Valuing Children's Health and Life:
What Does Economic Theory Say About Including
Parental and Societal Willingness To Pay?
--Commissioned Paper*--

William T. Harbaugh
Department of Economics
University of Oregon
Eugene, Oregon 97403-1285
harbaugh@oregon.uoregon.edu

Abstract: Governments can and do adopt many policies that will improve the health and reduce the mortality risks of children. Given this, estimates of the value of improvements in children's health and reductions in their mortality risk are needed so that governments can rationally choose which of the many possible policies to adopt. These estimates should be based on an appropriate measure of value that is based on economic theory. This paper examines what economic theory has to say about what sorts of elements should be counted in that value, and how that value should then be used in decision-making.

Valuing Children's Health and Life:
What Does Economic Theory Say About Including
Parental and Societal Willingness To Pay?

1. Introduction:

Governments can adopt many policies that will improve the health and reduce the mortality risks of children. Given this, estimates of the value of improvements in children's health and reductions in their mortality risk are needed so that governments can rationally choose which of the many possible policies to adopt and how far to pursue them. These estimates should be based on an appropriate measure of value that is based on economic theory. This paper examines what economic theory has to say about what sorts of elements should be counted in that value, and how that value should then be used in decision-making.

The paper begins with a discussion of the various reasons why children's own willingness to pay (WTP) is unacceptable as a measure of value. I first ignore altruism by parents and other adults. I present short discussions of young children's psychological inability to imagine death, their generally high discount rates, the high degree of risk-taking behavior in adolescents, and the short time horizons of both children and adolescents. I argue that these preference related issues mean that own WTP for health and safety improvements are poor measures of the true benefits of these goods to children. I show that an additional difficulty arises from children's inability to borrow against future income.

I argue that these aspects of children's preferences and budget constraints can lead them to make decisions which can be Pareto improved on by a social planner. That is, even if parents and non-related adults are not altruistic, it may be possible for government to adopt policies that alter the voluntary decisions of children in ways that make some of the children, parents, and other adults better off and none worse off. I show how own WTP should be altered in order to provide the information necessary for such decisions.

I then focus on what I believe is a more significant question: how to account for the altruistic feelings that parents and other members of society have for the health and safety of children. It is commonly argued that parents and to a lesser extent society in general have a

legitimate interest in children's welfare. In practice, parents almost universally provide their children with far more health and safety than they would voluntarily consume. While the effect is usually less extreme, society also tends to provide children with more of these goods than their families would voluntarily provide, and in "dysfunctional" cases this effect can also be very large. It is much rarer (though not unheard of - adults often believe that some degree of risk taking is part of growing up) for parents to insist that children are being too safe, or for society to take the opinion that parents are being overprotective.

While I have argued above that part of this protective behavior may be explained by a model where decisions are made by benevolent planners, rather than by altruism in the usual sense, altruism is also an important, and potentially more important factor. How altruistic preferences should be correctly incorporated into policy decisions is not obvious.

For the purposes of this paper two kinds of distinctions in altruistic preferences are relevant. The first is that between non-paternalistic and paternalistic altruism. In the former the utility of one person (the child) is an argument in the utility of another (the adult.) In the latter it is the level of consumption of a particular good by the child, say safety, that enters the preferences of the adult. This distinction is potentially important. Others have shown that, under certain circumstances, if parents care about the utility of children, then incorporating adults WTP for children's safety can result in more safety than is socially optimal. I examine the reasonableness of the assumptions on which this result is based and how sensitive this conclusion is to those assumptions. For example, I assume that there is some constraint on cash transfers to children, and look at second best solutions. There are obvious reasons why in multi-period models parents may prefer not to make cash transfers to children, even if they really care about the utility of their children.

The second distinction is between pure and impure altruism. Pure altruism is where the level of utility or consumption of the child enters the adult's utility. Both the non-paternalistic and the non-paternalistic cases above would be examples of pure altruism. Impure altruism is where the amount of the adult's contribution to the child's utility or consumption enters the donor's utility. This might be either because the donor feels good when he donates, or because he gets some benefit when other people notice he has donated.

It is well established that impure altruism is an important explanation for donations to charities and contributions to small groups in experimental settings. It seems likely that this is

also true for contributions by adults to charities that help children. It is an open question as to whether parent's support of their own children is an example of pure or impure altruism. I address the question of how preferences that incorporate impure altruism will affect WTP for the well-being of another, and how measures of WTP that include impure altruism should be used in making policy decisions.

2: Some Simple Problems with Own Willingness to Pay:

Although there is no ideal measure, economists generally agree that for the purposes of conducting benefit-cost analysis and making policy decisions the amount that a person is willing to pay to acquire a good is a useful measure of the good's value. In later sections of this paper I will discuss what happens to the validity of this measure if people other than the purchaser care about how much of it the purchaser consumes. The purpose of this section is to argue that - even ignoring externalities and altruism - this measure should not be applied to reductions in children's mortality and morbidity rates.

Different conceptions of what death means.

One argument is that young children simply lack the ability to imagine death. Carey (1985, pp. 13-40 and 60-65) reviews the psychological literature and finds a consensus that there are three stages in children's understanding of death. Until age 5 or so, children typically see death as a form of sleep, and while they see it as painful, because it involves separation from parents, they do not understand that it involves an final end to the body's biological processes. For example, they ask questions such as "How do dead people go to the bathroom?" and they speak of the need to whisper when talking at funerals to avoid waking up the deceased. Elementary age children do understand that death is terminal, but not that it is an inevitable biological fact. They often attribute the death of a person described as bad to that person's bad deeds or bad nature. However, elementary age children do understand that things such as poisons

and falls and cancer can kill a person, and that once dead they aren't coming back. By about age 9 or 10, children seem to understand death as adults do.

It seems likely that children not only do not understand death as adults do, but that they do not understand that their conception of death is going to change in a way that makes death more unacceptable. Since death is irreversible, this means that we can argue that a child's WTP for a given reduction in the probability of death will be a downward biased measure of the true benefits to them of that reduction.

Changes in Discounting and Risk Aversion

A similar problem arises because children and adolescents discount the future at high rates (Krause and Harbaugh, 1998). Again, it seems likely that children do not understand that their discount rates will decline as they grow older, though the evidence on this is less conclusive. If they are faced with giving up current consumption for future increases in health or decreases in the risk of death, and if they fail to realize that their discount rate will decline, they will discount these improvements at the current rate instead of at a rate that declines with age. Again, this will mean that own WTP for safety improvements will undervalue the true benefits of the improvements.

On the other hand, if given a chance to trade off their current (but not future) health for increased future consumption, children will *underestimate* the value of future consumption, and presumably choose too much current health. Unfortunately, children seem to have relatively more opportunities of the first sort.

While risk aversion also seems to increase with age, and adolescents are well know for their willingness to take far greater risks to health than adults will accept, changes in risk aversion are probably not the source of problems of the above sort. This is because risks are typically one shot affairs. Adults are not forced to repeat the sorts of risks that they take as children. One exception might be addictions. Adolescents might be willing to take the chances that, say, cigarette smoking entails, while adults are not. However, once addicted, the adult may essentially be stuck continuing to accept repeated risks of heath damage that he would be unwilling to agree to with his current preferences. Note that this could happen even if the

adolescent had made a rational forward looking decision to become addicted, as in Becker (1989).

Restricted Access to Credit

Even if there were no problems of the sorts described above, and children were able to make fully rational choices, another difficulty arises because children's current incomes are very low relative to their permanent incomes. Legal prohibitions on their rights to sign contracts make it essentially impossible for them to borrow against their future earnings. This means that, in the common situation where the cost must be paid now and the health benefits or risk reduction come later, children would be unable to borrow to make optimal choices, given their preferences. The simple solution to this problem would be to remove the borrowing constraint, but the costs of doing this will be large, if the sorts of problems described above *do* exist.

3. Should Social Planners Try to Improve on the Decisions of Children?

The above issues suggest the possibility of Pareto improving changes in children's own choices regarding health and safety, even if we ignore the possibility that adults are actually altruistic towards children. This is slightly different from the usual situation where the social planner's approach is used. The typical setup is the case where one person's actions affect another's. While these children are making bad decisions, those decisions are only affecting themselves (again ignoring altruism).

Still, it seems clear that in every case considered in section 2 above, it is possible at least in theory to construct a Pareto improvement. For example, consider the under-investment in activities that increase future health, caused by temporarily high discount rates. The social planner needs only to borrow and make the investments for the child, then have the child pay pack the loans when older.

In short, I am arguing that it's possible to give plausible normative and positive explanations, that have nothing to do with altruism, for interfering in children's own decision's.

This is important because it suggests that the interference in children's decisions we *do* observe may not solely be the result of altruism, where that is defined as an adult's willingness to sacrifice his own consumption for that of a child's. As we will see below the question of how to include WTP that is derived from altruistic preferences is complicated. I believe this adds another layer of complication, requiring that empirical efforts to measure WTP for children's safety must also determine the motives behind that WTP.

4. Altruism.

In this section I address the question of how to account for the altruistic feelings that parents and other members of society have for the health and safety of children. For expositional purposes I will often take the (hopefully) oversimplified point of view that these altruistic feelings all run in one direction, from adults to children. I will also often assume that adults are more altruistic toward their own children than to other children. These conventions will make it more obvious as to how the theory, which was often developed for more general purposes, applies to the question at hand. I should note that there are models of the evolutionary development of altruism, described in Bergstrom 1996 and Sober and Wilson 1998, that predict these sorts of preferences.

For the purposes of this paper two kinds of distinctions in altruistic preferences are relevant. First is the distinction between non-paternalistic and paternalistic altruism. Non-paternalistic altruism means that the altruist cares about the well-being of other people *as those other people define their well-being*. In other words the utility of the other person is an argument in the altruists utility function. Paternalistic altruism means that the altruist cares about some particular aspect of a person's well being, not their utility. For our purposes that something will generally be safety.

It has been shown that, under certain circumstances, if people are non-paternalistically altruistic, then incorporating their WTP for the safety of others will result in more safety than is socially optimal. I examine the reasonableness of the assumptions on which this result is based, how sensitive this conclusion is to those assumptions, and how applicable this result is to the question of children's health and safety.

The second distinction is that between pure and impure altruism. Impure altruism is an important explanation for donations to charities and for contributions to small groups in experimental settings. It seems almost certain that this motive is also an important one for contributions by adults to charities that help children. It is an open question as to whether parent's support of their own children is an example of pure or impure altruism. I address the question of how preferences that incorporate impure altruism will affect WTP for the well-being of another, and how measures of WTP that include impure altruism should be used in making policy decisions.

4.1 Non-paternalistic and paternalistic altruism.

In this subsection I review work by others on the appropriate way to include WTP for reductions in the mortality and morbidity rates of others. I show that in general it is not sufficient to just look at revealed or reported WTP, and that instead it is necessary to understand both the motives behind the willingness to pay, and the constraints on the altruist and the recipient.

<u>Non-Paternalistic Altruism</u>

Bergstrom (1982) proved what at first glance seems to be a rather astonishing result about how non-paternalistic altruism affects the socially optimal level of safety. With a few relatively innocuous assumptions he shows that the conditions for the Pareto optimal level of public safety are the same whether people care about others or not.

The intuition is very simple if we view safety as a private good. Safety is expensive and providing it means someone must consume less of some other good. If that someone is the recipient, he gets less consumption and more safety than he would have voluntarily consumed, and so is worse off than before. Since the altruist cares about the recipient's utility, he is also worse off. This is obviously not a Pareto improvement, much less Pareto optimal.

So suppose the altruist pays for the safety. The recipient is better off because he has more safety, a good he cares about. The altruist is better off because of the increase in the well-being of someone he cares about, but worse off because of the decrease in his own consumption. It's not clear if this is a Pareto improvement, but it can be shown that it's not Pareto optimal.

Suppose that the altruist gives the recipient cash equal to the cost of the safety, instead of safety. The recipient would then buy the amount of safety that maximizes his utility. This would leave the recipient with no less utility than before, and assuming the marginal utility of consumption was positive, with more utility. Since the altruist cares about the recipient's utility he'd be better off with this larger utility increase than he would be with the smaller increase he got by giving safety. So there's a way to make everybody better off: redistribute money and let people by the amount of safety they find optimal, that is where there WTP equals the marginal cost of provision. This is just the standard argument for transfers of money rather than goods.

Bergstrom extends it to the situation where safety is a non-rival good. The argument is essentially the same: if we provide more safety than is optimal by the usual Samuelson rule, people must be consuming less of others goods than is optimal. So increasing a person's safety beyond the amount people would voluntarily buy cannot be Pareto optimal. This is not to say it's bad, just that we can do better.

In the context of the question of how to account for parental and social valuations of children's safety, this result says that society should not provide children with anymore safety than children would voluntarily buy themselves, since we could always do better by redistributing income instead. In the context of this paper, which is concerned with the question of how to value improvements in children's health, the implication is that, if we are trying to achieve the efficient amount of safety, we should use the child's own value *and not add a term for their parents willingness to pay for safety.*

Note that this is not quite the same as saying that the socially optimal quantity of children's safety, with parental or societal altruism, is the same as the level that would be optimal without that altruism. Instead, we are saying that the marginal conditions for optimality are the same. If benevolent altruists transfer money to children, then so long as safety is a normal good, the amount needed to satisfy the children's own condition for optimality will increase.

But what if the altruists are paternalistic?

There are several difficulties with using this result as a prescription for what should and should not count in benefit cost analysis. First, there is abundant evidence, beginning with the very origin of the word paternalistic, that parents, and society in general, are concerned with children's safety, and not their utility. In such a situation Jones-Lee (1991) shows that it is correct to consider *all* the altruist's WTP for the recipient's safety when determining the socially optimal level of safety.

Some intuition for this result is as follows. First, suppose we ignore the altruist's WTP in setting the recipient's safety. Now consider a slight increase in safety. This makes the recipient better off, since his safety goes up, and it also makes the altruist better off, for the same reason. Continue this process until the altruist's WTP is fully incorporated into the decision to buy safety, that is so he is no longer willing to pay for more safety.

Can we find a Pareto improvement to this situation? Obviously we can't make the altruist better off unless we can somehow induce the recipient to increase his consumption of safety even more. But we are already providing the recipient with more safety than he was willing to buy voluntarily. Again, this logic is developed for the case where safety is a private good, but the conclusion also holds if it is non-rival.

An explanation for why WTP from non-paternalistic altruists should count too.

In this part of the paper I argue that an important assumption of the Bergstrom model is unlikely to apply to the case of parents and children. As a result I will argue that, *even when parents are non-paternalistic altruists*, it is appropriate to include some portion of their WTP for safety into the calculation of the socially optimal amount of safety.

Bergstrom assumes that transfers of money to children and transfers of goods are equally expensive. However, if it is cheaper to transfer a particular good, say safety, to a recipient than it is to transfer cash, the Bergstrom result no longer holds. For example, suppose that it costs $3 to transfer $2 of cash (or of the consumption good), but only $1 to transfer $2 of safety. Then

clearly it is no longer always possible to create a Pareto improvement to a safety transfer by making a cash transfer instead.

Arguably, the most important reason why it is expensive to transfer cash to children is the distortions that the prospect of these transfers create. While at first glance it might seem obvious that cash transfers to children will distort their behavior, the issue is actually rather subtle. Becker's (1981) well known rotten-kid theorem showed that there are plausible circumstances where, rather than cause children to distort their behavior in *inefficient* ways, cash transfers can actually cause them to act *efficiently*.

Suppose that the parent is an altruist who is going to make a cash transfer to the child. The child knows this, and knows that this transfer is going to be an increasing function of the parent's wealth. By choosing actions that maximize that wealth, the child will maximize the transfer. So in this situation the prospect of a cash transfer from the altruistic parent actually serves to *reduce* inefficient distortions in the child's behavior.

The problems with this argument are both empirical and theoretical. Peters et al. (1997) in an ingenious experiment with family members show that children simply do not behave this way towards their parents. Either they don't understand the game, or they don't believe their parents are altruists. The second problem is that under more realistic assumptions the theoretical prediction no longer holds.

Bergstrom (1989) shows the rotten-kid theorem only holds in restrictive circumstances. One of several ways that cash transfers can produce distortions is if the child can commit to actions before the adult, as Bergstrom shows in a two-period model. Suppose that in period 1 the child has a choice between consuming $1 and investing it in a way that will increase the family's period 2 earnings by $1(1 + r)$. The child knows that his altruistic parent will divide the second parent income up between the parent and the child, so the child has a choice of $1 now or a *portion* of the $1(1 + r)$, later. Suppose that r is greater than the child's and the parent's discount rates, so that it is efficient to make the investment. If the portion of family income that the parent intends to share is small enough, it is quite possible the child will prefer *not* to make this investment, even though doing so would be efficient.

Bruce and Waldman (1990 and 1991) further develop this idea in a way that is relevant to the question of safety. They develop a two-period model like Bergstrom's, and use it to show that it may be optimal for even non-paternalistic altruists to give gifts in kind rather than cash.

Their explanation is similar to Bergstrom's argument above and is explicitly based on Buchanan's (1975) "Samaritan's Dilemma," which was concerned with the adverse incentives of welfare programs. The dilemma for the parents is that if they promise their children a future cash transfer that is inversely related to the child's future wealth, they will induce children to work less than is optimal, and also to under invest in activities that increase their productivity. The intuition they give is that by spending more now and less in the future, children increase the marginal utility of future consumption, and this higher marginal utility will induce altruistic parents to increase their transfer. This distortion is inefficient.

Bruce and Waldman argue that parents can avoid this inefficiency by giving their children an in-kind transfer instead. They argue that the ideal good is one that forces the children to increase their savings, and they use education and down payments on a home as good examples. Children would like to convert these gifts to cash, spend the cash on current consumption, and then collect higher last period transfers from their parents, but the nature of these particular sorts of gifts makes this very difficult.

A similar and perhaps even stronger story could be told about morbidity. Children naturally, and generally correctly, believe that their parents will take care of them if they are injured or get sick. Suppose that a child with these beliefs is given the opportunity to sacrifice $1 of consumption now, in order to get a reduction in morbidity with a present value of $2 to the parent and the child. Obviously , it would be optimal to make the sacrifice. But, suppose the child knows that if they consume the $1 now, their parents will increase their future bequest, since they will be poorer in the future, *and* that if after not buying the safety they do get injured, their parents will take care of them. In such a situation children will obviously have an incentive to consume rather than invest that is even stronger than that which occurs with regular investments.

Note that the situation with risks to life is somewhat different than that of risks to health. Parents cannot make second period transfers to their children that can compensate them for death, as they can for injury and illness. Because of his, children will have no particular incentive to consume too little of forms of safety that specifically reduce death. Since in practice risks of morbidity and of mortality are correlated, this means that the problem of children under-investing in safety is somewhat mitigated.

Applying Bruce and Waldman's results to the case of safety has shown that children will tend to under-invest in safety to an even greater extent than in other things. This provides a justification for policies that increase safety above the amount that children will purchase voluntarily. The question is how far to go. Since both parents and society in general may be making second period cash transfers to children, both will be in a situation where their transfers are distorting behavior, and both will conceivable be in a situation to implement policies to increase children's safety.

For simplicity, I will assume that there is only one altruist, the parent. The analysis will be similar with more than one. We want to know how we should use the child's and the parent's WTP for safety in determining the optimal level of safety. First, recall that the fact that the altruists are making second period cash transfers causes the recipient to choose less safety than would otherwise be optimal, even if the altruist's preferences are ignored. So it is clear that there is scope for the altruist to do as Bruce and Waldman recommend and increase the provision of safety. The question is how far, and in particular should the quantity decision also incorporate the parent's WTP?

As argued above, for Bergstrom's result that we should ignore the altruist's WTP for safety to hold it must be possible to transfer money at the same cost as safety. Is that possible here? We already know that, because he cannot pre-commit to a transfer, the cash transfers from the parent will be distortionary. The question is, can the government do any better? In practice, we would have to say no. For example, neither SSI payments, Medicare, or Medicaid benefits discriminate against those whose conditions are the result of their own decisions, such as smoking or riding a motorcycle without a helmet.

Interestingly, if the government *could* pre-commit to a transfer, this would still not necessarily eliminate the distortionary effects. Parents still might undo the governments commitment by adjusting their own transfer to reflect the recipient's marginal utility of second period income.

So, I argue that in the two period model, the WTP for safety of parent's and other altruists, generally *should* be considered when making decisions about how much public safety to provide children, even if the altruists have entirely non-paternalistic motives. This is contrary to Bergstrom's conclusion. Note that it does not matter whether we measure WTP by observing

parent's purchases of private safety or use CV questions about public safety. In either case, the estimated WTP should be used in government decision-making.

While the Bergstrom / Jones-Lee results are interesting, they do not apply under what I believe are the most realistic conditions. The Bruce and Waldman (1990) assumptions are more realistic, and they give a contradictory result. The conclusion for pure altruism is that, when determining the socially optimal level of safety, we should include even non-paternalistic altruist's WTP for increases in children's safety.

4.2 Impure altruism:

Now I consider the situation where parents derive a benefit that depends on the amount of contribution they make towards their child's utility or safety. There are numerous reasons why this may be the case. Suppose that parents derive utility not from how safe their kids are, but from the actions they take to make them safer. Any parent who has found themselves worrying not only about whether their child is safe, but about whether they have taken the right steps to insure their safety knows what I mean here. Having your child suffer from an accident feels bad, but knowing that you could have done something to prevent that suffering, and failed to do it, feels even worse. Or, suppose that parents get utility when other people see that they have taken "proper" steps to ensure the safety of their children, or disutility when others see they have neglected something.

These sorts of feelings may not be uncommon. Andreoni (1988) shows that giving to charities cannot be explained without this "warm glow" motive, and work by Palfrey and Prisbrey (1997) show in an experimental setting that it is a far more important motivation than pure altruism is for giving to strangers. Harbaugh (1998) argues that *public* recognition of these gifts are important motivations as well. Our question is how, if at all, WTP for safety that is motivated by warm glow should be used for government decision making.

There are two very different possible issues here. The first is Kahneman and Knetsch's (1992) argument that the warm glow motive may explain people's responses to contingent valuation (CV) studies. That is, when people are asked if they would be WTP $20 to reduce a child's risk of death they respond yes, not because they value the reduction, but because they

know they get a warm glow from contributing. Kahneman and Knetsch give a convincing argument that if this motive is in fact behind CV responses, these responses do not represent WTP in the usual sense.

But, that is not to say that impure altruism should be ignored. Suppose that the experimental results on strangers also apply to adult's altruistic feelings toward children: it's their contribution to children's safety, not the overall amount of safety the children have, that matters to the adults. Now consider a program that would solicit donations from adults and use the money to improve child safety. The "warm glow" motive would obviously lead to an additional benefit of such a program, beyond the safety improvement itself, and ignoring this additional benefit could lead policy makers to incorrect decisions.

The difficulty arises when trying to take measures of WTP from an altruist that are in part based on warm glow and then using those measures the determine the benefits of policies that do not provide the same warm glow. For example, suppose we estimate WTP by looking at contributions to a charity that promotes children's safety, and then use these estimates to determine the benefit of adopting a policy that will provide similar amounts of safety but be funded by taxation. Since taxes are involuntary, there presumably is no warm glow associated with paying them, and we will have overestimated the benefits of the policy. On the other hand, voting for such a policy, and the associated tax increase, is a voluntary act that presumably does create some warm glow benefits. In fact, it's quite possible that people might get some benefit from paying a tax to provide a benefit to others even if that tax is involuntary.

These sorts of possibilities obviously raise many questions. To my knowledge there is virtually no work on their theoretical implications for how WTP should be used. Similarly, there is little empirical understanding of how warm glow type benefits change with the method of payment.

5. Conclusion:

While I have argued that theory does *not* say that the appropriate level of safety is obtained simply by equating the sum of own, parental and societal WTP for a child's safety to the marginal cost of provision, I have provided numerous reasons why children should be

provided a level of safety that exceeds the amount that would be optimal if we looked only at their own WTP.

My first arguments were made from the position of a social planner, and ignored the possibility of altruistic preferences. Instead I relied on the argument that children's safety choices suffer from failures that must be corrected, in order to achieve the efficient level of safety. I began with the evidence that very young children do not take death as seriously as adults do. Since death is permanent and they do not realize that their preferences will change, children will under-invest in safety. Second, even once children reach an adult understanding of death, they cannot borrow against future earnings. This market imperfection leads them to under-invest in safety. Third, adolescents are notorious for taking extraordinary risks with their health and safety, by the standards of adults. If they do not understand that their risk aversion will drop substantially as they get older, they may commit to patterns of behavior now that are not optimal. Along similar lines, even if children could borrow, their discount rates are higher than the rates they will have as adults. If they take their current discount rates as permanent, they will again under-invest in safety.

All these problems can be seen as market failures which lead children to purchase too little safety, and which should be corrected by government policies that provide additional amounts. Similarly, they lead to children's own reported or observed WTP for safety to be lower than what is optimal. When considering optimal levels of such publicly provided forms of safety as a clean environment, this means that the usual rule, to provide the public good in a quantity that sets the sum of WTP equal to marginal cost, will lead to too little provision of children's safety. I believe that one empirical approach that might produce more useful estimates of the correct WTP would be to use estimates of own WTP for safety from adults, and apply them to children.

I then turned to the question of altruism. It is obvious that parents, and to a presumably lesser extent non-related adults are willing to pay money to reduce children's morbidity and mortality. However, it is not so obvious how this WTP should be counted when determining whether a given policy should be adopted. The reason for this is that if we count altruist's WTP for safety, while ignoring their WTP for other things (for example, education), society will provide children with more safety and less of the other goods than is optimal. I argued that despite this theoretical result, there were some good reasons to include the WTP of parents and

other adults for safety in a measure of the benefits of children's safety. First, if the altruism is *paternalistic*, WTP for safety should be counted. It would seem relatively simple to design CV studies that would determine to what extent the altruistic preferences of parent's and non-related adults toward children are specifically directed toward safety.

A second reason for why altruist's WTP matters is that, even with non-paternalistic or benevolent altruism, safety transfers may be cheaper than cash transfers, and that for this reason it may be optimal, in a second best sense, to consider altruist's WTP for safety. I argue that the informational requirements necessary to do this correctly are likely to be quite high, but of course that does not mean this should be ignored.

Another complication is impure altruism. I argue that there is substantial evidence that this is an important reason for charitable contributions to public goods, and that this suggests it is almost certainly an important part of the WTP by non-related adults for children's safety, if not for parents. Properly accounting for this sort of WTP in policy considerations requires a good understanding not only of WTP, but of how that WTP differs for different payment vehicles such as voluntary contributions and mandatory taxation. Again, this sort of information will require substantial empirical work of a new sort in order to correctly incorporate this motive.

To conclude, it is clear that there are many convincing reasons, well grounded in economic theory and common sense, for why a child's own WTP for safety improvements that reduce mortality and morbidity will be an underestimate of the social WTP for safety. The preferences of altruistic parents and other relatives, and of unrelated but still concerned adults, surely matter for determining what portion of it's resources society should devote to children. However, there are good reasons why the optimal amount to spend on children's safety cannot be found simply by adding up the WTP for safety of the various interested parties. Accurate measures of the social benefits of policies that increase children's health will require more than just measures of children's own preferences for safety and the altruistic preferences of their parents and of society at large. In this paper I have argued that we will also need measures of such things as the severity of the distortions that transfers create, and of the effect of payment methods on altruism.

References:

Andreoni, James, 1988, "Privately Provided Public Goods in a Large Economy: The Limits of Altruism." *Journal of Public Economics*, 35: 57-73.

Becker, Gary S. 1981. A Treatise on the Family, enlarged edition, Harvard University Press, Cambridge MA, 1981.

Becker, Gary S. and Kevin M. Murphy, 1988, "A Theory of Rational Addiction" *Journal of Political Economy*, v96 n4 August 1988, pp. 675-700.

Bergstrom, Ted, 1982, "When is a man's life worth more than his human capital?" in The value of life and safety : proceedings of a conference held by the "Geneva Association, Edited by M.W. Jones-Lee, New York: North-Holland Pub. Co.

Bergstrom, Ted. 1995. "A survey of theories of the family" UCSB Mimeo.

Bergstrom, Ted. 1996. "Economics in a Family Way." UCSB Mimeo.

Bruce, Neil and Michael Waldman. 1990. "The Rotten Kid Theorem meets the Samaritan's Dilemma," *Quarterly Journal of Economics,* 105(1).

Bruce, Neil and Michael Waldman. 1991. "Transfers in kind: why they can be efficient and non-paternalistic. Dec 1991, 81(5) *American Economic Review*.

Buchanan, James. "The Samaritan's Dilemma," in *Altruism, Morality and Economic Theory*, ed. E. S. Phelps, 71-85. New York: The Russell Sage Foundation.

Carey, Susan. 1985. *Conceptual Change in Childhood*, MIT Press, Cambridge MA.

Harbaugh, William T. "The Prestige Motive for Making Charitable Transfers," *American Economic Review: Papers and Proceedings*, May 1998.

Jones-Lee, M. W. 1991. "Altruism and the value of other people's safety" *Journal of Risk and Uncertainty* v4 n2.

Jones-Lee, M. W. 1992. "Paternalistic altruism and the value of a statistical life," *Economic Journal*, 102, January 1992, pp. 80-90.

Kahneman, Daniel and Jack L. Knetsch, "Valuing Public Goods: The Purchase of Moral Satisfaction," *Journal of Environmental Economics and Management*, v22 n1, January 1992, pp. 57-70.

Krause, Kate and William T. Harbaugh, 1998. "Economic Experiments that you can perform at home on your children," mimeo, University of Oregon.

Palfrey, Thomas and Jeffrey Prisbrey. "Anomalous Behavior in Linear Public Goods Experiments: How Much and Why?" *American Economic Review*, December 1997, 829-46.

Peters, H. Elizabeth, A. Sinan Unur, Jeremy Clark, and William Schulze. "Free-Riding and the Provision of Public Goods in the Family: An Experimental Test of the Rotten Kid Theorem". Cornell Department of Economics working paper, 1997.

Sober, Elliot and David Sloan Wilson, 1998. Unto Others: The Evolution and Psychology of Unselfish Behavior. Harvard University Press, Cambridge; Massachusetts.