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Parfit and Mistakes in Moral Mathematics*

Kristin Shrader-Frechette

In addition to the immediate and delayed fatalities and ailments following the Chernobyl explosion and the Bhopal toxic leak, numerous persons suffered allegedly imperceptible, painless, but slightly harmful effects. One question this raises is whether one ought to ignore acts causing allegedly imperceptible, but slightly harmful, effects on large numbers of persons.

In *Reasons and Persons* (“Mistakes in Moral Mathematics,” pp. 67–86), Parfit argues, correctly I think, that one ought not follow “common-sense morality” and ignore acts causing such imperceptible effects on large numbers of persons.¹ Although his conclusion is correct, Parfit’s three main arguments (used to justify his account of imperceptible effects) are highly questionable. I call these the “Mistaken Pain Defense,” the “Total Effect Defense,” and the “Simplicity Defense”:

THE MISTAKEN PAIN DEFENSE: Since “someone’s pain can become less painful, or less bad, by an amount too small to be noticed,” there can be imperceptible harms and benefits.²

THE TOTAL EFFECT DEFENSE: We can appeal to the “total effect” of what each action (with allegedly imperceptible effects) accomplishes.³

THE SIMPLICITY DEFENSE: If we hold that there are imperceptible harms and benefits, then our account of why it is wrong to cause imperceptible suffering “could be simple.”⁴

These three arguments are problematic because they rely on (1) taking pain as the paradigm instance of harm; (2) assuming that pain predicates, such as “at least as bad as,” are transitive; (3) attempting to show that

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1. Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, Oxford University Press, 1984), pp. 67–86 (hereafter cited as *RP*).

2. *Ibid.*, p. 78.

3. *Ibid.*, p. 79.

4. *Ibid.*, p. 31.

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acts with allegedly imperceptible effects are members of a set of acts together causing perceptible harm; (4) presupposing that there is an easy, practical way of ascribing responsibility for *individual acts* when one deals only with the total effects of *sets of acts*; (5) assuming that it is easy to determine causal chains of harm; (6) using a questionable notion of collective responsibility; (7) presupposing that allowing ourselves to be mistaken about pain lets us preserve transitivity (and therefore collective responsibility for sets of acts); (8) employing unrealistic examples to support key points; and (9) ignoring the privacy problem.

Since Parfit has admitted that he misstated himself in his Mistaken Pain Defense,⁵ and since Gruzalski already has pointed out some of the problems associated with the Total Effect Defense,⁶ my focus is on flaws in Parfit's Simplicity Defense. I argue (1) that Parfit's account of allegedly imperceptible harms is not simple, as he alleges, and (2) that an alternative framework, probabilistic risk assessment, is superior to Parfit's for taking account of allegedly imperceptible effects on large numbers of persons.

PARFIT'S VIEW

Acts with imperceptible effects on other people pose difficulties, especially for consequentialists, since such acts apparently cannot be wrong *because* of their effects. To resolve these difficulties, claims Parfit, persons often make a fifth "mistake in moral mathematics" and appeal to a false tenet: "An act cannot be right or wrong because of its effects, if the effects of this particular act are imperceptible."⁷ Instead, says Parfit, such acts can be shown to be wrong because each such act may be one of a *set* of acts causing perceptible harms or benefits. To substantiate his point, Parfit uses the example of a thousand wounded men in the desert; each of the thousand remaining soldiers, all altruists, must decide whether to contribute his pint of water to the common water cart where it will be distributed equally to the wounded. Parfit stipulates that outcome 1 is that in which one man contributes his pint of water to the hundred pints (already collected) to be distributed to the thousand wounded men, that outcome 2 is the case in which two persons contribute their pints, that outcome 3 is the case in which three persons contribute, and so on until outcome 900 is the case in which all of the remaining nine hundred persons contribute. Because the contribution of one pint would add only one one-thousandth of a pint of water to the ration of each of the thousand men, says Parfit, the benefit to each thirsty person from the contribution of one pint would be imperceptible.⁸ But suppose a thirsty person says, continues Parfit, that his pain in outcome 2 is at least as bad as it was in

5. Derek Parfit, "Comments," *Ethics* 98 (1986): 847 (hereafter cited as "Comments").

6. Bart Gruzalski, "Parfit's Impact on Utilitarianism," *Ethics* 98 (1986): 780–82.

7. Parfit, "Comments," p. 847; this is a slight restatement of his earlier views found in *RP*, pp. 75 ff.

8. Parfit, *RP*, pp. 75 ff.

outcome 1, that his pain in outcome 3 is at least as bad as it was in outcome 2, and so on until his pain in outcome 900 is at least as bad as it was in outcome 899. Then he also ought to be able to say that his pain in outcome 900 is at least as bad as it was in outcome 1. But it would be absurd to say that the individual's pain in outcome 900, where he has one pint to drink, is at least as bad as it was in outcome 1, where he had only one-tenth of one pint to drink. Parfit's reasoning is as follows: if one assumes both (A) that "someone's pain cannot become *imperceptibly* better or worse," and (B) that "*at least as bad as*, applied to pains, is a transitive relation," then one reaches absurd conclusions.⁹ Hence Parfit argues, "Since this conclusion is absurd, we must reject either (A) or (B). Which should go? I reject (A)."¹⁰

Parfit's reasoning in rejecting A is that, if one admits that one's pain can become imperceptibly better or worse, then the pain predicate "at least as bad as" can be said to be transitive; any apparent instance of intransitivity arises only because of mistaken perceptions about one's pain (mistaken perceptions about one's harms or benefits).

As grounds for choosing the latter course, rejecting A, the claim that one is always correct about changes in the degree of one's pains (and, therefore, correct about changes in the degree of one's harms or benefits), Parfit provides at least three related arguments, only the last of which (for reasons already noted) concerns us here. This I call the "Simplicity Defense."

PROBLEMS WITH TRANSITIVITY

Before considering the Simplicity Defense, however, it is important to point out that there are difficulties with Parfit's appeal to transitivity. His claims about transitivity are essential, *both* to all Parfit's defenses of his theory of imperceptible harms and benefits *and* to the success of his account of the total effects of sets of actions.

The main difficulty is that Parfit conceives the set of actions (each of which has imperceptible effects) as a set precisely because he alleges that the predicates describing their effects (e.g., "at least as bad as," when applied to pains) are transitive. Were the predicates not transitive, then on Parfit's terms a person (whose act caused no increased pain) could not be said to be responsible for the perceptible harm caused by a set of acts, of which his act is one. Parfit maintains that such predicates are nontransitive precisely because the speaker is mistaken about his pain. He appears to believe that, were someone not mistaken about his pain, his pain predicates would be transitive; because of this transitivity, the agent of act x is in part responsible for the total effects of the set of acts

9. *Ibid.*, p. 79.

10. Or, one could simply multiply the number of thirsty persons until one arrived at a number, p , for which it could be agreed that one pint of water, divided by p , would produce an imperceptible benefit to each of p persons.

which include x .¹¹ In other words, Parfit seems to believe that our allowing ourselves to be mistaken about pain lets us preserve transitivity and therefore a sense of collective responsibility for acts for which we otherwise might not be said to be responsible. This seems well and good, until one tries to determine what sort of responsibility is at issue.

What would it *mean* to ascribe responsibility on the basis of Parfit's particular notion of transitivity? Suppose I say, "Pain predicates are transitive." What sense would this assertion have if the item said to be transitive describes a state (pain) about which the subject could be mistaken? How could a predicate which was able to be misused, because of one's making mistakes about his pain, be said to be transitive? How would one *know* if it were transitive, apart from the way it was used? Presumably one must have a "fix" on the item said to be transitive, or else one could never know that it was used consistently and hence never know if it were transitive. Without such a "fix," one would never know *what* it was that was said to be transitive. Yet the fact that Parfit says that one could be mistaken about his pain and therefore mistaken in ascription of pain predicates means that one does not have a definite "fix" on these predicates. And if one does not have a fix on them, then one does not know *what* is being said to be transitive. And if one does not know what is being said to be transitive, then it is unclear how this notion of transitivity is robust enough to undergird claims about total effects, imperceptible effects, and collective responsibility.

IS PARFIT'S ACCOUNT SIMPLE?

Perhaps part of the reason why Parfit appeals to such a questionable notion of transitivity as his basis for rejecting A and accepting B is that he believes that he is then able to provide a simple account of responsibility for sets of actions, each member of which has imperceptible effects. Parfit's response, which I call the "Simplicity Defense," is that "if we reject (A), our objection [to the "Harmless Torturers" in which each of a thousand torturers pushes a torture button, but no one of them alone makes the victim's pain worse, although all of them together do make it worse] could be simple. We could claim that each of the torturers inflicts on the victim a great total sum of suffering."¹²

Parfit's objection to the "Harmless Torturers" indeed is simple, in at least four senses. First, he appeals to a priori considerations (e.g., knowing the etiology of harm generated by a set of acts, not all of which can be said to have perceptible effects). Second, he idealizes situations allegedly involving imperceptible harms. Third, he assumes that morally problematic cases need only be discussed in terms of whether they cause harm or no harm, rather than also in terms of whether they cause increased risk or probability of harm. And fourth, he reduces the case of harmful

11. See Parfit, *RP*, pp. 78–81.

12. *Ibid.*, p. 31.

effects to that of pain. Simplicity, however, can be a mixed blessing. Let us examine each of Parfit's moves.

Parfit's first simplifying move, assuming that acts with allegedly imperceptible effects can be shown to be causally linked and to constitute a set of acts, does render his account of harm quite simple. This assumption allows Parfit to postulate harm even where it is allegedly imperceptible. Although it simplifies Parfit's treatment of harm, it also renders his account of *responsibility* less simple because now he needs to explain collective or shared responsibility.

One of the problems with collective responsibility is determining the level of each one's "share" of the responsibility. Another difficulty is knowing precisely how to define the set whose member acts are performed by agents who are responsible for the "total effects." For example, because we attribute actions, therefore moral responsibility, to a collectivity (group of persons), it need not follow that the collectivity's members are morally responsible for the action of the collectivity.¹³

Other problems with contributory causation,¹⁴ with ascribing responsibility to a person for an act which, only together with other acts, results in perceptible benefits or harms, are (1) one often does not know if the other acts have occurred or are likely to occur, and (2) one can avoid responsibility for his act by alleging that the other acts have not occurred or are unlikely to occur. Numerous governmental and industrial agents, in exactly these sorts of cases (single acts whose effects are allegedly imperceptible but which together with other acts have perceptible effects), make claim 2. They maintain that the necessary conditions for harm (the occurrence of the other acts in the set) have not been met. Because of their making this claim, and thereby focusing on *sets* of acts whose members (they say) have a low probability of occurrence, it is difficult to hold them accountable for harms allegedly resulting only as a consequence of the occurrence of all the members of the set.¹⁵

13. See, e.g., Virginia Held, "Can a Random Collection of Individuals Be Morally Responsible?" *Journal of Philosophy* 67 (1970): 474–75, also 471–81. See also Stanley Bates, "The Responsibility of 'Random Collections,'" *Ethics* 81 (1971): 348, also 343–49. One of the main problems raised by a notion of collective responsibility is that performance of a single act, by person A, is not alone sufficient to guarantee the accomplishment of actions for which person A (together with other persons) is allegedly collectively responsible.

14. Some prominent discussions of the problem of contributory causation may be found in Jonathan Glover, "It Makes No Difference Whether or Not I Do It," *Proceedings of the Aristotelian Society* 49, suppl. (1975): 171–90; David Lyons, *Forms and Limits of Utilitarianism* (Oxford: Clarendon Press, Oxford University Press, 1965); and Donald Regan, *Utilitarianism and Cooperation* (Oxford: Clarendon Press, Oxford University Press, 1980).

15. Risk assessors who claim that the probability of certain events is low and, therefore, that one need not worry about the occurrence of a set of events which together can cause great harm include D. Okrent, "Comment on Societal Risk," *Science* 208 (1980): 372–75; C. Starr, "Benefit-Cost Studies in Sociotechnical Systems," in *Perspectives on Benefit-Risk Decision Making*, ed. Committee on Public Engineering Policy, National Academy of Engineering (Washington, D.C.: National Academy of Engineering, 1972), pp. 26–27; and

Not knowing whether other acts in the set have occurred, problem 1, is just as troublesome to Parfit's strategy of collective responsibility. One often does not know because epidemiological studies and various forms of monitoring low-effect hazards simply do not take place. For example, in pesticide monitoring in the United States, food chain and synergistic effects, both important pathways for human risks, are ignored because determining all these effects would be both difficult and costly. Because none of the sixty thousand chemicals used annually in industry and agriculture are fully monitored, it is extremely difficult to infer the complex sets of causes of obvious harms, even when one knows the statistical risks associated with various causal agents. We know the probability of contracting liver cancer, for example, given a particular level of exposure to vinyl chloride, but we cannot infer with certainty that a given liver cancer was caused by exposure to vinyl chloride simply because the causal chain is complex and rarely fully known. The difficulty of establishing the causal sequence of events is also why, in a recent liability case in Michigan, all the manufacturers of diethylstilbestrol (DES) sold in that state were assessed liable as a consequence of damage claims. The court lumped all damage claims together and assessed liability to manufacturers on the basis of their share of the DES market in Michigan. Although there was a causal chain from a particular DES manufacturer to each victim, it could not be established.

Parfit's second simplifying move, idealizing certain situations involving imperceptible harms, renders his examples extremely precise and clear. However, because his idealized cases involve abstracting from all indicators of harm, except pain, they are atypical and perhaps implausible. Parfit does not discuss the typical instances of imperceptible effects, for example, hurting someone's interests, even though the victim may be unaware of it, or causing painless, subthreshold exposures to dangerous chemicals.

D. Okrent and C. Whipple, *Approach to Societal Risk Acceptance Criteria*, no. PB271 264 (Washington, D.C.: Department of Commerce, 1977). For an example, the U.S. government has disclaimed responsibility for allegedly imperceptible effects of single events (radiation exposures) occurring during nuclear weapons' testing in the forties and fifties. The government's rationale has been that other events (hundreds of similar exposures to radiation), necessary for the occurrence of perceptible harm, have not occurred. Between 1951–62, e.g., approximately four hundred thousand U.S. servicemen were exposed to fallout from U.S. tests of nuclear weapons. Some soldiers were marched to within three hundred yards of ground zero immediately after the detonations. Others in the Pacific were within five miles of ground zero, likewise unprotected, for twenty to thirty above-ground nuclear tests. Thousands of servicemen or their survivors have claimed that their injuries and deaths "were the result of radiation exposure received during the U.S. nuclear weapons' tests"; nevertheless, courts have awarded benefits to only ten men because of the claimants' difficulty in proving that all events (many radiation exposures), together necessary for perceptible radiation damage, have occurred (M. Korchmar, "Radiation Hearings Uncover Dust," *Critical Mass Journal* 3 [1978]: 5; see also R. Kraus, "Environmental Carcinogenesis: Regulation on the Frontiers of Science," *Environmental Law* 8 [1976]: 83–135).

Instead, he uses atypical cases, for instance, those of torturers, each of whom contributes allegedly imperceptibly to harming the victim.¹⁶ Or he uses equally implausible examples concerning scores of thirsty men in the desert, each of whose painful thirst cannot be alleviated by only a small amount of water, even though not giving them water can be said to harm them.¹⁷ These unusual examples suggest that Parfit's theory may give us no simple mechanism for dealing with ordinary cases that we face every day. In the ordinary, real-world cases, pain is not the only criterion of harm, and it may not be the most important one. Moreover, it is not simple or easy to *discover* whether real-world cases of *de minimus* harm involve either pain or harm. However, Parfit's "Harmless Torturer" is said, *by definition*, not to add perceptibly to his victim's pain. For both these reasons it is not clear that Parfit's examples mirror the real-world case; perhaps the simplicity of his theory is bought at the price of applicability.

Parfit's third simplifying move, using the harm/no harm disjunction and avoiding talk about risk of probabilities of harm, also raises a number of questions. Chief among these is whether an agent harms someone if his acts increase the risk faced by the subject. Why does Parfit assume that only nonprobabilistic harms are harmful? It might be argued that, in failing to deal with risk, Parfit fails to deal with real situations in the most plausible way.¹⁸ Risk assessors have told us repeatedly that there is no such thing as a zero-risk situation.¹⁹ Every nonmental act has effects which increase or decrease particular kinds of risk. But if so, then there are few actions causing either certain perceptible harm or no perceptible harm; instead, there are many actions causing one's risk to increase or decrease. But if so, then Parfit's simplification, refusing to talk about risk, is questionable.

Parfit's fourth simplifying move, limiting his considerations to pains and therefore reducing cases of harmful effects to cases of pain, also raises a number of issues. Immediately after asking the topic question for section 29, chapter 3, of *Reasons and Persons*, "Can There Be Imperceptible Harms and Benefits?" (pp. 79–80), Parfit very nearly leaves the whole issue of "harms and benefits" and instead talks about pain; in so doing, he suggests that the pain case, problematic as it is (for reasons already discussed), determines the harm and benefit case. He writes, "I believe that someone's pain can become less painful, or less bad, by an amount too small to be noticed. . . . More generally, there can be im-

16. Parfit, *RP*, pp. 80–81.

17. *Ibid.*, pp. 76–79.

18. Gruzalski, p. 782, makes a similar point. He notes that Parfit has not been able to solve the problem of contributory causation because he uses an actual-consequence version of act utilitarianism, rather than a foreseeable-consequence (risk) version.

19. For an explanation and substantiation of the claim that there are no zero-risk situations, see A. Wildavsky, "No Risk Is the Highest Risk of All," *American Scientist* 67 (1979): 32–33; see also M. Douglas and A. Wildavsky, *Risk and Culture* (Berkeley and Los Angeles: University of California Press, 1982).

perceptible harms, and imperceptible benefits.”²⁰ After making this statement, Parfit then goes on to talk about pain, and only about pain, even though he means his remarks to apply to all instances of harm. Parfit realizes that one can harm a person without causing him pain and, hence, that the absence of perceptible changes in *pain* is not a sufficient basis for affirming that an act has imperceptible *effects*. Parfit apparently fails to realize that, if one admits this fact, then one can still make a plausible alternative argument: although a single torturer does not make any victim’s pain perceptibly worse,²¹ he is harming him, in one of at least two senses. Either he is harming him in some sophisticated, perhaps microscopically detectable physical sense, or he is increasing the probability that some harm or damage will befall him in the future. Perhaps the relevant increased probability is that the *next* jolt of torture will cause him pain. It could then be argued that, although the current jolt causes no pain, it is a necessary condition for feeling later pain and therefore it does cause a measurable increase in the probability that the victim will either experience pain or be harmed in some way.

To subscribe to this alternative account of harm and imperceptible harm, however, one need not deny the existence of pain thresholds or the desirability of using step functions to describe pain. Rather, one need admit only that, in the case of the step function, the effect of a nonmental act (such as pushing a torture button or releasing lead into the atmosphere) causing no perceptible pain could be to move the victim closer to the threshold point at which pain will be felt or obvious damage will occur. In moving the victim closer to the threshold point, one could be said to have increased the probability of harm and, therefore, to have harmed the victim by increasing the risk he faces. Admittedly this probabilistic notion of harm is not simple, but it does enable one to talk of measurable effects of individual acts, and it appears to be more in keeping with the nature of real situations involving allegedly imperceptible harms.

In appealing to sets of acts, using idealized examples, avoiding talk of probability of harm, and reducing harm to pain, Parfit has made four simplifying moves. These moves have allowed his theory to be formulated in highly idealized terms. It is not obvious, however, that this simple theory can be *interpreted* in any but an extremely complex fashion, once it is applied to real-life ethical problems regarding allegedly imperceptible effects. This means that Parfit may have correct answers to the idealized moral questions he poses but that he may not be answering the realistic moral questions we most want and need answered.

AN ALTERNATIVE APPROACH TO ALLEGEDLY IMPERCEPTIBLE EFFECTS

If an alternative theory were capable of answering some important questions about allegedly imperceptible effects, what might it be like? First, addressing

20. Parfit, *RP*, p. 79.

21. See *ibid.*, p. 80.

Parfit's problems with transitivity and simplicity, an alternative account might be built on A, acceptance of the claim that there are no imperceptible changes in the degree of pain and no imperceptible (i.e., nonmeasurable) harms and benefits.

Second, it would be an account in which one were able to talk about increased and decreased *risk*, or increased and decreased probability of harm. Scientists and risk assessors long ago began talking about certain harm, no harm, and risk or probability of harm. Economists, for example, talk about the "compensating wage differential," the wage which is higher because the occupational *risk* of harm, not *certain* harm, is greater than that for a similar job.²² Epidemiologists also talk in terms of risks and probabilities, not in question begging, either/or terms of harm/no harm.²³ Engineers computing risks from energy technologies, for example, typically use the *BEIR* dose-response curve to relate radiation exposure to cancer risk; they know that one rad of radiation is responsible for approximately .0002 cancers.²⁴

Were we to think of all types of harms and benefits in terms of probabilistic dose-response or act-consequence curves, as scientists and risk assessors do, then we could avoid talk about imperceptible differences in pain. A philosophical analysis of allegedly imperceptible effects could then be expected to focus not so much on linguistically peculiar pain statements and a priori assertions of causality, in order to establish moral responsibility, but more on measurement difficulties associated with various probabilistic and dose-response criteria for harm.

To engage in such probabilistic and scientific talk, however, one would have to define increased risk as a harmful effect of an individual act and decreased risk as a beneficial effect. To make this transition from speaking of *sets* of acts causing *certain* harm to *individual* acts causing increased *risk* of harm, however, one likely would have to make two further admissions. One is that the effects of every nonmental act are capable of being known in some way, at least at the molecular level through sophisticated instrumentation. Another admission is that the absence of perceptible change in *pain* is not a sufficient basis for affirming that an *effect* is imperceptible. The first admission seems to me to be at

22. See, e.g., W. K. Viscusi, *Risk by Choice* (Cambridge, Mass.: Harvard University Press, 1983), pp. 37 ff., 56 ff.

23. See, e.g., E. Lawless, M. Jones, and R. Jones, *Comparative Risk Assessment*, grant no. PRA8018868 (Washington, D.C.: National Science Foundation, 1983), pp. 118–19.

24. Using the National Research Council's study, *Biological Effects of Ionizing Radiation (BEIR)*, the U.S. Atomic Energy Commission drew this conclusion. See Atomic Energy Commission, *Comparative Risk-Cost-Benefit Study of Alternative Sources of Electrical Energy*, no. WASH-1224 (Washington, D.C.: Government Printing Office, 1974), pp. 3–5 (chap. 3, p. 5). Numerous effects of single acts (rather than sets of acts) which increase the probability of harm are measurable. See, e.g., C. Woteki, *Environmental Contaminants*, no. OTA-F-103 (Washington, D.C.: Office of Technology Assessment, December 1979), pp. 154–65; and G. M. Karny, *The Role of Genetic Testing in the Prevention of Occupational Disease* (Washington, D.C.: Office of Technology Assessment, 1983), pp. 55–85.

least in principle plausible,²⁵ and I defended the second admission earlier in this section.

With all this talk of evaluating *perceptible* harm at the physiological or molecular level, for example, in terms of increased risk, it is important to note that Parfit is not clear as to what he means by “imperceptible.” He apparently means by it “effects on other people, if none of these people could ever notice any difference.”²⁶ Yet surely Parfit must mean more than this since it is obvious that agents are responsible for harmful effects which are “not noticed” by their victims.

PARFIT’S RESPONSE

What would Parfit say about the preceding “alternative account” of allegedly imperceptible harms? His main objection would likely be that any theory which accepts A, the thesis that pain cannot become imperceptibly worse, is therefore bound to reject B, to reject the thesis that predicates about pain are transitive.²⁷ Parfit appears to believe that giving up transitivity is untenable, so he argues that pain can become imperceptibly worse.

It is less than obvious, however, why accepting A entails rejecting the thesis that predicates about pain are transitive. This is because, even were Parfit really able to “save” transitivity by rejecting A, it is not clear that much would be gained by his doing so. This is because transitivity has never been in question, as Dummett has pointed out,²⁸ in any except a very few cases. Transitivity has never been in question in cases in which the application of predicates is taken to be established by observational comparison of some object with a prototype. For example, if we say “*x* is circular,” then it is because we can compare *x* with prototypical circles. Further, if we say “*x* is circular, and all circular things are *y*,” then we can also say “*x* is *y*” because the “difference” in question is discriminable with respect to a prototype. In other words, because of the existence of this prototype, being circular is a discriminable difference, and because

25. The first admission can be seen to be plausible once one realizes what is meant by a nonmental act. Even if such an act were directed at a victim, but did not cause pain, it might cause various physiological effects associated with a higher or lower incidence of risk in the victim. Consider the act of using a particular insecticide in such a way that other persons would ingest it into their lungs. Even if such an act caused no pain, it would have some physiological effects, e.g., chromosomal abnormalities, or decreased cell respiration, and some of these effects could place the victim in a higher risk category, e.g., one associated with precancerous states. If effects such as these are measurable, and they are in most cases (see n. 23 above), then they may be said to increase or decrease one’s probability of being harmed. But if so, then one’s talk about pain might be replaced with talk of physiological effects and probabilities of harm. This might be a good move since Parfit’s only alleged instance of a case involving imperceptible harms and benefits is that of pain.

26. Parfit, *RP*, p. 51.

27. This is the response Parfit made to my proposal (mentioned in discussion on April 2, 1985) that one reject B and develop a theory of risk based on small, physicalistic effects of actions. He also makes this response in *RP*, p. 82, and in “Comments,” p. 847.

28. See Michael Dummett, “Wang’s Paradox,” *Synthese* 30, nos. 3–4 (April–May 1975): 320.

it is a discriminable difference, it is transitive. (If we say “ x is painful” or “ x is red,” however, the transitivity is in question because the application of the predicates “red” and “painful” is not taken to be established by observational comparison of some object with a prototype. We cannot compare x to some prototype for “painful” or for “red” because there is none. These differences are nondiscriminable, and because they are nondiscriminable, their transitivity is in question.)

If I am correct in accepting A, and in believing that all benefits and harms must be perceptible or measurable in some sense, then the class of discriminable differences, once one extends discrimination to the microphysical level, is very large. And if it is very large, then a great many problems associated with allegedly imperceptible differences can be understood in terms of finer microphysical discriminations, for example, among cell abnormalities having a propensity to develop into cancer. These discriminations, in turn, are likely to play a role in the risk to which one is subjected, for instance, to one’s probability of contracting a disease such as cancer. The point is that, if one looks at allegedly imperceptible harms with fine enough medical and scientific know-how and instrumentation, then it is questionable whether there are any genuine effects of nonmental acts which are imperceptible. And if there are not, then the class of cases for which Parfit wishes to “save” transitivity is very small—as well as problematic—and it includes only predicates like “red” and “painful.”

But if transitivity is “saved” only in these small numbers of already problematic cases, then perhaps little is to be lost by adopting an alternative, risk-based account of allegedly imperceptible effects. If my arguments have been correct, then perhaps the typical case of allegedly imperceptible harms is that for which differences in harm or benefit are discriminable and therefore the case for which transitivity is not at issue.