"Dissecting Bioethics," a column edited by Tuija Takala and Matti Häyry, welcomes contributions on the conceptual and theoretical dimensions of bioethics.

The section is dedicated to the idea that words defined by bioethicists and others should not be allowed to imprison people's actual concerns, emotions, and thoughts. Papers that expose the many meanings of a concept, describe the different readings of a moral doctrine, or provide an alternative angle to seemingly self-evident issues are therefore particularly appreciated.

The themes covered in the section so far include dignity, naturalness, public interest, community, disability, autonomy, parity of reasoning, symbolic appeals, and toleration.

All submitted papers are peer reviewed. To submit a paper or to discuss a suitable topic, contact Tuija Takala at tuija.takala@helsinki.fi.

Probability Potentiality

CHRISTOPHER NOBBS

Potentiality, like novelty, is a notion which many philosophies have trouble accommodating. It has been with us since the days of the Greeks, but seldom is it treated as altogether welcome.
C.E. Whitmore, The Paradox of Potentiality, p. 239[1]

The concepts of personhood and potentiality are central to many bioethical debates concerning the intrinsic value, or moral worth, of existing and potential human beings. Personhood theorists such as John Harris and Peter Singer claim that self-awareness is a necessary condition of moral worth, whereas some of their critics contend that the potential to become self-aware is a sufficient basis for intrinsic value. In this paper, I illustrate that both these concepts have problems. I go on to argue that an intuitively appealing way to resolve these problems is to adopt a notion of probability potentiality that states that a potential person's intrinsic value increases with its likelihood of achieving its potential.

Personhood and Infants

Theories of personhood abound in modern bioethics. The basis of all personhood theories is the same in that they try to define what it is that makes some beings more valuable than other beings, what separates a human from a worm. To do this, most theories have a set of criteria that have to be met to become a being with intrinsic value. These valuable beings are called per-

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sons. For example John Harris' personhood theory states:

> A person will be any being capable of valuing its own existence. . . . On this account of the person, the moral difference between persons and non-persons lies in the value that people give to their own lives. The reasons it is wrong to kill a person is that to do so robs that individual of something they value, and of the very thing that makes possible valuing anything at all.[2]

Thus Harris believes that the criterion to become a person is the ability to value one's own life.

Variations on personhood theory differ wildly on what they believe the criteria should be. In this paper, I do not need to reach a definitive set of criteria for personhood; all I need do is point out that most of the personhood theories regard humans before they reach the required criteria as non-persons. For example, under Harris' theory, as young humans have not yet developed the ability to value their own lives, Harris cannot believe they are persons. For the purposes of this paper, let us call humans who have not yet met the criterion to become a person infants.[3]

This lack of value in infants, however, results in some highly counterintuitive situations, highlighted by the case of Mary and Jodie, the Manchester Conjoined Twins.

The Manchester Conjoined Twins

To summarize the tragic facts of the case, Mary and Jodie were born on August 8, 2000, sharing a number of organs. Most notably Mary's heart and lungs were insufficiently formed to allow her to live independently. Mary was, therefore, relying on oxygenated blood from Jodie's heart, through an aortic shunt, to survive. Jodie's heart, therefore, was pumping around two circulatory systems and so had to overcome twice the peripheral resistance that a heart normally faces. This was causing Jodie's heart to progressively fail with total failure expected in 6–24 months, at which point both girls would die.

The case came to court[4] when the hospital wished to surgically separate the twins, against the religious wishes of the parents. This separation would give Jodie a high chance of a normal life but would unavoidably kill Mary. Thus there were two possible future situations:

1. Non-separation: both twins would die in 6–24 months, before either would become a person under Harris' personhood theory
2. Separation: Mary would die and Jodie would have a reasonable probability of becoming a person.

John Harris' analysis of the case[5] chose the first option because

> [t]he fact that neither Mary nor Jodie were persons at the time of the operation separating them and killing Mary . . . explains why the decision to operate knowing that Mary must die was not unethical. However it also shows that had the wishes of the parents been followed and both Mary and Jodie had been allowed to die, equally this would not have involved the premature death of any persons. So while reflections on personhood can perhaps provide the ethical justification for the decision in *Re A*, such reflection would also underpin the decision that I believe would have been the better decision. This would have been for the Court of Appeal to declare the operation to be *lawful but not mandatory* and that following the wishes of the parents would also have been lawful.[6]

Because John Harris believes that neither Mary nor Jodie was a person he

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is forced to conclude that the only difference between situations 1 and 2 is the overriding/following of the parents' views. Thus it is the parents' views that tip the balance. Harris is led to this decision because he sees all infants as having no intrinsic value of their own, as they do not meet his personhood criteria. Therefore there is no difference between the death of one infant and the deaths of two infants.

This conclusion, however, is highly counterintuitive to what most people feel should happen and what does happen in an example advanced by Charles Erin and Soren Holm:

> Janet P., a practicing Jehovah's Witness refused consent for blood transfusions for her newborn daughter, necessary to prevent retardation and possible death. At a hearing convened at the Columbia Hospital for Women, Superior Court Judge Tim Murphy ordered that the neonate be assigned a Guardian to sign the requisite releases, and she was given the transfusions and survived (pp. 80–1).[7]

And they go on to conclude

> it seems to us, it would be quite correct for the state to intervene to protect the interests of the neonate, even where it goes against the wishes of the parents (p. 81).[8]

I believe one is forced to agree with Holm and Erin's conclusion; to allow a newborn, a potential person, to die because of the parents' wishes is surely an unjust and a counterintuitive state of affairs. Indeed how strong would these wishes have to be? As the personhood theory places no value in infants, it has great difficulty in explaining why the loss of an infant is morally wrong and therefore why people's actions should be restricted. Therefore a personhood theorist would have great difficulty in explaining why any wish a parent has would not be morally justifiable. For example why should the parents not go on holiday leaving their child behind?

Personhood's Escape?

One possible way of giving the infant some protection under personhood theory is to say that as an act that harms a person is morally wrong, harming an infant in such a way that a future person is harmed is morally wrong. For example, not giving Janet P's daughter the blood transfusion may result in harm to the person Janet P's daughter may become. The omission, then, is a harmful act to a person who will exist in the future and therefore morally wrong, thus giving the personhood theorist a method of protecting the infant.

This argument, however, creates no value in the infant for what it is now. The value is only in the future person and therefore does not exist if the future person cannot exist—either because the infant is killed or incapacitated so far that he/she can never develop the properties required for personhood. Therefore, although this argument allows one to say why harming an infant is wrong, it does not give one a way of saying why killing the infant is wrong. This results in severe anomalies as demonstrated by the following example.

Consider the parents mentioned above who want to go on holiday without their infant, whom they leave locked up at home. Under this extension of the personhood theory, the parents should not leave their infant unattended for a weekend, because without food and water the child may suffer harm that will carry over to the future person. All well and good. How-

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ever, if the parents were to leave the infant alone for 6 months, leaving no chance that the infant will be alive when they return, there is no future person and, therefore, there is no moral wrong. This extension of personhood theory proposes that leaving an infant for a weekend is morally wrong but leaving an infant for 6 months is, at the least, morally neutral. Surely, however, logic demands that the longer an infant is left unattended the worse, in moral terms, the act is. And surely the act does not become morally neutral if the infant dies.

These three situations—Manchester conjoined twins, Janet P's daughter, and the holiday example—present personhood theory with three counterintuitive and logical flaws. I will now show that potentiality could solve these flaws. There is, however, a fourth flaw to the personhood theory, which is indeed a variation of an argument used by advocates of the personhood theory to attack potentiality. So, for now, I move on to potentiality, leading to the personhood advocate's criticisms of potentiality, and then return to this fourth criticism of the personhood theory.

Potentiality

In many ways, potentiality is a common enough notion in everyday life, even if it is not in bioethics at the moment. Simply put, it is the notion according to which something is valued because of what it *could* become or what it has the *potential* to become. So the flower bud is valued because it will flower and the wool because it can become a jumper. Therefore, when combined with a theory of personhood, potentiality theory classically holds that, because an infant has the potential to become a person, it should be valued as a person. So because Jodie has the potential to become a person, she should be valued as a person. Tragically, though, Mary can never become a person; therefore she is not a potential person and, therefore, has no intrinsic value. Under potentiality, one would choose to save a potential life and so separate Mary and Jodie.[9] Also, by placing value in infants, it allows us to explain why leaving an infant in a situation that will result in its death needs moral justification, thus preventing the parents going on holiday without their infant.

Potentiality theories, however, raise other problems because many other things also have the potential to be a person—most notably, gametes. This leads Harris to point out that if we were to imbue all entities that had the potential to be persons with the value of a person, we would be in for an "exhausting time"[10] as we tried to save every gamete in order to avoid murdering a potential person. That observation that, if left standing, would ridicule the potentiality argument, as it means that male masturbation, which leads to the eventual death of 100–400 million sperm,[11] would be comparable to genocide.

The usual response to Harris' argument, and arguments like it, is to draw a distinction between active and passive potentialities. These two types of potential go back to Aristotle and were summarized by Massimo Reichlin,[12] with passive potential being

> extrinsic, in that the principle of actualization comes from outside the body which is transformed. This kind of potency has to do with contingent qualities of the substance, which the substance can assume or not, without its perfection being affected: this meaning of potency is simply the disposition to receive modifications. Thus a tree can be said to be a potential table, in so far as it can be the object of a craftsman's work through which a table can be produced.[13]

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Whereas Reichlin summarizes active potentials to be

> those in which the principle of becoming is internal, in that it does not depend on external causes.[14]

If one attributes value only to entities with active potential, one can give value to the embryo but not the gametes, as the individual gametes need to meet and fuse to become an entity that has an internal principle to become a person. One can, by this means, distinguish between the embryo and the gametes and say that the embryo has internal value but the gametes do not. Therefore the death of 100–400 million sperm is not comparable with genocide. This distinction in value between the embryo and gametes, however, is absolute—there is no gradual or progressive increase between the gametes having no value and the embryo having the value of a person. This leads to a different problem.

The Personhood Theorist's Sink and Petri Dish

Peter Singer (another advocate of the personhood theory) raises another problem that is outlined by a thought experiment:

> A laboratory assistant is told to dispose of the egg and sperm. She does so by tipping them down the sink. So far, so good; but a few hours later, when the assistant returns she notices that the sink is blocked. The egg and its fluid are still there, in the bottom of the sink. She is about to clear the blockage, when she realizes that the sperm has been tipped down the sink too. Quite possibly, the egg has been fertilized! Now what is she to do? Those who draw a sharp distinction between the egg-and-sperm and the embryo must hold that while the assistant was quite entitled to pour the egg and sperm down the sink, it would be wrong to clear the blockage now. This is difficult to accept.[15]

This example is indeed difficult to accept. But why does this example prove so counterintuitive? Singer offers the explanation "potentiality seems not to be such an all-or-nothing concept; the difference between the egg-and-sperm and the embryo is one of degree."[16] It does seem highly counterintuitive that there should be such a divide in value between something with an active potential and something that can be placed in a situation that with a little bit of time would acquire an active potential. Singer's example demonstrates that it appears arbitrary that something can be worthless one moment and after very little change in time, composition, or position can have a huge value. That is why the example creates a situation in which with so little change such a large change in value takes place. This example forces one to believe that any large value distinction between things that are close to one another results in a questionable state of affairs. Therefore, even though the distinction between active and passive potentialities seems credible, the placing of such a large or absolute difference in value can lead to an equally counterintuitive state of affairs. Singer shows that potentiality, even with the active/passive distinction, is flawed.

It is Singer's argument, however, that returns us to the personhood theory. Compare the situations: Both potentiality and personhood have a valid distinction between two things that can be placed in a situation that, with a very small time difference, can change from a worthless entity to something that has the value of a person. With potentiality, this is the change from gametes to embryo; with person-

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hood theory, it is the change from infant to person. The two situations resemble each other very closely, as an infant that is seconds from being able to value its own life has no value but seconds later will have the value of a person. This allows us to ask a question of the personhood theory similar to that the personhood theorists asked of potentiality: How can one allow the killing of an infant that is so close to becoming a person when the killing of a person is so condemned? In exactly the same way as it is counterintuitive to hang such a large difference in value on the active/passive potentiality distinction, surely it is also counterintuitive to place an equally large distinction on personhood, as under both theories a situation can be imagined when something with very little change can go from having no value to the value of a person. Thus if Singer is right and his sink criticism flaws potentiality, as I believe it does, then surely it also further flaws the personhood theory.

Probability Potentiality

We have now looked at the current situation and problems of personhood and potentiality theory. As we have seen, the problem lies in placing a large value difference on two things that are close together. Therefore, if the value varied gradually as the change occurred, the problem would be avoided. But what could link the gradual change? While looking for a distinction other than the active/passive potentiality, John Noonan suggested probabilities because

> [t]he appeal to probabilities is the most commonsensical of arguments, to a greater or smaller degree all of us base our actions on probabilities, and in morals, as in law, prudence and negligence are often measured by the account one has taken of the probabilities.[17]

We are, I believe, forced to agree with this point, as probabilities are included in the making of most of our moral decisions. For instance, in the decision to remove nutrition from a persistent vegetative state patient, the almost certain probability of that individual not recovering consciousness and the fact that removing nutrition will almost certainly result in that patient's brain stem death are both major factors. Probability, even if in a minimized way due to certainty, does play a role in most of our moral choices.

What I propose is a theory of potentiality where the magnitude of the value is dependent on the *probability* that the infant will reach personhood—a theory of probability potentiality. Under this theory, the embryo at conception, which has an active potential to become a human, has a low probability of achieving its potential and therefore a low intrinsic value due to probability potentiality. As the infant develops with time, the probability of it achieving personhood increases, and, thus, its intrinsic value due to probability potentiality increases. Therefore, once a child has been born and is close to achieving the criteria of personhood, it has a high probability of achieving its potential and so has a high intrinsic value, very close to that of a person. Overall, then, the intrinsic value increases gradually over the period of development, as the probability of achieving personhood increases. There is, therefore, no step at which there is a large change in the intrinsic value and therefore the theory avoids the problems of both personhood and potentiality that have already been discussed.

The Lottery of Life

As an example, consider a lottery with a prize of £1 million for each person who can choose the correct order in which

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the numbers 1–37 are picked out of a bag. The lottery runs over 36 weeks, with one number being drawn and not replaced each week. A ticket costs £1.

Now imagine a ticket that on week 35 has all the previous numbers in the correct order and, depending on which of the remaining two balls is drawn from the bag,[18] could be worth £1 million. How much is that ticket worth before the last draw? Well, it is worth more than the £1 it was bought for in the first place, because that ticket has a 50% chance of being worth £1 million. And if anybody is willing to sell a 50% chance of £1 million for £1, I am buying! Surely what that ticket is worth is the probability it has of winning multiplied by the potential jackpot: 50% of £1 million pounds = £500,000. Likewise if there was a ticket at week 33 with all the correct numbers the ticket's value could be calculated using the jackpot size and the probability of winning (~£8333), as one could for every weekly stage. Thus, as the ticket progresses through the weekly draws, its value increases up to the value of the jackpot. Furthermore, if one of the numbers were out of sequence, the unrefundable ticket could not reach the jackpot and can't be refunded and would be worth nothing.

Now let us compare our 36-week (or nine-month) lottery with an infant under our probability potentiality theory. Conception is comparable to the buying of the ticket, the weekly draws akin to the developmental hurdles the infant overcomes, and the jackpot is synonymous with achieving personhood—although that would be after years not nine months. The ticket has a potential to win the jackpot, just like the infant has a potential to become a person. Although the ticket's probability of winning the jackpot increases with each passing correct draw, the embryo's probability of reaching personhood increases as it successfully completes the different stages of its development. Both the ticket and the embryo therefore start with a low value that increases as they approach their respective jackpots. Furthermore, if either loses its ability to reach the jackpot, it loses its value due to potentiality.

This example illustrates first how the theory of probability potentiality works and also how common this concept of potentiality is at present, even if the theory is not simple. Likewise, although the values created by this theory may not be fixed—in contrast to potentiality and personhood values—it does not mean that the theory is uncommon or incorrect.

When applied to the four examples that have been shown to flaw personhood theory, the theory of probability potentiality supports personhood theory. It allows us to give distinguishable values to Mary and Jodie and hence a reason to consider separating them against the parents' wishes. Likewise, because Janet P's daughter has value under probability potentiality, we can consider giving her a blood transfusion against Janet P's wishes.

One may think that, as the value is linked to probability of achieving personhood, that probability potentiality will suffer the same problem as personhood theory when considering the holiday example (that as leaving the infant for six months removes all chance of the child surviving, no moral wrong has been done). However with the probability potentiality theory, the infant has value when the decision to leave it is being made, because, at that point, the infant still has a probability of achieving personhood. Therefore, deciding to leave the infant to certain death results in a loss of value and, therefore, requires justification, whereas under personhood theory, as demonstrated, because there is no future person who will suffer harm, leaving an

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infant to certain death is, at the least, morally neutral.

Finally, as there is no large change in the value of the infant, with probability potentiality there is no point at which to use an example like Singer's sink, thus avoiding the final criticism of personhood and the fatal criticism of potentiality. Overall, therefore, the theory of probability potentiality seems to support personhood theory with its serious flaws.

Conclusion

By looking at the Manchester conjoined twins, Janet P's daughter, and parents wanting to go on holiday, I have argued that personhood theory has several serious flaws. These flaws could be solved by a theory of potentiality. However Singer's sink example showed that potentiality theory itself has a flaw by placing a large value difference between the gametes and the embryo. I also argued that the logic of Singer's sink example could also be applied to the personhood theory if one were to consider an infant that was on the cusp of achieving personhood.

To solve these flaws, I proposed a theory of probability potentiality—a theory that places value in an infant that is proportionate to the probability it has of reaching personhood. To illustrate this theory I outlined the example of a 36-week lottery where the ticket was comparable to the infant. I then showed how probability potentiality could support personhood theory in relation to the four criticisms that this paper presented it with. What I have not done in this paper is to apply probability potentiality to the common ethical problems involving infants (e.g., embryo research, abortion), a task that will be left for another day. However, probability potentiality as it stands already seems to have four applications—applications that personhood alone cannot logically or intuitively fulfill.

Notes

1. Whitmore CE. The paradox of potentiality. *The Journal of Philosophy* 1939;36:239–47.
2. Harris J. *Value of Life*. London: Routledge; 1985:18–9.
3. Although in this paper I only consider human infants, it could apply to any species capable of achieving personhood.
4. *Re A* (Children) (Conjoined Twins: Medical Treatment). 2001. Fam. 147.
5. Harris J. Human Beings, Persons and Conjoined Twins: An Ethical Analysis of the Judgment in Re A. *Medical Law Review* 2001;9:221–36 at p. 222.
6. See note 5, Harris 2001:236.
7. Holm S, Erin CA. Deciding on life—An ethical analysis of the Manchester Conjoined Twins case. *Jahrbuch fur Wissenschaft und Ethik* 2001;6:67–87.
8. See note 7, Holm and Erin 2001.
9. This choice is dependent on whether one believes one can ever morally end a potential person's life. Although this is an interesting question, it is beyond the scope of this paper, and the outcome has no direct effect on this paper. So, for now, I leave the assumption that one can kill a potential being to save another.
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12. Reichlin M. The argument from potential: A reappraisal. *Bioethics* 1997;11:1–23.
13. See note 12, Reichlin 1997.
14. See note 12, Reichlin 1997:14.
15. Singer P. *Practical Ethics*. New York: Cambridge University Press; 1993:160.
16. See note 15, Singer 1993.
17. Noonan J. An almost absolute value in history. In: Feinberg J. *The Problem of Abortion*. Belmont, CA: Wadsworth; 1973:15. Engelhardt also mentions a similar concept: Engelhardt HT Jr. *The Foundations of Bioethics*. New York: Oxford University Press; 1996:141.
18. Thereby revealing the last remaining ball and ending the lottery—hence why a 37-ball lottery takes 36 weeks.

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