rate to future losses. Thus Gilbert obtains his result by multiplying the current year equivalent of \$175,000 by the number of year's of an individual's remaining life expectancy. In response to this author's query as to whether this method implies a total offset assumption for future life enjoyment, Gilbert responded:

The \$175,000 value has already been discounted to present value using an implicitly nominal discount rate equal to approximately 12 percent (if I remember correctly). One advantage of the Moore and Viscusi paper is that it explicitly takes into account discounting to present value over a worker's remaining life expectancy and provides an empirical estimate of the subjective discount rate. Therefore, the \$175,000 value represents the present value of a single year of life for the average person in the sample, where the average is computed over the full, remaining life expectancy of each individual in the sample.²²

Scaling Approaches for Personal Injury Analysis.

Any application of the hedonic damages concept to a personal injury damage assessment requires that the value of a whole enjoyment of life must be "scaled" to reflect that part of the value of whole enjoyment of life that still remains. The first article to address the matter of scaling was by Berla, Brookshire and Smith (1989). The "scaling" issue raises special issues of its own, since there is no accepted set of percentages among psychologists for determining the percentage of enjoyment of life that is lost due to various types of injuries. It is recognized that the same injury can have quite different impacts on the level of life enjoyment of different persons, depending on their interests and level of psychological health before the injuries. Problems with the Berla system for scaling annual losses of

enjoyment are outlined in Caragonne (1993), while the range of conceptual issues that must be addressed by any use of the hedonic damage concept in personal injuries as compared with death cases is discussed by Ireland (1996). At the same time, both Mark Cohen and John O. Ward have indicated that they find the hedonic damage concept appropriate for personal injury circumstances, but do not use it in death circumstances.²³ Their reasoning is based on the old common law truism that "you cannot compensate a dead person," coupled with a lack of confidence that "value of life" numbers convey useful information about the loss of society to survivors.

Stan Smith's Loss of Society Valuation Using Value of Life Numbers.

The use of the Annual Value for Life Enjoyment approach for measuring loss of society by survivors of a decedent appears to be completely unique with Stan V. Smith. Smith's method is almost identical with his analysis of loss of the enjoyment of life, but uses the life expectancy of the survivors if shorter than the life expectancy of the decedent. Smith's approach is to treat the loss of society by survivors as equal to his annualized value of life enjoyment for the decedent, regardless of the number of survivors involved. Thus differences in the value of loss of society compared with lost enjoyment of a decedent would only arise if the decedent's life expectancy was longer than the life expectancies of all survivors who have lost the society of the decedent. For example, if the decedent was a child of five years of age and the survivors included parents and other siblings of the child, the youngest of whom was seven years of age, Smith would use the life expectancy of the seven year old to calculate the hedonic loss of society and the life expectancy of the five year old to calculate lost pleasure of life.

But while variations of Smith's "loss of the enjoyment of life" analysis have been developed and used by other forensic economists, his use of the same concept for "loss of society" valuations has not. That use of hedonic damage testimony to measure loss of society is not mentioned in the Brookshire and Smith (1990) book, but Smith published a paper on that use in 1996. In that paper Smith says:

Value of life estimates are frequently based on what members of a family spend to save a life. If a person places a smoke detector in his own bedroom, he is expressing a lower-bound to the value of his life in an amount equal to the cost of the detector (purchase price, installation, batteries, etc.) divided by the reduction in the risk of death. If, for example, the detector costs \$25 dollars and reduces the risk of death by 1 chance in 100,000, then the value of life expressed is \$2.5 million.

Now, suppose that a detector is placed in the bedroom of a child by a parent who seeks to preserve the society and relationship with that child. What value is expressed? The same value, \$2.5 million. But that is the value to the family of the child's life. (p. 377)

In essence, Smith is saying that when people make consumer purchases to provide safety for themselves, they are revealing the value of life for themselves. When they make the same types of purchases to protect the lives of loved ones, they are implying the same value for those lives. That they reveal about their own when the purchases are for themselves. Thus, the numbers from the value of life literature would apply equally to both circumstances. Methodologically, the one difference is that the value to be attached to the loss of society by survivors depends on the life expectancies of both the decedent and the survivors. For example, if a child had a life expectancy of 60 years, but the life expectancy of her one living parent was 45 years, the value of loss of society would only be calculated over a 45 year period, whereas the value of lost enjoyment of life would be calculated over a 60 year period.

Noneconomists Using the Annual Value of Life Enjoyment Approach.

Edward Berla and Anthony M. Gamboa and apparently other employees of Vocational Economics, Inc., use a variant of the Annual Value of Life Enjoyment method. In a November 26, 1996 report, they state:

Various economic studies have estimated the value of life as falling within a range of \$2,300,000 and \$12,200,000 stated in terms of present value. These figures can be used to calculate a per annum value of human life. Assuming an average life expectancy of 75.8 years and using the midpoint of the range in value placed on life of \$7,250,000, a \$96,000 per year figure is derived.

Mrs. XXX's life expectancy is 38 years. Multiplying her life expectancy by the percentage of lost pleasure of life (41.5%) by the per annum value of life (\$96,000), the loss is \$1,513,920.²⁴

Several things are different in this analysis from how it is performed by economists using the same general methodology. First, the calculation is premised on a simple total offset assumption that the growth rate in the value of life will exactly offset the discount rate used to reduce future values to present values.²⁵ The second difference is that Berla and Gamboa obtain their annual value of life by dividing the value of life number by the life expectancy of a newborn child rather than the life expectancy of the average living person, as is done by all economists using this method.

The Safety Incentive Value of Life Method

W. Kip Viscusi has both done direct research in the "value of life"/risk reduction and has testified in courts of law using information from this literature as relevant to damages in special circumstances involving safety incentives. He is widely respected in academic circles with most of his publications placed in top academic journals, and has also published in forensic economic journals. His December 1993 paper on "The Value of Risks to Life and Health" is regarded by both proponents and opponents of hedonic damage testimony to be the defining study of the risk-reduction literature, from which hedonic damage testimony is drawn. Viscusi has used "value of life" testimony as an expert witness, but has sharply criticized the use of this literature to estimate lost pleasure of life or to determine appropriate levels of compensation for damages demonstrated in torts.

Viscusi (1993) argues that value of life testimony is useful in two areas:

"First, it can be used to assess whether a company has fulfilled its safety obligations within the context of a risk-utility test. Thus, it is appropriate to use this value for the purpose of determining whether a company should be liable for damages.²⁶ Second, if it were truly desired to set punitive damages awards, then the value-of-life concept provides information on the optimal deterrence value. The efficient level of compensation will, however, be less than the deterrence value because the value-of-life amount provides excessive insurance."²⁷

Viscusi's 1990 paper, "The Value of Life: Has Voodoo Economics Come to the Courts," makes it clear that his focus is on product liability cases. In the paper, Viscusi is careful to make the distinction between the "insurance value" and the "deterrence value" of damage awards. With respect to deterrence, the size of damage awards is only part of the deterrence incentives of potential tort malfeasors to prevent deaths and injuries. Regulatory penalties for failure to meet regulatory safety standards are another major incentive for precautionary behavior. The goal in deterrence is to cause all potential tort malfeasors to value human lives at the safety value for preserving human lives in general, which is not closely related to amounts necessary or desirable for compensation of specific tort victims.

In his October 28, 1994 affidavit, Viscusi countered claims by Stan V. Smith that Viscusi had testified on behalf of the hedonic damage concept for compensation purposes. He said (after nine background points):

10. The value-of-life concept and the hedonic damages approach are not appropriate for calculating compensation. Hedonic damages

should not be used if the sole objective of the damages award is to compensate the survivors for losses that have been experienced. Instead, one should rely upon conventional measures of economic loss, which are well established and are case-specific.

11. The value-of-life estimates used by the Federal government are for evaluating regulations that prevent deaths. However, these numbers are not used by the Federal government to determine compensation. The U.S. Department of Justice has opposed the use of the hedonic damage concept in airplane fatality cases, and I have consulted to the Torts Division of the U.S. Department of Justice in their efforts to oppose this concept.

12. Mr. Smith indicates (page 74) that I have testified in favor of this concept in damage suits to recover damages for wrongful death. I have submitted numerous analyses opposing this concept. I have also never testified in court either for or against this concept. The only instances in written analyses or depositions in which I have advocated using this concept have been those in which the purpose of the damage award was to provide incentives for the deterrence of injuries, not to provide compensation to victims. In most jurisdictions, this is a punitive damage concept quite different from the nature of the damages being discussed by Mr. Smith in this case.

Conclusion

This has been an account of the different methods used by forensic economists and non-economists in presenting testimony based on the value of life literature, which is frequently called "hedonic damage testimony." The primary conclusion that should be drawn from this paper is that the methods used to develop hedonic damage or value of life testimony differ substantially among different practitioners, and that even the purposes for the testimony are significantly different. The differences identified in this paper include the basic assumptions about the meaning of the value of life literature, the methodology used to generate loss estimates and the target or goal of the analysis being made. The comparisons and explanations provided here will hopefully provide a variety of insights into the applicability of testimony involving the value of life literature.

Table 1
Replication of \$2.3 Million Lost Pleasure of Life Value
Starting from \$60,000 in 1988

Year	Annual Pleasure	Present Value	Cumulative
1988	\$60,000	\$60,000	\$60,000
1989	\$60,450	\$59,557	\$119,557
1990	\$60,903	\$59,117	\$178,673
1991	\$61,360	\$58,680	\$237,353
1992	\$61,820	\$58,246	\$295,599
1993	\$62,284	\$57,816	\$353,415
1994	\$62,751	\$57,389	\$410,803
1995	\$63,222	\$56,965	\$467,768
1996	\$63,696	\$56,544	\$524,312
1997	\$64,174	\$56,126	\$580,437
1998	\$64,655	\$55,711	\$636,148
1999	\$65,140	\$55,299	\$691,448
2000	\$65,628	\$54,891	\$746,339
2001	\$66,121	\$54,485	\$800,824
2002	\$66,617	\$54,083	\$854,906
2003	\$67,116	\$53,683	\$908,589
2004	\$67,620	\$53,286	\$961,876
2005	\$68,127	\$52,893	\$1,014,768
2006	\$68,638	\$52,502	\$1,067,270
2007	\$69,152	\$52,114	\$1,119,384
2008	\$69,671	\$51,729	\$1,171,112
2009	\$70,194	\$51,346	\$1,222,459
2010	\$70,720	\$50,967	\$1,273,426
2011	\$71,250	\$50,590	\$1,324,016
2012	\$71,785	\$50,217	\$1,374,233
2013	\$72,323	\$49,846	\$1,424,078
2014	\$72,866	\$49,477	\$1,473,556
2015	\$73,412	\$49,112	\$1,522,667
2016	\$73,963	\$48,749	\$1,571,416
2017	\$74,517	\$48,389	\$1,619,805
2018	\$75,076	\$48,031	\$1,667,896
2019	\$75,639	\$47,676	\$1,715,512
2020	\$76,207	\$47,324	\$1,762,896
2021	\$76,778	\$46,974	\$1,809,810
2022	\$77,354	\$46,627	\$1,856,437
2023	\$77,934	\$46,282	\$1,902,719
2024	\$78,519	\$45,940	\$1,948,660
2025	\$79,108	\$45,601	\$1,994,261
2026	\$79,701	\$45,264	\$2,039,525
2027	\$80,299	\$44,930	\$2,084,454
2028	\$80,901	\$44,598	\$2,129,052
2029	\$81,508	\$44,268	\$2,173,320
2030	\$82,119	\$43,941	\$2,217,261
2031	\$82,735	\$43,616	\$2,260,877
2032	\$83,355	\$43,294	\$2,304,171

Endnotes

¹ *Sherrod v. Berry*, 629 F.Supp.159, 162-63 (N.D.Ill.1985), Aff'd 827 F.2d 195, 2205-06 (7th Cir.1987), Vacated 835 F.2d 1222 (7th Cir.1987), rev'd on other grounds, 856 F.2d 802 (7th Cir.1988). It was, however, the 1988 decision that received front page attention in the *Wall Street Journal* on December 12, 1988, "Price of Pleasure: New Legal Theorists Attach a Dollar Value to the Joys of Living (by-line to Paul M. Barrett)," and brought the term "hedonic damages" into current parlance in the legal system. Ultimately the *Sherrod* decision was overturned on other grounds, preventing the decision from having precedential value. However, Judge Cummings, speaking for the majority, noted that the testimony of Stan V. Smith was very valuable in assisting the jury in valuing the life of Ronald Sherrod.

² It is important to distinguish between reported and unreported decisions. Most decisions involving the admissibility of hedonic damage testimony, both pro and con, have not been reported. These cases cannot be located by Lexis and West law searches and have no long-term legal significance. The statement above is limited to reported decisions. The one clear reported decision confirming the admissibility of hedonic damages testimony by an economist in a case at hand, was by the Court of Appeals of the State of New Mexico in *Sena v. New Mexico State Police*, 892 P.2d 604 (N.M.App 1995). The court rejected an appeal of the admission of the hedonic damage testimony by the economist, David Hamilton. The court based its decision on the New Mexico Supreme Court decision in *Romero v. Byers*, 872 P.2d 840 (N.M.1994), stating that the admissibility of hedonic damage testimony by an economist was at the discretion of the trial court. However, apparently no economist was involved at the trial court level in *Romero*. Subsequent to the *Sena* decision, the United States District Court for the District of New Mexico refused to admit hedonic damage testimony by John Myers in *Frank McGuire v. City of Santa Fe, et al.*, 954 F.Supp. 230 (D.N.M. 1996). This latter case, however, has no binding influence on future state cases in the state of New Mexico, though it would have influence in future federal cases in both New Mexico and elsewhere.

³ The irony stems from the fact that the term "hedonic" is a term of art in econometrics, referring to a technique for disaggregating prices into the price equivalents for utility generating components of prices and is a sophisticated topic not likely to be understood by a noneconomist. It applied in the circumstances of the value of life literature because the "willingness-to-pay" methodology underlying that literature relies upon a "hedonic" determination

of the "utility of safety" component of prices and wages. In other words, the "hedonic" technique used to determine the value of life gave its name to the "pleasure" components of the prices being disaggregated to create "value of life" measures. The hedonic technique is really an arcane matter in a very narrow corner of econometric theory, not even considered in beginning courses in econometrics, let alone other aspects of economic theory. It is used almost exclusively by econometricians in the academic literature of economics.

⁴ The author of this paper is known for his strong position that "lost enjoyment" cannot be measured by economic science. However, for purposes of this paper, that fundamental objection to the first two types of "hedonic damage" testimony has been put aside in favor of attempting to accurately describe how economists and other persons testifying as economic experts are developing the testimony that they are presenting in the first two methods described in the paper. The third type of "value of life" testimony is based on developing "optimal deterrent" values for the protection of human life for use in testimony for setting useful safety incentive values for protecting human lives and regarding punitive damages. The author of this paper supports uses for setting safety incentives and has no conceptual problems with uses in punitive damage contexts, but questions whether it is an effective way to develop punitive damage estimates.

⁵ With respect to wage-risk studies, this terminology can be misleading. The two types of willingness-to-pay studies are consumer-purchase and wage-risk studies. In consumer-purchase studies, consumers pay market prices for goods and services which have "bundles" of characteristics, among which are their "safety" characteristics. Safety characteristics include "fatality risk" characteristics, "injury risk" characteristics and may also include "property damage risk" characteristics. In developing a value of life, only the "fatality risk" characteristics are considered (at least in the better studies). The hedonic technique is used to determine the portion of the market price for the good or service that is explained by each characteristic contributing to consumer's "willingness to pay" for the good. In other words, consumers pay for reductions in risk when purchasing the goods or services and the value of life is determined from the aggregate amount paid for the fatality-risk reductions purchased divided by the number of lives assumed to be saved by the goods or services. In wage-risk studies, payments go in the opposite direction in the form of wage premiums paid to workers for bearing extra amounts of fatality risk in their jobs.

⁶ Telephone conversation on May 19, 1997 and E-mail correspondence, May 20, 1997.

⁷ Barrett for the *Wall Street Journal*, op. cit.

⁸ Telephone conversation May 19, 1997, facsimile transmission and e-mail message on May 20, 1997.

⁹ The *Annualized Value of Life Enjoyment* method relies upon a presumption that the enjoyment of life is either constant at different ages or increases at a linear rate equal to the annual growth rate in the economy. In other words, enjoyment of life by a child, by a working adult, and a retired older person are linearly related rather than being greater at some periods in life and lower during other periods of life. This will be discussed further in the next section.

¹⁰ For purposes of this paper, an "economist" is someone with substantial formal graduate training in economics. An M.B.A. involves some course work at an undergraduate equivalent level in economics, but not graduate training in economics as such.

¹¹ Report dated May 15, 1997.

¹² All users assume a real growth factor in the value of life over time, which carries the implication that the last year of everyone's life is the year providing the most real enjoyment. Smith's own method presumes that the value of the enjoyment of life increases at the same rate as the growth in the productivity of work in the American economy so that the real value of life enjoyment is growing over time. However, in Smith's method and in all other versions of the Annualized Value of Life Enjoyment method, the value of enjoyment of life by a child, a young adult and a senior citizen in any given year are assumed to be the same. This assumption is central to Palfin's disapproval of this method, as discussed earlier. Palfin does not believe that there is any way to determine the flow of life enjoyment accurately from whole life values.

¹³ Miller himself argued for an annual value of pleasure in after tax dollars of \$55,000 as of 1988 based on a value of life range from \$1,000,000 to \$3,100,000, after Smith had derived a pre-tax \$60,000 annual figure from a "whole" value for an average human life of \$3.1 million in 1988 dollars. Miller also argued that his own values are inclusive of "pain and suffering." Miller's point was that when individuals make choices to purchase safety equipment

or to accept fatality-risk wage premiums, they consider both the loss of enjoyment that occurs with death and the pain and suffering that goes with particularly painful types of death.

¹⁴ In Brookshire and Smith, 1990, op cit, there is a different derivation for \$60,000, and \$60,000 is identified as the correct value in 1989, rather than in 1988. The derivation in Brookshire and Smith starts from \$3.5 million, rather than \$3.1 million. \$800,000 for the average human capital of a living human being is subtracted to obtain \$2.7 million rather than \$2.3 million. A 45 year life expectancy is then divided directly into \$2.7 million to obtain \$60,000 per year as of 1989. In correspondence, Smith has indicated that this initial determination was based on a total offset assumption that real increases in the enjoyment of life would offset the discount rate, but that this assumption was changed to a growth rate lower than the discount rate when applying the \$60,000 figure to future lost pleasure in examples provided in the book. This substitution of methods was apparently performed to reduce difficulties in explaining the method in the context of the book. Nevertheless, Smith makes it clear in his paper, "Hedonic Damages in Personal Injury and Wrongful Death Litigation," in *Litigation Economics* (1993), Eds. Patrick Gaughan and Robert J. Thornton (Greenwich, CT:JAI Press, Inc.), pp. 39-59, that the correct year is 1988 and the correct value of life for that year was \$3.1 million. (This was confirmed in e-mail correspondence in June, 1997.)

¹⁵ The method employed by Michael Brookshire is generally similar to that of Stan Smith except that Brookshire starts from a lower value of life figure than Smith and reaches lower annual value of life figures, based on e-mail confirmation on June 30, 1997. Another important author who generally sympathizes with this approach is Gary Albrecht, who has defended hedonic damages in a number of important short papers in the *Journal of Forensic Economics*. At one time, Albrecht used methods similar to Smith's and regards Smith's method as legitimate. However, Albrecht now prefers to use a "whole value of time" approach for measuring losses other than earnings. In Ward and Ireland (1996), Albrecht's defense of hedonic damage testimony is illustrated in Readings 14 and 19 of *The New Hedonics Primer for Economists and Attorneys*, Lawyers & Judges Publishing Co., Tucson, AZ. His "whole value of time" approach is explained in Reading 11 in the same volume by Kurt V. Krueger, John O. Ward and Gary R. Albrecht.

¹⁶ In making his calculations, Perry assumed that \$60,000 was the correct loss of enjoyment value for 1996. He assumed that the annual value of life had a growth rate of 6 percent in nominal terms during 1996. Therefore, to derive a value for lost pleasure of life in 1995, he reduced the 1996 figure of

\$60,000 per year to \$56,604 in 1995. This is based on his report and deposition transcript in *Johnston vs. Mary I. O'Connor and Mayo Clinic Jacksonville*, Circuit Court, Fourth Judicial District, Duval County, Florida. Case No. 95-02207 CA, Division CV-G. This was an unreported case tried in Florida under Georgia standards of law in which the author was retained by the opposition.

¹⁷ Miller (1990) himself does not testify as an economic expert in personal injury damage analysis, but has expressed his opinions about the appropriate measure for an annual value, as of 1989, for lost enjoyment of life. Cohen has testified only a few times, but has based his testimony on Miller's calculations.

¹⁸ E-mail correspondence in June, 1997.

¹⁹ Miller does not assume that the average person is 38 years old. That is the average age of actual fatality victims in the wage-risk and consumer highway safety behavior studies that dominate the literature. He also defines the average victim as two-thirds male. Miller's \$400,000 estimate is for a 4 percent discount rate. Smith's discount rate is much smaller than 4 percent.

²⁰ E-mail correspondence, May 7, 1997.

²¹ May 7, 1997 e-mail message.

²² Queried (May 9, 1997) about whether this procedure might not provide estimates too small for workers with less than average life expectancies and estimates too large for those with longer than average life expectancies, Gilbert responded:

I agree that this method might over estimate losses for those with longer than average life expectancies, *ceteris paribus*. The error is smaller, however, than taking the average value of remaining years of life for the average worker as one's estimate and, thereby assuming that the total value of life accumulated over each year of remaining life expectancy does not depend on an individual's age. In short, an appraisal based on the average worker's age will tend to have a larger error than an appraisal based on the average value of one year of life expectancy times the estimated life expectancy. I agree that the error may be positive or negative depending on whether one is younger or older than average.

²³ E-mail correspondence, Mark Cohen and John O. Ward, June 1996, separate communications.

²⁴ In this passage, 41.5% is the scaling factor being used to determine the percentage of life enjoyment that has been lost due to the injury.

²⁵ Note that this is a quite different argument from the argument made by Gilbert (above) for not discounting future values. Gilbert's argument depended on the notion that the \$175,000 figure he used was an average for the discounted values of all future years, which avoided his having to make the assumption that all future years represented equal amounts of enjoyment per year. Gilbert pointedly did not argue from a total offset perspective.

²⁶ The "risk-utility test" focuses on whether proper values were assigned to the prevention of injury and death by the company in making decisions with respect to spending money on promoting safety in the manufacture of their products. In some cases, proving that lives were properly valued could be the basis of an argument against liability. For extensive treatment of this issue, which plays a relatively minor role in the current paper, see W. Kip Viscusi, *Reforming Products Liability*, Harvard University Press, 1991.

²⁷ Correspondence with the author, July 1, 1997. By "excessive insurance," Viscusi is considering the issue of the efficient level of compensation to be provided in tort awards. This notion focuses on the ex ante cost benefit calculation of a potential purchaser of insurance against various types of harms. The insurance approach is then compared with types of damages for which tort victims may recover to see how efficiently rights for tort recovery compare with categories for harm for which individuals might purchase insurance. For example, individuals would not purchase "lost enjoyment of life" insurance that would be paid only if they lost their own lives, but they would purchase insurance to provide for the pecuniary needs of their survivors in such instances. In this view, tort awards are viewed as a type of insurance to be paid to injured parties, the costs of which are paid through more expensive insurance policies individuals must purchase and through higher prices for goods and services whose producers must pay higher insurance costs. Through the insurance mechanism, costs of tort awards are paid by everyone and constitute a type of implicit insurance. The insurance approach tries to determine whether the benefits from the "tort provided insurance" exceed the costs paid for this special type of insurance to the average citizen on an ex ante basis. In this literature, it is assumed that, ex post, when an individual has already been injured, an attempt will be made to recover whatever amounts may be allowed in law, which has no relationship to a determination of the efficient level of "tort insurance."

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