



Princeton Bioethics Conference

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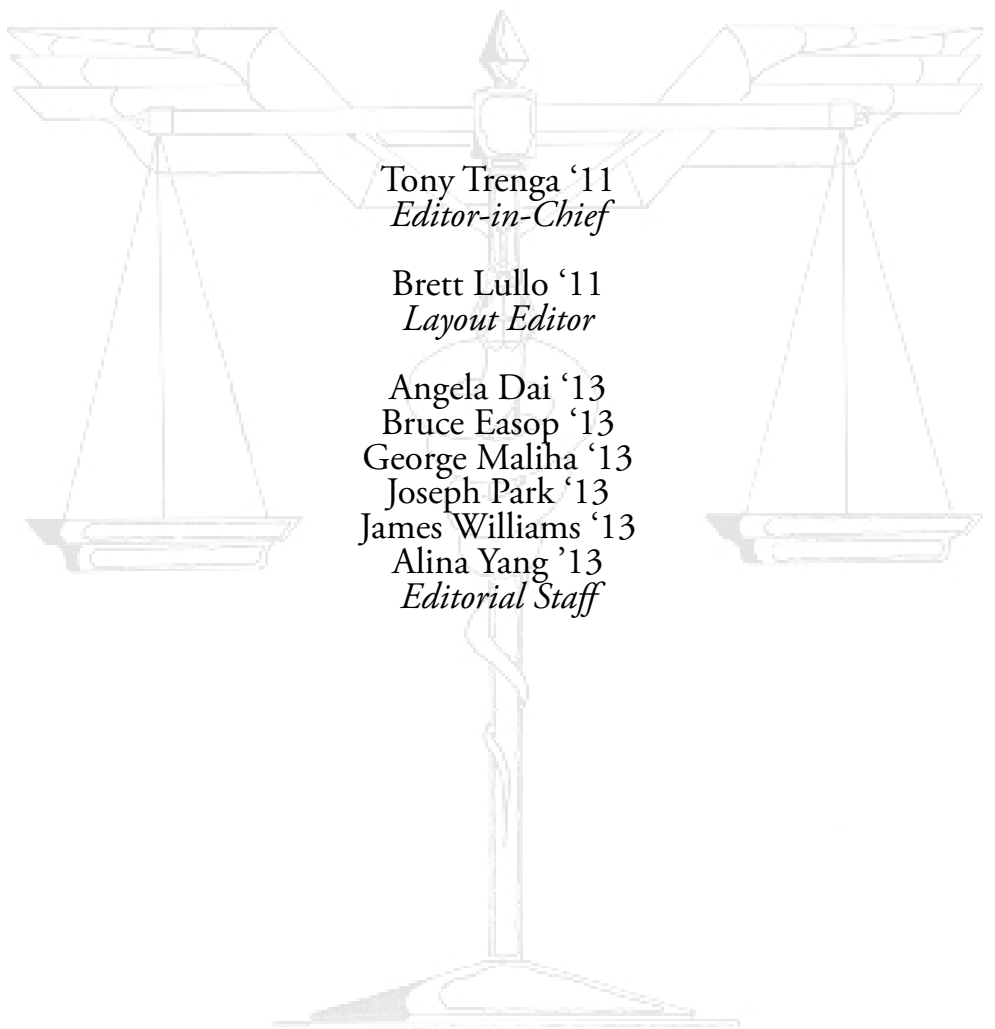
Princeton Journal of Bioethics

Princeton Bioethics Conference
Special Publication

Presented by
The Student Bioethics Forum
and FUSION

*Dedicated to the discussion and contemplation of issues
at the intersection of technology and society.*

The Princeton Journal of Bioethics



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The Technical Review Board was created to review the student writing thereby ensuring the accuracy and quality of the Journal. We would like to extend our appreciation to these professionals who donated their time and expertise to our endeavor.

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Foreword

We are proud to present the attendees of the *Princeton Bioethics Conference: Undergraduate Voices on the Intersection of Science, Policy, and Ethics* with this special publication of the *Princeton Journal of Bioethics*. A joint collaboration of the Student Bioethics Forum, FUSION, and the *Princeton Journal of Bioethics*, this issue of the *Journal* consists of the papers of the undergraduate students presenting at this year's conference. The articles we have selected discuss topics such as drug addiction and the addict's accountability, Michael Tooley's "Abortion and Infanticide," the ethics of the dissemination of nootropics, and life-support and end-of-life decision-making.

The *Princeton Bioethics Conference* was envisioned as a forum for undergraduate discussion on the bioethical issues of the current scientific age and to highlight exceptional student submissions from universities across the country. We firmly believe that many of the undergraduates present will have active voices in the bioethical debates of the future. It is our hope that this conference will help to start that conversation. We would like to acknowledge Peter Singer, Ira W. Decamp Professor of Bioethics in the University Center for Human Values, for his indispensable insights into how to make our idea for this conference a reality.

Thank you for your continued support and interest in the Princeton Journal of Bioethics and the Princeton Bioethics Conference. We hope that the presenters provide you with new perspectives and material to ponder, debate, and discuss. It is only through sustained dialogue and awareness that progress in bioethics can be made, and we invite you to become an active participant in this exciting and rapidly growing field.

Sincerely,

Tony Trenga '11
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The Princeton Journal of Bioethics

Undergraduate Bioethics Conference, November 20, 2010

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Emergency Contraception

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A year ago, it came to the attention of me and the Princeton Tory that the top search result for “Emergency Contraception” was not Planned Parenthood or some other “reproductive health” organization, but rather a Princeton-domain address – ec.princeton.edu. This website acts under the blanket of Princeton’s Office of Population Research, which receives an annual \$11 million grant from the National Institute of Health. This website was founded in 1994 by current director, Professor James Trussell. Trussell is one of the pre-eminent American authorities on emergency contraception. He serves on the board of directors at NARAL Pro-Choice America, and has published upwards of twenty articles concerning emergency contraception. It was not surprising to find, therefore, that the expressed purpose of Professor Trussell’s website is to “educate women about Emergency Contraception and encourage its broader use.” According to Professor Trussell, in 1994, when the website began, “very few people knew about emergency contraception.” Today, the website is accessed by 130,000 people in 50 countries over 575,000 times per month. Inevitably among its viewers are women who are under 17 years old (a segment of the population that emergency contraception has not been tested on). Nevertheless, the website encourages underage girls to access Emergency Contraceptives without their parents’ permission, and to avoid doctors who will not keep such information away from their parents. This article discusses the problems with Princeton University hosting such a website.

If one were to type the phrase “emergency contraception” into the Google search bar, one would expect to find among the first results Planned Parenthood, or some other “reproductive health” organization. It would come as quite a surprise, then, to learn that the very top result, ahead of all these other groups, is the website ec.princeton.edu. This Princeton-domain address is also listed along with Planned Parenthood and the FDA on the government website womenshealth.gov as a resource for “more information” about emergency contraception. When this site came to our attention, therefore, I and some other writers for the Princeton Tory Magazine were curious about the nature of both its content and its Princeton sponsorship.

The website is operated by the Princeton Office of Population Research (OPR), established in 1936 as the very first center for research on populations. OPR's "public infrastructure core" consists of four branches: the Population Annual Meeting Program Application, which manages "the scientific program of the annual meeting of the Population Association of America"; Research Briefs, which "summarize the core findings of recent analyses based upon data collected for the Fragile Families and Child Well-being Survey"; the Future of Children journal, which is concerned with influencing policy to "better the lives of children now and in the future"; and the emergency contraception website ec.princeton.edu. This website was established in 1994 by current director, Professor James Trussell, to educate women about Emergency Contraception and to encourage its broader use.

Prof. Trussell, a Professor of Economics and Public Affairs at the University, has been a member of the Office of Population Research since he came to Princeton as a graduate student in 1973. Serving as OPR's director from 1992 to 1998, and again from 2002 until today, Trussell says that when he founded the website, "very few people knew about emergency contraception," and he wanted to show women that there is a final option to prevent pregnancy after unprotected sex. In many of his articles, Trussell expresses concern over the large number of "unplanned" pregnancies in the U.S., and argues how important it is for women who accidentally have unprotected sex on occasion to know that they can still prevent pregnancy for up to 5 days after the encounter. His strong commitment to this cause has led Trussell to become one of the preeminent American authorities on emergency contraception, with at least two dozen articles published on the subject, including six out of his last seven. In addition to all of this, Trussell is on the board of directors at the National Abortion & Reproductive Rights Action League (NARAL Pro-Choice America), designating him a leader in the pro-choice movement.

The website ec.princeton.edu is a compendium of Trussell's efforts in emergency contraception. According to the site, its mission is to increase women's knowledge about and timely access to emergency contraception and other reproductive health choices, both in the United States and abroad. With an online database of emergency contraception providers in the United States, a database of emergency contraceptive pills around the world, and information on explaining to sexual partners how regular contraception pills can be used as a form of emergency contraception, ec.princeton.edu employs a variety of methods to further its purpose.

The website includes a brand-by-brand comparison of pills by company, dosage, and hormone levels per dose. It even analyzes the effectiveness and side effects of selected pills, specifically Plan B, Plan B One-Step, and Next Choice.

While the amount of information and detail that this website holds may be considered admirable, ec.princeton.edu goes beyond merely providing "neutral" information. It forms a core part of Trussell's avowed mission to increase the use of emergency contraception worldwide, and a very effective part at that: 130,000 people from over 50 countries view this website a total of 575,000 times per month. It is published in English, Spanish, French, and Arabic.

Teenage girls under 17 who have engaged in unprotected sex and are looking for answers are inevitably among such viewers. Even though emergency contraception pills have not yet been clinically tested on teenagers, ec.princeton.edu specifically encourages teens under 17 to use emergency contraception. To make matters worse, it encourages girls under 17 to acquire and use emergency contraception without prior parental consent. In fact, it suggests that these teenagers "be sure to ask if the medical care [they] receive will be confidential and, if not... contact someone else to get emergency contraception." Such an action takes a conversation that one would ordinarily expect a teenager to have with her parents, and puts it in the hands of an unknown doctor – a stranger. The website does not stop there, however. Upon acknowledging that it may be difficult for a girl who has had unprotected sex to procure the "morning-after" pill in the short time before she becomes pregnant, it encourages teenagers to keep emergency contraception pills "on hand" in a medicine cabinet to minimize the time between unprotected sex and the pregnancy prevention step.

The website also provides a manual, *EC at the Grassroots*, a self-described "Manual for Developing an Emergency Contraception Access Campaign in Your Community." This twenty-two-page grassroots organization guide is published by the National Network of Abortion Funds (NNAF). And, as one might well expect, the NNAF was created specifically to raise funds to help women pay for abortions. While this manual does not directly endorse abortion, it presents abortion in a very positive light, and clearly demonstrates the seamless ideological connection between Trussell's efforts and the pro-choice movement at large. At one point, the manual states that, "In many rural areas, women in need of information and timely access to EC must contend with barriers ranging

from their remote location to a conservative climate that limits and distorts public awareness of the issue.” This statement summarizes the ideological one-sidedness that underlies the entire website: its authors are so convinced of their position’s unassailability that they refuse to acknowledge the controversy that continues to surround the issue of emergency contraception, and dismiss their opponents as either misguided or malicious distorters of reality. It is hard to see any truth behind the pretense of neutrality to a website that openly allies itself with pro-choice activists, and ignores the clearly present controversy.

In statements on the problems caused by “conservative climates,” the authors of this manual are actually criticizing the legitimacy of the ongoing pro-choice/pro-life debate. Despite the abundant assertions throughout the manual and the website that it is impossible for emergency contraception to cause an abortion, this debate has not yet been definitively settled. In the FAQ section, ec.princeton.edu details the three ways in which emergency contraception can prevent pregnancy. If taken before the sperm and egg meet, emergency contraception pills can prevent or delay ovulation and fertilization. If taken after the sperm fertilizes the egg, the website admits the possibility that the drug prevents the implantation of the new embryo, causing it to die from lack of nutrition. Trussell and other emergency contraception advocates avoid the conclusion that killing the embryo is effectively an abortion by some sophistic wordplay: since “pregnancy” is defined by the National Institutes of Health and the American Association of Obstetricians and Gynecologists as beginning at implantation, and since “abortion” refers to the “termination of a pregnancy,” killing an embryo before implantation is not an abortion. Trussell himself seems to recognize this blatant sophistry, and so goes to great lengths to show that the cases of implantation being prevented by emergency contraception are rare or non-existent. His demonstration is by no means conclusive, however, and he himself admits throughout the website that this second method is a possibility, but sidesteps the discussion point on whether this method is abortion by using a very limited definition of pregnancy.

The firm pro-choice position that leads Trussell to dismiss concerns about emergency contraception’s abortifacient potential is present throughout the site, especially in its external links to sites such as www.prochoice.org, a website that unabashedly advertises the virtue of abortion over other options such as adoption or parenthood. This website too presents itself as an “informational” site, but it is even more clearly ideological than the

emergency contraception site. For example, the site refers to the unborn child as a “pregnancy” in an attempt to hide the harsh realities of abortion, e.g., “[In a surgical abortion] suction is used to remove the pregnancy from the cervix.” In addition, the main source given for “safe and accurate information” on the option of parenthood is the well-known abortion supporter and provider Planned Parenthood; the only other link for information about parenthood is broken. Other links provided by Trussell’s site include: the Guttmacher Institute, the National Organization for Women, the Feminist Majority Institute, NARAL Pro-Choice America, and Condomania, just to name a few. To be fair, there is one link (out of about 50) to a site that advocates natural family planning. Numerous other instances throughout the Princeton site reveal the intensity of the ideology behind it, which views the unborn child as a “medical condition,” and adults as completely autonomous individuals whose decisions should be dictated by subjective feelings. While Trussell claims that his site and organization are not activist and are not advocating abortion, it is easy to see his pro-choice, NARAL advocacy seeping into his purportedly unbiased and informative opinions on the use of emergency contraception.

To complicate matters further, the National Institute of Health currently funds the Office of Population Research, and, with it, its overtly pro-choice agenda. OPR had received previous funding from a host of foundations, including the Compton Foundation, the Educational Foundation for America, and the John Merck Fund. According to Trussell, however, OPR turned to the NIH in 2009 when funding dried up as the preceding organization, the William and Flora Hewitt Foundation, cut funding due to a change in priorities. Today, the NIH grants OPR \$11 million per year. Each branch of the public infrastructure core receives some part of the grant, but Professor Trussell was reluctant to disclose exactly how much of the grant is spent on Emergency Contraception, specifying only the payment of a part-time Webmaster. Nevertheless, regardless of how the money is spent, the simple fact that OPR receives federal funding lends credence to the idea that it should be purposefully maintaining political neutrality.

The Office of Population Research was created first and foremost as a research organization at Princeton University. Yet although research may still be its primary occupation, it sponsors an activist agenda by encouraging women all around the world to use emergency contraception while withholding or obfuscating crucial information about the continu-

ing controversy over the safety of the drugs and their abortifacient potential. Perhaps worse, it encourages the use of drugs on a clinically untested segment of the population – underage teenage girls. Although the office denies it, OPR is taking political and social stands on controversial issues, while at the same time receiving federal funding. One wonders: if OPR opposed abortion or advocated sexual abstinence, or if its director were an ardent supporter of the Anscombe Society or the National Right to Life Committee, would the student body and University administration so passively accept its ideological posturing?

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An Analysis of and Commentary on Thomson's A Defense of Abortion

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In A Defense of Abortion, Judith Thomson argues that abortion is morally permissible in certain cases, even if we grant that a fetus has a right to life. She uses various analogies to illustrate the permissibility of abortion in the cases of rape, a threat to the mother's life, and failed contraception. Thomson concludes that it follows from her comparisons that abortion is permissible in each of these situations. However, Thomson's analogies are each flawed in substantial ways. In her famous example involving a pianist being connected to her reader's kidneys (compared to pregnancy in the case of rape), Thomson fails to account for the connection (beyond the physical one) that exists between a mother and her child. Thomson commits a similar error in her examples involving an expanding child threatening to destroy the house in which it resides (compared to pregnancies in which the fetus threatens the mother's life), and in her example involving Henry Fonda flying across the country to save her life (compared to pregnancies in which the mother's life is not threatened). In her final example involving "people-seeds" (compared to failed contraception) Thomson does not give credence to the option of simply leaving their windows closed (i.e. abstain from sexual intercourse) unless the inhabitants are prepared to deal with the possible consequences of opening them. Because Thomson's comparisons are not completely analogous, her conclusions cannot be regarded as absolute.

The issue of abortion is a hotly contested one on many levels, from arguments between individuals to debates between political leaders. The two extreme views on the topic range from abortion never being permissible, to the opposite end of the spectrum, where abortion is permissible under any circumstances. Most of the disagreement in this debate is focused around whether or not an unborn fetus constitutes a person with a right to life. One interesting essay on abortion is Judith Thomson's A Defense of Abortion. In it, she takes a different outlook on the issue. Rather than arguing that the fetus does not have a right to life, she grants this premise for the purposes of her argument. She goes forth to argue that even with this admission abortion can still be morally

permissible in some situations: in cases of rape, in cases of a threat to the mother, and in cases when contraception was used and failed. For each circumstance, she proposes far-fetched examples that she argues are analogous to pregnancies in these situations. I will argue that her examples are beyond far-fetched, and that they are flawed in ways that make these examples unsuitable to their respective intended situations. Though her examples are flawed, some of her conclusions seem to be valid, while some are not. Her conclusions on the cases of pregnancies resulting from rape, and those that threaten the life of the mother are valid. However, her conclusions about pregnancies in which the mother's life is not at risk, even those resulting from failed contraception, are not.

Before delving into her examples and conclusions, it is important to establish what Thomson is referring to when she uses the phrase "right to life." Thomson is arguing under the premise that the right to life is "the right not to be killed unjustly" (57). This allows for the killing of organisms in cases in which killing them would not be acting unjustly towards them. Understanding this definition of a right to life allows for a better understanding of Thomson's arguments in favor of abortion in certain situations. In the sections that follow, Thomson's examples will be explained, and I will present my objections to them as they pertain to cases of pregnancy.

Abortion in the Case of Rape

Thomson's first example in her essay is meant to be analogous to a situation in which a woman has been raped, and as a result of this crime, has become pregnant. The example goes as follows: imagine you wake up one morning next to an unconscious famous violinist. He has a fatal kidney disease, and you alone have the correct blood type for a procedure to cure him from this disease. The Society of Music Lovers has located and kidnapped you, and your circulatory system was connected to that of the violinist. It is necessary for him to be plugged into your body for nine months, and if you unplug yourself from him, he will die. Thomson argues that to unplug yourself from the violinist is morally permissible because he has no right against you to do otherwise, so you would not be killing him unjustly by unplugging him.

There is one major point at which this example diverges from a true situation involving a rape victim and the resulting fetus. The violinist who is reliant on the third party for life support is a complete and total

stranger to that third party. This is just not so in the case of pregnancy. Regardless of the circumstances under which the fetus came into being, it is not a random person dependant on its mother. Half of its genetic makeup comes from its mother! It is her child, not a random violinist who happens to perfectly match your blood type. Although this discrepancy exists, I largely agree with Thomson's assessment of the morality of abortion in the case of rape, and believe it is supported by both major philosophical camps.

From a consequentialist perspective, in a case of pregnancy due to rape, having an abortion may have better consequences than not having an abortion. The mother has been put into the situation against her will, and allowing it to continue has the potential to effectively ruin her life. She may live out the nine months of her pregnancy in complete emotional agony. In some extreme cases, she may even endanger her own life. Allowing the fetus to fully mature may allow for more agony to be brought into the world than would be brought about by an abortion.

From a deontological perspective, the rapist did not treat the victim as an end, nor would what he did be universalizable. In this sense, the circumstances under which the pregnancy came about were non-ideal. According to Christine Korsgaard in "The Right to Lie: Kant on Dealing with Evil", this allows for options of actions to become permissible that are impermissible in ideal circumstances.

Both of these analyses may lead one to believe that abortion is permissible in the case of rape. This does not necessarily have to lead to the conclusion that fetuses that came into existence because of rape have less of a right to life than those that did not; the situation is simply not an ideal one. Following either consequentialist or Kantian lines of reasoning, it may be concluded that abortion is permissible in the case of rape. However, by no means is it required.

Thomson is quick to declare that those who are opposed to abortion on the basis that a fetus has a right to life "do not make an exception in the case of rape" (49). But I believe she would be hard pressed to find a significant number of people who would openly declare that rape victims have no right to obtain an abortion. Sure, there are those on the religious far right who would declare that the rape was part of God's will, and therefore the pregnancy must not be interfered with, but they are contradicting their own beliefs. Traditional Christian religious doctrine commands its followers to have compassion for others. It does not follow

that we should force a rape victim to live in emotional agony for the rest of her life. By having respect for persons, the mother's choice becomes her own.

Abortion in the Case of a Threat to the Mother's Life

Thomson then argues that abortion is morally permissible in "a case in which continuation of the pregnancy is likely to shorten the mother's life" (50). She uses the analogy of a mother trapped in a tiny house with a rapidly expanding child to illustrate her point. Though I do not believe this analogy is perfectly analogous to a pregnant woman whose fetus threatens her life, Thomson makes some valuable conclusions from it. Thomson argues that it is not morally obligatory for the mother to sit by and allow herself to be crushed to death by the ever expanding child, but rather that it is morally permissible for the mother to take the life of the child to prevent herself from being crushed to death. Though the child is innocent, she argues that there is nothing morally wrong with killing it, because it is a threat to the mother's health. She alters the analogy slightly, and says that the mother is the house, rather than being inside the house. This allows for the fact that the child is inside the house (the mother), rather than expanding alongside her. Even with this change, I do not believe this analogy makes the case for abortion when the fetus threatens the mother's life. The growing child has no connection with the mother; it is just another party in the house. Even if the mother is the house, there is still no illustration of the connection between a mother and her child. This analogy may be more accurate if we said that the mother is the house, and the pipes inside the walls represent the rapidly growing child. Now there is a connection between the two parties, and the house will be significantly affected by the removal of the pipes.

There is another distinction Thomson fails to account for in her analogy and analysis. This distinction is between a case in which the threat to the woman's life is immediate (IE: she will die in childbirth), and a case in which the mother's life will be shortened, but she may very well live for another 20 years. Thomson seems to treat the situations as one and the same, as she uses the phrases "shorten the mother's life," (50) and "passively wait for death" (52) interchangeably. Abortion seems permissible in the case of the imminent death of the mother, because as Thomson states and successfully argues the sum of her rights outweighs the fetus's right to life (50-53). However, a line must be drawn at the point at which we define

this term "imminent," and it seems that this line would be completely arbitrary, and therefore cannot be reasonably justified.

After exploring this analogy, Thomson concludes that "a woman surely can defend her life against the threat to it posed by the unborn child, even if doing so involves its death" (53). I largely agree with this conclusion. If a woman's life is at risk, and this has been confirmed beyond a reasonable doubt, she has the right to abort the baby herself. However, this is for the most part, impossible to do safely. Thomson goes into another example to illustrate why it may be permissible for a third party to perform the abortion. She provides an example in which it is very cold outside, but there is only one coat to be used between two people. One of them owns the coat, and therefore he has a greater claim on it. She argues that it is unreasonable for someone to refuse to choose to give the coat to its owner, and therefore unreasonable for a third party to refuse to perform an abortion on a woman whose life is threatened by the continued growth of her fetus, because the woman "owns" her body.

Abortion in Cases Where the Mother's Life is NOT at Risk

Following her argument on the morality of taking the life of a fetus in situations in which the mother's life is at risk, Thomson takes this one step further by claiming that killing a fetus is permissible even when the life of the mother is not at risk. To illustrate this, she asks the reader to imagine that she is on the verge of death on the east coast, and the only thing that can save her is the touch of Henry Fonda's cool hand on her forehead. This man has no connection to her whatsoever, and so far as we know, has never even met Thomson. She then says that though it would be nice of Fonda to fly across the country and touch her, she has no right against him to do so. Thomson wants us to think of this situation as analogous to one in which a woman's life is not threatened by her pregnancy, but she does not wish to carry the fetus to term. The argument is that the fetus has no right against the mother for the support of her life, and therefore is allowed to be removed from her body.

The problem with this analogy is similar to that in the violinist example. It does not account for any sort of connection between the fetus and the mother. Obviously Henry Fonda has no connection to the woman on her deathbed, other than the fact that he can save her life. In the case of a fetus, the fetus is the genetic offspring of the mother in which it resides.

In addition to the lack of connection between the two parties involved, there is another problem with this analogy. The woman on her deathbed requiring Fonda's touch is not being brought into existence as a result of Henry Fonda's actions. There was nothing Fonda could have done to prevent the woman from being in this situation. In the case of a mother supporting the life of her fetus, it was the actions of the mother (except in the case of rape) that brought it into existence. In a sense, it is her fault that the fetus exists in the first place, so she has a responsibility towards it. This is similar to a child wanting a dog. The parents will undoubtedly tell the child that if they buy him a dog, he will have to feed it and spend time with it. Because owning the dog is the child's (and the parents', in a sense) fault, he or she is responsible for keeping it alive. In this way, the mother is responsible for keeping the fetus alive. This unique connection is nearly impossible to illustrate using analogies and comparisons.

Abortion in Cases of Failed Contraception

Thomson seems to recognize that her last argument stands on shaky ground, and goes further to attempt to justify her view on the issue. Thomson makes a distinction between cases in which a pregnancy results from a failure in properly used contraception, and cases in which the woman did nothing to prevent the pregnancy from taking place. To illustrate this point, she asks us to imagine a world in which the only way people come into existence is by sprouting up from "people-seeds" that are simply floating around in the air all the time. The way they "germinate" is by coming in contact with carpet inside of someone's house. In order to keep these seeds out, one can either leave their windows closed all the time, or purchase screens to keep the seeds out. However, occasionally the screens malfunction, and a seed is allowed to pass. Thomson argues that if it germinates, the owners of the household should be allowed to vacuum up the little person, because they have taken every feasible precaution to prevent it from being there, and therefore it is not their responsibility to support it.

Thomson seems to just brush over an option that every household would have, which is to keep the windows closed unless they were prepared to deal with the consequences. She dismisses this proposal as ridiculous, but I do not believe it is as far-fetched as any of her examples are. People are responsible for the consequences of their actions, regardless of the precautions they took. Taking these precautions does not relieve involved

parties of responsibility—it just reduces the chances that you will have to deal with the responsibility.

Making distinctions regarding the level of precautionary measures taken by two sexual also poses a moral hazard. If we were to grant that a woman should be allowed to seek out an abortion if she has used contraception and it has failed, we would be creating a world in which it is more beneficial for a person to lie than to tell the truth. Currently, there is no way to prove that a woman used contraception in an attempt to avoid pregnancy, and therefore the only evidence of the use of contraception is the testimony of the parents. The heightened emotional strain associated with pregnancy, in combination with this manufactured incentive to lie brings about a world in which it is extremely beneficial to lie. Granting abortions in cases of failed contraception would bring about a world in which people would treat each other as means to their ends, rather than as ends alone.

Conclusions

Thomson admits at the end of her essay that her arguments may prove unsatisfactory to some proponents of abortion because it does not provide for the permissibility of abortion in all situations. However, she does not even successfully prove that abortion is permissible in the situations that she presents. Her examples are far-fetched, which would be perfectly fine, but in each case, they are not quite analogous to pregnancy. It is important that these comparisons are completely analogous, or else the situations are not applicable, and therefore invalidate the conclusions. I may even venture to claim that there simply is no comparison possible to pregnancy. Thomson is correct to conclude that in cases of rape, and in cases where there is a definite and imminent threat to the woman's life, abortion may be morally permissible if the mother desires it. However, her other analogies do not withstand careful scrutiny. Performing abortions when a mother's life is not at risk, even when the pregnancy is not entirely her fault (as in the case of failed contraception) is morally impermissible. It is important to remember that in both of these essays the authors are proceeding with the belief that the fetus does have a right to life for the purposes of their arguments. This point of heated debate still needs much more investigation to be settled, and until this occurs, conclusions on abortion, in my opinion, are still up in the air. Though it cannot be concluded that "abortion is never permissible," it is certainly

not permissible in all circumstances. The morally permissible solution lies somewhere in the middle of the spectrum, abortion is permissible in few, specific circumstances.

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Addiction, Hedonism, and Moral Responsibility

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The question of what makes for diminished responsibility is a question for both moral philosophy and for the law. In this paper, I will examine the case of addiction in order to understand the issue of diminished responsibility. My paper is divided into three sections. In the first section, I argue that morally exculpatory drug use, or what I call addiction, can be equated with coercion. Addicts are not morally responsible for their drug use if they are taking drugs primarily to avoid painful withdrawal symptoms. In the second section, I argue that Bennett Foddy and Julian Savulescu's objections to this position—in which they argue that (almost) all drug users are responsible agents—do not take into account the coercive force to be expected of withdrawal. In the third section, I examine some of the implications of my view for questions of moral and legal responsibility, concluding that those who consume drugs primarily to avoid painful withdrawal symptoms are not responsible, both legally and morally, for the actions that are a direct result of their habits.

Introduction

The question of what makes for diminished responsibility is a question for both moral philosophy and for the law. In this paper, I will examine the case of addiction in order to understand the issue of diminished responsibility. This paper will be divided into three sections. In the first section, I argue that morally exculpatory drug use, or what I call addiction, can be equated with coercion. Addicts are not morally responsible for their drug use if they are taking drugs primarily to avoid painful withdrawal symptoms. In the second section, I argue that Bennett Foddy and Julian Savulescu's objections to this position—in which they argue that (almost) all drug users are responsible agents—do not take into account the coercive force to be expected of withdrawal. In the third section, I examine some of the implications of my view for questions of moral and legal responsibility.

In this paper, I will examine only the question of addiction in which addicts are in no way responsible for the original source of their addictions. Including this assumption sidesteps many of the thorny questions as to whether, even if an addict is subjected to volitional or rational impairment as a result of her addiction, the addict was negligent in allow-

ing herself to become impaired. Though it is probably true that many if not most addicts are at least partially responsible for becoming addicted, this paper's assumption is not purely hypothetical. There are a number of documented cases in which children under the age of 10 have become addicted to nicotine as a result of their parents' smoking. This was not only because having a parent that smoked set a bad example for the children, but also because the second-hand smoke from the parents' cigarettes led to physical addiction in the children (Cole 2).

What makes a user an addict?

An individual is not responsible for her continuing drug use when the individual has a valid excuse for deciding to consume drugs. Coercion, or expected threats, provides just this excuse; addiction is like a continuing threat. Such threats, Robert Nozick argues, are coercive and lead to a loss in autonomy; conversely, offers to use drugs involve no loss in autonomy. For example, let us say that gunman A credibly proposes to B that B must surrender \$100 or otherwise A will harm B. Conversely, let us say that a masseuse, C, offers to give B a massage for \$100. In both scenarios, B technically has the ability to choose to give A or C, respectively, the \$100 or not. The scenarios, however, are meaningfully different. The first comprises a threat, and resultant loss in autonomy, while the second amounts to no more than an offer. The gunman A has, in a sense, already stolen B's personal safety, and then offers to sell it back to B for \$100; the masseuse C offers B a service without prior theft. In its general form: A coerces B to do x only if A (credibly) threatens to make B worse off relative to some baseline condition if B does not do x. For B, the baseline condition is where B must neither suffer harm from the gunman nor gain benefit from the masseuse. I will assume that, for the analogous drug user, the baseline condition amounts to the absence of either pain or pleasure from a drug. Therefore, an addiction, like a threat, is coercive.

One may object that drug users are not, unlike B, threatened or offered by other *agents*, but by, if anything, threatened or offered by inanimate objects, drugs. I do not think this is relevant. Suppose that instead of encountering gunman A or masseuse C, B sits in an unassuming chair. The chair then automatically latches him in, and an automated voice emanating from the chair states that B can either deposit \$100 into the chair's arm or B can be electrocuted; it is an electric chair. Conversely, B sits in another unassuming chair and an automated voice states that B can either deposit \$100 into the chair's arm and be provided with a massage, or not

deposit \$100 and not be provided with a massage; it is a massage chair. Though neither chair has agency, the first chair is coercive to B and the second chair is not. Coercion does not require the coercer be an agent.

If a drug user has consistently consumed a drug, *not* consuming that drug can lead to significant pain in the form of terrible withdrawal symptoms. Given that a chronic drug user reasonably expects to fall subject to this pain if she does not consume her substance, she is coerced into consuming the substance in the same way that B is coerced by the gunman. If the drug user does not reasonably expect to experience pain from not consuming a substance, she consumes the substance for the pleasure of the substance in the same way that B pays C for the pleasure of a massage. Thus, addiction is (1) the consumption of a substance in the avoidance of expected pain or discomfort rather than (2) the consumption of a substance in the pursuit of expected pleasure; the latter is simply hedonism.

This definition of coercive addiction dovetails nicely with A.J. Ayer's account of free action and constraint. According to Ayer, one's actions are not free if another individual coerces one to perform those actions. Ayer states "it is enough that he should induce me to do what he wants by making it clear to me that, if I do not, he will bring about some situation that I regard as even more undesirable than the consequences of the action that he wishes me to do" (20). One does not need to be volitionally or rationally impaired to be excused from addiction; one needs only to face, as drug addicts do, an "undesirable ... situation," like withdrawal, to be excused from addiction.

Foddy and Savulescu Objections

Foddy and Savulescu, in *A Liberal Account of Addiction*, argue that almost all that we consider to be addictive behavior is, in reality, hedonistic behavior, or the pursuit of pleasure. Most so-called drug addicts, the authors argue, simply prefer to take drugs more than they prefer to do any other thing (14). That some drug addicts claim to desire not to use drugs is a result of the social stigma of chronic drug use; drug addicts have an 'out,' so to speak, as they can use drugs but use "addiction" as an excuse, avoiding social stigma. In other words, Foddy and Savulescu believe that almost all drug use falls under the category of (2) from above, drug use for pleasure. This logic, however, falls apart in the case of the regretful addict who is not stigmatized for her addiction. With no social stigma, why should this addict lie about the reasons for her addiction? Addicts like these are often associated with certain everyday substances, like caf-

feine. Because so many people drink caffeinated beverages like coffee, *not* drinking coffee is, though not stigmatized, considered strange. Imagine that there is a certain coffee addict who drinks coffee in the morning so that he feels alert and rested for the rest of the day. Let us assume that this coffee addict is chronically overworked, and so never has enough time to get a ‘full night’s rest.’ Let us then imagine that the coffee addict is fired from his job and begins to sleep ‘for the full night.’ This addict, however, still craves coffee in the morning and feels physically sick if he does not drink coffee. But because he has slept an adequate amount, the addict feels otherwise alert and well rested. This individual is not, as Foddy and Savulescu would claim, a ‘coffee hedonist,’ only consuming caffeine for the pleasures of the drug; because of adequate sleep, the coffee provides little to no added benefits to the addict. This individual, if he regrets his addiction, is a true regretful addict, and would only consume coffee (provided he had adequate sleep) to avoid coffee addiction withdrawal. It seems clear, then, that not all drug users consume drugs only for their pleasure; true addicts, instead, attempt to avoid pain.

Foddy and Savulescu argue further that fear of withdrawal symptoms cannot be the motivating factor for why addicts take drugs (12). The authors cite a source by Loimer et al. that concluded, “objective measures of heroin withdrawal bear no statistical correlation to an addict’s subjective feelings of withdrawal” (12). This is a puzzling argument against the validity of withdrawal symptoms for two reasons. First, it admits that there are tangible physically objective measures of heroin withdrawal, sustaining the fact that withdrawal symptoms really do exist. This is an incontrovertible fact; there are dozens of cases of medically documented deaths due to abrupt withdrawal, most notably with alcohol, benzodiazepines, and morphine (Ball). Second, it should not matter whether an addict’s subjective feelings towards withdrawal are correlated to objective measures of withdrawal. This is true for two reasons. First, subjective feelings of stress and terror are the essence of stress and terror; one does not need associated bodily harm for an experience to be undesirable. If an individual, say, has arachnophobia, and is compelled to be in a room full of spiders (though is not forced to come into contact with the spiders), this could still be a terrifying experience though there is no associated bodily harm. Second, though it seems clear that negative withdrawal symptoms are indeed real, all that matters for my account of addiction is whether the drug user *expects* that he will experience negative withdrawal symptoms. Let’s say a highly credible man (M) informs a woman (W) that she must rob a bank

or be killed. Even though M’s threat may be empty and he has no attention of harming W if she does not actually rob the bank, she is still coerced into robbery. The *expectation*, not the practice, of harm is what is relevant. It seems probable that many drug users believe, either validly or invalidly, that if they were to stop their drug use, they would enter a painful withdrawal period. This fact is enough to lessen responsibility for drug taking.

Moral and Legal Responsibility

To get at the issue of moral responsibility for wrongdoing, this paper will question the case of an addict (who is addicted at no fault of her own) who has robbed a store to procure money to buy more of the substance to which she is addicted. I will also assume that this addict had no other recourse to procure the money but robbery; she had no other money at the time and—jobs were scarce—had no other way of making the money. Can this addict be morally or legally blamed for robbery?

To reiterate, there are two reasons an individual can consume a substance: (1) the avoidance of expected pain and (2) the promise of expected benefit. Because the threat of painful withdrawal is coercive, while the promise of pleasure is not, we should only find the former to be morally exculpatory. In addition, the law should track moral responsibility; only those who deserve to be punished should be punished. This conclusion, however, raises the epistemological question of how the legal system could come to know which of the two reasons (or combination of reasons) it is that a drug user continues to consume a substance. The on-trial drug user always has incentives to claim that she consumed the substance for reason (1) if this defense is exculpatory. This is why it very much matters which substance it is that the “addict” claims to be addicted to. Some substances, like marijuana, do not have strenuous withdrawal periods while other substances, like nicotine, very much do. A marijuana user who claims to be addicted to the substance and who steals to procure it, then, is morally and legally blameworthy, as this user did not face a credibly bad withdrawal period if she were to stop taking the drug. A chronic alcohol user, however, faces a tremendously painful and arduous withdrawal period, and even the possibility of death. Regretful chronic alcohol users, then, can be categorized as addicts, while marijuana users cannot. This means that certain chronic alcohol users are justified in robbery to pay for their drug habits but all marijuana users are not.

Some may claim that substance users are addicts if they reasonably suspect that they will bear a loss by not consuming the substance; thus ev-

ery person is addicted to food, water, and air, among other things. Indeed, one is certainly subjected to tremendous pain and discomfort (and death) if one goes without these substances for too long. But is this a problem for my view? Foddy and Savulescu are persuasive in arguing that traditional drugs are not different in kind from “normal” substances like food and water. In fact, these authors point to a case of water addiction themselves (5). I think that most people generally consider it morally excusable to steal in order to procure water to live, as one is coerced into the theft by the lack of water. Even if they do not, however, they should consider theft of both drugs and water for the purpose of avoiding pain to be the same. The similarity of water along with other “normal” substances to drugs is a *strength* of this view of addiction, as it reconciles substance similarity with how we treat people who consume substances under coercive situations.

Note that this account of addiction significantly differs from Gary Watson’s account in *Excusing Addiction*. Watson believes that choosing whether to consume drugs when one is “addicted” amounts to choosing under duress. Choosing under duress is defined as when “one chooses wrongly but in circumstances in which choosing the right thing is too difficult to expect of one another” (605). Watson, however, believes that duress can be either negative or *positive* forces that unduly affect choice. Watson writes, “the appropriate interpersonal counterpart [to addiction] is ... the thug ... who *threatens* to beat me up unless I leave. (Or is it, in the case of addiction, rather like someone who seduces me to stay?)” (606). I agree that chronic drug use, taken in total, can be analogized to either the thug or the seducer (or a combination of the two), but I believe that *morally exculpatory* drug use, or what I define as addiction (as opposed to hedonism), must only be compared to the situation with the thug, not the seducer. The thug is the same as the gunman, as they both threaten to make one worse off relative to a baseline standard. The seducer is the same as the masseuse, as they both, assumably, offer to make one *better* off relative to a baseline standard. The former compromises moral responsibility while the latter does not. In the same way that the law would and should not excuse an individual from stealing in order to hire a prostitute (or seducer), the law should not excuse an individual who steals to pay for a hedonistic drug habit.

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Critiquing Tooley's Argument Against the Potentiality Principle

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In "Abortion and Infanticide," Michael Tooley famously argued against those who proscribe abortion and infanticide by demonstrating the irrelevancy of the potentiality principle in the face of his own moral symmetry principle. This paper aims to show that Tooley's argument is unsatisfactory since the success of his appeal to the moral symmetry principle requires his intended audience to believe something which they very reasonably do not, namely, that sex for reasons other than procreation is permissible. Therefore, for his argument to convince its intended audience Tooley must demonstrate why it is either wrong or irrelevant to believe that sex is intended for procreation only.

I. Those who routinely maintain the impermissibility of both abortion and infanticide often do so by way of an appeal to the potentiality principle. The potentiality principle states that there is a property, possessed by adult humans, that endows beings possessing it with a right to life. Furthermore, any being that will come to possess this property in the normal course of its development also already possesses a serious right to life.

Michael Tooley, in his paper "Abortion and Infanticide," and en route to arguing in favor of the permissibility of abortion and infanticide, offers one of the strongest arguments against the potentiality principle. The aim of this paper is to show that Tooley's objection to the potentiality principle is unsuccessful as it stands. More specifically, this paper will show that Tooley's argument can convince the members of his audience only if they do not believe that sexual intercourse is intended for procreation only. However, Tooley's argument is insufficient precisely because it is reasonable to assume that many of those who oppose abortion and infanticide on the basis of the potentiality principle also believe that sexual intercourse is intended for procreation only. Before it can be successful, then, Tooley's argument needs to show why such a belief is either wrong or irrelevant.

II. To comprehend Tooley's argument against the potentiality principle, the moral symmetry principle must be first understood. It should be noted that in no way does this paper attempt a refutation of the

moral symmetry principle. While many objections to it can be made, my aim is to expose a separate difficulty in Tooley's argument.

The moral symmetry principle applies to scenarios in which a distinct causal process, initiated by one action but capable of being interfered with by a different action, will result in a distinct outcome, and only that outcome, unless the interfering action is taken. Therefore, given such a pair of scenarios, either refraining from the initial action or engaging in the interfering action will lead to the same outcome. In such a pair of scenarios, the moral symmetry principle states that if the motivations for refraining from the initiating action or for taking the interfering action are the same, and that if taking the interfering action requires minimal effort, then there is no moral difference between refraining from the first action or engaging in the second action.

Tooley clarifies this principle by providing the example of a man who, in one possible scenario, sees that his enemy is about to be killed by a bomb and therefore refrains from alerting him and who, in a second possible scenario, kills that enemy with his own hands. Is the man's decision not to act in the first case any morally different from his decision to act in the second case? Not according to the moral symmetry principle. After all, the same goal motivated the man in each scenario.

Furthermore, the reason that the moral symmetry principle limits itself to cases in which the taking of action requires minimal effort is because one would be forced to consider the agent's right to lead a life of his or her choosing in cases where taking action requires a great deal of effort. This consideration would preclude the moral symmetry principle from claiming that there is no moral difference between refraining to act and acting even when each scenario produces the same outcome.

Tooley now asks us to consider the following hypothetical scenario. A chemical has been invented that, when injected into a newborn kitten, initiates a process that causes the kitten's brain to eventually develop into a brain that is psychologically equivalent to the brain of an adult human. In other words, an injected kitten would develop into a cat that would be able to converse with humans, rationalize like humans, and feel the same emotions as humans. Such a cat, after fully developing, would be on a moral par with adult humans. As such, one could not claim that adult humans have a serious right to life without also claiming that the cat has the same right.

Tooley then states that, "...it would not be seriously wrong to

refrain from injecting a newborn kitten with the special chemical, and to kill the kitten instead.”¹ By this he means that it is not wrong to kill the kitten instead of injecting it, even in the face of the knowledge that one has the ability to initiate a process that would culminate in a cat that possesses a serious right to life. In other words, it is no more wrong to kill the kitten now that there is technology available that will endow it with a serious right to life than it would have been to kill the kitten before such technology was developed.

We can now see that Tooley has created a hypothetical scenario for which the moral symmetry principle is perfectly suited. First, there is a casual process: the process of development that would culminate in a cat with the same psychological properties as an adult human and that ensues if the kitten is injected. Second, injecting the kitten with the special chemical represents the action that, if refrained from, will prevent this casual process from beginning. Third, neutralizing the chemical after it has been injected into the kitten or killing an already injected kitten represents the interfering action that can be taken to prevent the casual process from continuing after it has been initiated. Fourth, it is clear that the motivations behind either refraining from injecting the kitten or taking action to prevent the effects of the injection are the same. In each case, the agent is motivated to not create a cat with the same psychological properties as an adult human. Finally, minimal effort would be required to interfere with the kitten’s development after it has been injected.

With all the requisite conditions met, Tooley applies the moral symmetry principle to the hypothetical scenario and moves from his assertion that it would not be wrong to refrain from injecting the kitten to the assertion that it cannot be wrong to interfere with the already initiated process, as long as the kitten has not already become a cat with the same psychological properties as an adult human, by either neutralizing the chemical or killing the kitten.

With this in mind, Tooley concludes that, “if it is not seriously wrong to destroy an injected kitten which will naturally develop the properties that bestow a right to life, neither can it be seriously wrong to destroy a member of *Homo sapiens* which lacks such properties, but will naturally come to have them.”² Tooley justifies this logical move by saying that there is no morally relevant difference between the scenario in which a kitten naturally develops into a creature with a serious right to life and

1 Michael Tooley, “Abortion and Infanticide,” 61.

2 Ibid.

a scenario in which a member of *Homo sapiens* does the same. As such, he concludes that those who oppose both abortion and infanticide on the basis of the potentiality principle are wrong to do so.

III. I now want to argue that there is in fact a morally relevant difference between the two scenarios considered above and that the difference is tied to the belief, stated earlier and plausibly held by many of those in Tooley’s intended audience, that sexual intercourse is intended only for procreation. Once the plausibility of this belief is shown, it will become clear that Tooley’s argument has failed to account for it and, as a result, will be unacceptable to many of those in his intended audience.

First, it is plausible to assume that many of those who oppose both abortion and infanticide do so because of what they believe to be God’s commands.³ That being said, God’s commands, and authorities on the interpretation of God’s commands, like the Pope, also state that it is wrong for a couple to use contraceptives during sex, for the woman to take birth control pills, and so on, in an attempt to prevent procreation.⁴ Therefore it is plausible to assume that those who oppose both abortion and infanticide also believe that it is wrong to use contraceptives and to have sex for reasons other than procreation. Finally, it is plausible to assume that this is the sort of married couple that Tooley, knowingly or not, engages with his argument against the potentiality principle since such a couple will most likely believe in the relevancy of the potentiality principle to questions of abortion and infanticide, and therefore, be a part of his intended audience. After all, both the question of the permissibility of abortion and infanticide and the question of the permissibility of sex engaged in for reasons other than procreation hinge on a belief in the sanctity of life. As such, it would be odd for a person to appeal to the sanctity of life when opposing abortion, but to ignore it when deciding to use contraceptives designed to prevent procreation during sex.

Now, recall the kitten in Tooley’s hypothetical scenario. It is possible for the kitten in this scenario to exist prior to being injected with the chemical that endows it with the potential that carries with it a

3 Though the Bible never expressly forbids “abortion,” many theological arguments still conclude that it does. For example, many believe that Psalms 51:5, “Behold, I was shapen [sic] in iniquity; and in sin did my mother conceive me,” (King James Bible) suggests that to be conceived with sin means that a fetus, at the moment of conception, is a person, since sin can only be attributed to people. Of course, even Michael Tooley believes that it is wrong to kill a fetus or newborn once it has become a “person” (cf. “Abortion and Infanticide,” 43). Also, numerous popes have written widely on the impermissibility of abortion. Cf. Pope John Paul II, “*Evangelium Vitae (The Gospel of Life)*,” 1995, #99.

4 Cf. Pope John Paul II, *Love and Responsibility*, 227.

serious right to life. That is to say, it is only after the kitten is born that it may be injected with this chemical. However, consider a scenario in which a human fetus is concerned. It is clear, if we grant the truth of the potentiality principle, that a human fetus never exists without also possessing this potential. In fact, the “injection” of a human fetus is just another way to describe the moment of conception during sexual intercourse. Put another way, injecting the kitten produces a creature that in the natural course of its development will come to have a serious right to life in the same sense that the mere conception of a human creature during sexual intercourse does. Therefore, since it is plausible to assume that many of those targeted by Tooley’s argument believe that sexual intercourse is intended for procreation only, we must conclude that these same people will believe that two adults who have decided to have sex cannot decide to prevent the moment of conception by employing any sort of contraceptive measure. To do so would be to have had sex for some reason other than procreation. As such, and to use Tooley’s own language, the two adults cannot refrain from “injecting” the human fetus.

Finally, think back to Tooley’s crucial claim that “it would not be seriously wrong to refrain from injecting a newborn kitten with the special chemical, and to kill the kitten instead.” This claim enabled him to conclude, via the moral symmetry principle, that it would not be wrong “to destroy an injected kitten which will naturally develop the properties that bestow a right to life.” Then, precisely because Tooley saw no morally relevant difference between such a case and a case in which a human fetus is concerned, he concluded that, “neither can it be seriously wrong to destroy a member of Homo sapiens which lacks such properties, but will naturally come to have them.”

That being said, it is now obvious that there is in fact a difference between these two scenarios that is morally relevant to Tooley’s target audience. As was shown above, many in Tooley’s audience simply do not believe that “it would not be seriously wrong to refrain from injecting a human fetus” even though they will grant the truth of the same statement as it applies to a kitten. As such, Tooley’s application of the moral symmetry principle to cases in which humans are concerned does not follow from his successful application of the principle to cases in which kittens are concerned. Thus, Tooley’s argument, which is intended to dissuade opponents of both abortion and infanticide from appealing to the potentiality principle, cannot successfully do so because it does not

account for a particular feature of the ideology of its opponents.

IV. I have based my objection to Tooley’s argument on the fact that Tooley’s intended audience includes whomever appeals to the potentiality principle and the assumption that it is plausible to assume that some in this audience will also believe that sexual intercourse is intended for procreation only. To strengthen his argument, Tooley needs either to demonstrate the falsity of that belief or its irrelevance to his argument. Until he does so, it seems that many in his audience have every reason to continue using the potentiality principle to support the claim that both abortion and infanticide are impermissible.

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The Moral Impermissibility of Removing Theresa Schiavo's Feeding Tube

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When it became clear that Theresa Schiavo would never be able to recover from her unfortunate condition, her loved ones found themselves confronted with an incredibly complex and emotionally difficult moral dilemma. They were forced to decide whether or not to remove the artificial feeding tube that was providing her with the necessary nutrition in order to survive. Her husband, Michael Schiavo, argued that the feeding tube only prolonged what had degenerated into a permanent and miserable existence for Theresa and, that the feeding tube impinged upon her autonomy by subjecting her to an unfortunate existence that she never would have wished to live through. However, her parents and other loved ones strongly believed in continuing to have the feeding tube provide Theresa with the nutrition that her body needed to go on living. They argued that her life ought to be protected and strongly opposed the removal of the feeding tube since its removal would undoubtedly lead to a quick death. After a very contentious process that engendered great disagreement and animosity among Theresa's family, United States Courts, and politicians across the country, the feeding tube was eventually removed and Theresa died shortly thereafter. The issue of whether or not the removal of the tube constitutes a morally permissible action represents an extremely complex moral dilemma that seems to have very compelling arguments on both sides.

On March 31, 2005, Theresa Schiavo died after having spent the final fifteen years of her life in a persistent vegetative state (PVS). She had been diagnosed as being in a persistent vegetative state and this was later confirmed during her autopsy. She died shortly after the feeding tube which had been providing her with the required nutrition to survive was removed on March 18. Her story attracted the attention of millions of Americans and provoked great controversy with regard to the decision to remove the feeding tube. In this essay, I will argue that act of removing the feeding tube constitutes a morally impermissible action. I will begin my argument by discussing the nature of the action that occurred and by clarifying the intentions of the agents involved. I will go on explain how the Principle of Double Effect must be used to evaluate the morality

of the action in question due to the fact that the removal of the tube brought about both positive and negative outcomes. I will show that the action in question clearly meets three of the four conditions of the Principle of Double Effect. I will then present an argument in favor of removing the feeding tube by demonstrating how one may argue that the fourth condition of the principle is also satisfied. I will go on to present the argument against the removal of the feeding tube by explaining how one may argue that the fourth condition of the principle is not actually satisfied. I will conclude my essay by demonstrating why I believe that the fourth condition was not actually satisfied. I will base my argument on a key distinction between the nature of treatment and the nature of care to show that the removal of the feeding tube constitutes a morally impermissible action.

The controversy surrounding the decision to remove the feeding tube stems from the fact that its removal was likely to result in Theresa's death shortly thereafter. It is not a coincidence that she died less than two weeks after the tube was removed. However, Theresa died due to malnutrition as a result of her unfortunate condition. In other words, although removing the tube certainly hastened her death, it did not directly cause it. Additionally, her husband, Michael, who ordered the tube to be removed, the judges who supported his decision, and the doctors who literally performed the action did not intend to kill Theresa. The fact that she died two weeks later was a foreseeable yet unintended consequence. According to the person who in 2003 was appointed to be Theresa's guardian ad litem, Michael Schiavo "resolved not to allow the woman he loved to be subjected to treatment he believed she would have abhorred" (Wolfson 408). In addition, people who were close to Theresa testified that she had previously stated that she would not want to ever be kept alive artificially. This means that the intention of those involved was to liberate her from being subjected to a situation that she would have never wanted to be in. They simply tolerated the strong possibility that she would die soon for the sake of freeing her from a terrible situation. This observation distinguishes the action that occurred in this case from euthanasia. Euthanasia can only occur when one acts with the intention of killing. Therefore, the removal of the feeding tube amounted to allowing Theresa to die naturally as a result of her condition.

In order to determine whether or not the removal of the tube was morally justifiable, one must consider the ways in which the action affected human goods. Alfonso Gómez-Lobo explains that moral evaluations

“depend on how human goods are directly affected by each kind of action an agent chooses to perform.” (52). Human goods include the good of human life and other goods such as family, friendship, work, play, knowledge, and integrity. (10-24). Those who believe that removing the feeding tube was morally permissible must address the fact that everyone knew that there was a very high chance that she would die of malnutrition after the tube was removed. In other words, human goods were indeed harmed as a result of this action. This means that the only way that one can argue that the action was morally permissible is by appealing to the Principle of Double Effect (79). This is the only way to justify performing an action which one knows will harm human goods.

The Principle of Double Effect is a normative principle which can be applied to actions that lead to both good and bad effects at the same time. The principle is typically applied to moral dilemmas that seem very difficult to resolve. The principle can be formulated in the following way: “An action that has two effects, one of which is bad, is morally permissible if and only if” the following four conditions are satisfied (79). The first condition is that “the action itself is morally permissible” with respect to the main intention of the agent (80). The second condition is that “the intended good effect will not be obtained by means of the bad effect” (80). The third condition is that “the agent does not intend the bad effect” (80). The fourth condition is that “there will be a favorable proportion or balance (prudentially judged) between the good and bad effects” (80). If the removal of the feeding tube satisfies all four of these conditions, the action was morally justifiable.

The argument in favor of the moral permissibility of the removal of the feeding tube begins by showing that the act of removing the tube satisfies the first condition of the principle. People who believe that the action was morally permissible would argue that there is no moral norm which prohibits the main intention of the action. In other words, there is not any norm which states, “One must always keep another alive via artificial means” in the same way that there is a norm which states, “One should never commit murder.” Whether or not one is morally obligated to keep someone alive via artificial means depends on a case by case consideration of the effectiveness of the attempt and the burdens which the attempt brings about. In this particular case, the attempt was very futile because the probability of her ever recovering from her condition was infinitely small. Moreover, the attempt to sustain her was very burdensome because it created hardships for some of her loved ones and was not

consistent with her own wishes. All of this means that there are limits to the obligation to care for one’s life.

At first, such a conviction may appear flawed based on the idea that life is the most basic or fundamental human good. However, this does not mean that life is the absolute good which must always be chosen over other goods because “there are circumstances in which not even life should be preserved at all costs” (40). It is not always wrong to put one’s life in danger in order to achieve other human goods. For example, it would not be immoral for a father to risk his life in order to stop a criminal who intends to steal his children to use them as slaves. The father is not wrong in valuing the autonomy and happiness of his children over his own biological life. This example shows that life must not always be valued above other goods.

In addition, the action satisfies the second condition of the principle which states that the bad effect cannot be the means of obtaining the good effect. The relief of the burden experienced by her loved ones and the fact that her wishes were being respected was not dependent on her death being hastened. In other words, the goods effects would have been achieved even if she miraculously recovered a day after the tube had been removed. Moreover, the action satisfies the third condition of the principle which states that the agent cannot intend the bad effect. The fact that the hastening of Theresa’s death was not actually intended has already been explained. It was a foreseeable and tolerated yet unintended consequence of the removal of the tube. One may object to this argument by claiming that it is possible to bring about a foreseeable and expected consequence without having the motivation to do so. Although this objection seems plausible, it is not always true. For example, the pilot of a military aircraft who drops bombs on an enemy’s military base may end up harming innocent civilians who happened to be either inside of the base or very near the base at the particular moment. However, the pilot certainly does not intend to kill any civilians. His intention is to damage the enemy’s military base. The negative outcome that some innocent civilians may be harmed is a foreseeable but unintended consequence. The death of innocent civilians is not a required aspect of the fulfillment of his ultimate goal. The pilot would be thrilled if he were able to complete his mission without harming any civilians. Therefore, it is clear that an agent may bring about a foreseeable outcome without actually intending that outcome.

Finally, those who support the removal of the feeding tube would argue that the fourth condition of the principle is satisfied. This

justification involves a discussion between the difference between positive and negative norms. Negative norms “tell us what kinds of actions negatively affect instances of human goods and are therefore morally wrong” (58). Negative norms are rules that require people to refrain from participating in actions that may harm human goods. Positive norms, on the other hand, “tell us what it would be impermissible for us not to do” (59). Positive norms compel people to engage in actions for the sake of protecting or contributing to human goods. For example, the negative norm which states that one should not kill another is meant to prevent people from harming the human good of life. The positive norm to help other people in need is meant to compel people to assist their fellow human beings whenever possible.

Those who support the removal of feeding tube may argue that keeping her alive involved extraordinary, futile, and burdensome means which essentially served to harm human goods. Her husband and others suffered and her own wishes were not respected because of a feeding tube which would never have been able to heal her. This means that the act of keeping the feeding tube in her violated negative norms which forbid the violation of autonomy. Attempting to keep her alive follows the positive norm which requires people to perform actions which protect the human good of life.

Negative norms must be followed before positive norms as long as the goods associated with the positive norm do not outweigh the goods associated with the negative norm (76). This is the case because “the requirement expressed by the negative norm” is “the norm that applies without qualification to the choice of the agent” (76). Violations of negative norms involve making a choice to engage in actions that directly harm human goods (76). One who violates a positive norm, however, simply “fails to act to prevent a harm” (76). The cause of this harm must be external to the agent in question (76). In this case, for example, none of the people involved can be held accountable for the fact that Theresa’s was unable to continue living without the feeding tube. They did not have any choice with respect to the development of her unfortunate state. Therefore, negative norms must always be looked to before positive norms since they always apply to the choices of the agents.

Those who believe that the feeding tube should have been removed would argue that the goods associated with following the negative norm to not violate one’s autonomy are proportional to any good that would have been achieved by keeping the feeding tube in her and following the

positive norm to protect life. Allowing the feeding tube to remain in place engendered great harms for the sake of an infinitely small probability of recovery. Therefore, they would argue that the negative norms in this case must be looked to rather than the positive norm to preserve life. This means that all of the conditions are satisfied and, therefore, that the act of removing the tube can be morally justified by the Principle of Double Effect.

Nevertheless, many people, including Theresa’s parents, believe that the removal of the tube was morally impermissible. Their position can also be argued by performing an analysis of the way in which the action affected human goods. The argument is that the act of denying her the feeding tube resulted in harming the most basic human good of life. The act violated a positive norm that states that people should act in ways that protect human goods. The action violated the positive norm which requires people to choose the action that preserves the human good of life. It is true that one must not always choose the action that protects life regardless of the specific circumstances of the case. It is sometimes morally permissible to decide to act in such a way that values other human goods over the good of life because there are limits to the duty to protect life. However, those who do not support the removal of the tube would argue that this is not a case where such an exception can be made. It is necessary to decide “prudentially whether a negative norm takes precedence or not” (76). In other words, one must decide which of the norms protect the more important good. For example, a doctor giving a child a necessary shot should not follow the negative norm that forbids performing an action that brings pain to a child and makes her cry. He should follow the positive norm which requires him to provide the child with what she needs to remain healthy because the good of health is much more valuable than the good associated with not feeling a brief pinch. In Theresa’s case, those who do not support the removal of the tube would argue that the positive norm certainly outweighs any possible negative norms which could have been violated.

This debate hinges on whether or not the fourth condition of the Principle of Double Effect is satisfied. In other words, the most important thing to consider is whether or not the action should have been guided by the positive norms or the negative norms. This entails an evaluation of whether or not the goods associated with the negative norms outweigh the goods brought about by following the positive norms.

After an evaluation of all of the goods involved, I believe that

the positive norm should have been followed in this case. Therefore, the fourth condition of the Principle of Double Effect was not actually satisfied. People who think that the condition was satisfied have not made the crucial distinction between examples of treatment and examples of care. A feeding tube is an example of care. Care is associated with nutrition and hydration and the goal of sustainment (Gómez-Lobo). In other words, feeding a child who cannot feed herself is also an example of care. In Theresa's case, the fact that she was fed artificially via a tube does not change the fact that the action involved providing her with the nourishment she needed to survive. Care is different from treatment because the goal of treatment is to improve one's condition (Gómez-Lobo)

People who believe that it was morally permissible to remove the tube point out that keeping the tube in was futile because it was not going to help Theresa get better. This argument is actually deemed irrelevant based on the distinction between treatment and care. The goal of the tube was not to help Theresa get better because care is meant to sustain as opposed to improve. The feeding tube was, therefore, not futile because it was succeeding in keeping Theresa alive. The feeding tube was fulfilling its ultimate goal. There are cases of treatment such as chemotherapy where a doctor may be morally justified in stopping treatment when the treatment has no chance to make the person better while engendering great burdens for the patient and her family. In such a case case, further treatment may be deemed extraordinary and the negative norms may take precedence over the positive norm to attempt to preserve life.

In Theresa's case, however, it is impossible to argue that leaving the feeding tube in amounted to an extraordinary measure. The tube was not going to keep her alive for an extra two months like further chemotherapy is sometimes limited to. It was going to keep her alive for decades. The futility of the practice affects the goods associated with the positive norms. In other words, in cases of treatment, the fourth condition of the principle could be satisfied because a futile attempt that results in only briefly delaying death means that the good of preserving life carries less weight in the comparison of goods. The good of preserving life is not affected in such a way in Theresa's case. This difference is due to the fact that treatment essentially amounts to delaying death whereas care actually amounts to preserving life. Theresa could have lived as long as a typical healthy person with the help of the feeding tube. The feeding tube amounted to countering the disabilities created by her condition. In cases of treatment

however, the patient's condition is going to eventually kill her because no medical practice can permanently counter it. Whereas care stops the process of dying, treatment only delays it. This is why treatment can be deemed extraordinary while keeping the feeding tube in Theresa cannot be.

One may object to my argument by claiming that Theresa's unfortunate condition detracts from the positive norm to protect her life. One may claim that the quality of life experienced by one in a persistent vegetative state is inferior and that, as a result of this fact, the positive norm to protect life becomes less powerful. However, this objection is flawed because it rests on the unreasonable assumption that the positive norm to protect a person's life rests on the quality of life that she enjoys. This reasoning leads to the absurd conclusion that there is a more powerful positive norm to protect a happy person's life than there is to protect an unhappy person's life. Quality of life issues with respect to this particular case are only relevant with respect to an examination of the negative norms. If quality of life issues are related to values embodied in negative norms such as the norm to respect autonomy, it follows that quality of life issues are relevant. For example, one may argue that Theresa's wish to never be subject to such unfortunate and miserable circumstances must not be violated. The idea is that one's quality of life leads the negative norms to outweigh the positive norm. Still, one's quality of life cannot impact the positive norm to protect that person's life. Moreover, despite the unfortunate quality of life experienced by Theresa, the fact that the feeding tube is classified as an example of care as opposed to treatment indicates that the positive norm to protect her life must be followed.

All in all, because we are dealing with an example of care, I believe that the goods associated with keeping a person alive for many years outweigh the goods associated with removing the feeding tube. This means that the fourth condition of the Principle of Double Effect is not satisfied. As I mentioned before, the only way to justify performing an action that will bring about foreseeable negative harm to human goods is to use the Principle of Double Effect. It is evident, however, that this cannot be done in this case. Therefore, the removal of the tube was morally impermissible.

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***Compensatory Environmental Policy and Rights of Future Persons:
A Response to Shue's "Bequeathing Hazards"***

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Environmental policy proposals that seek to compensate future persons for harm caused by past and current industrial emissions have been objected to on the grounds that these proposals would in some way violate rights of future persons. In "Bequeathing Hazards: Security Rights and Property Rights of Future Humans," Henry Shue echoes this objection, claiming that such policy proposals are objectionable on the grounds that these proposals violate the non-marketable right to physical security of future persons. This paper lays out Shue's argument for this claim. The paper then argues that some implicit assumptions Shue seems to rest his argument on are mistaken and cannot be maintained under scrutiny. The paper concludes by positing a revision to Shue's argument that can account for these mistaken assumptions while at the same time preserving the force of Shue's central claim.

Introduction

In "Bequeathing Hazards: Security Rights and Property Rights of Future Humans," Shue claims that any environmental policy proposal violating the non-marketable right to physical security of future persons is morally objectionable such that any policy of this sort should not be implemented. In the following paper, I argue that Shue's argument for that claim fails on the grounds that it does not consider cases in which a person's marketing of the right to physical security should not be considered morally objectionable. After considering a number of responses to my objection to Shue's argument, I suggest a revision to Shue's argument that can account for cases in which it is not morally objectionable to violate a right to physical security while still preserving the force of Shue's claim.

Shue's argument: A Brief Outline

Shue's argument for the claim that any policy proposal violating the non-marketable right to physical security of future persons is morally objectionable such that any policy of this sort should not be implemented is outlined as follows. In my treatment of his argument, I will enumerate each premise and then offer any necessary commentary on each premise.

Premises 1 and 2 are as follows:

1. All current persons have a fundamental right to bodily integrity (39).
2. If all current persons have a fundamental right to bodily integrity, then all future persons have a fundamental right to bodily integrity (39).

In his consideration of certain environmental policy proposals, Shue points out that the relevant fundamental right to bodily integrity is the basic right to physical security (39). Throughout “Bequeathing Hazards,” Shue uses bodily integrity and physical security interchangeably. Insofar as bodily integrity and physical security can refer to different kinds of a body’s well being (indeed, there seems to be some distinction between physical, mental, and emotional well being), physical security concerns a person’s physical well being. That subtle distinction noted, let us continue to premise 3.

3. The fundamental right to physical security is an inalienable right. (41)

Shue notes that this premise is relevant to his argument for the moral impermissibility of certain environmental policy proposals insofar as the inalienability of rights means that these inalienable rights must also be non-marketable (42). This is because the kinds of policy proposals that Shue is considering in his argument concern monetary compensation for any violations of these inalienable rights (42). Shue makes clear that inalienable rights to physical security must also be non-marketable: they cannot be bought and sold (41). Considering this, it will be helpful to modify premise 3.

3. The fundamental right to physical security is a non-marketable right.

Let us also continue to the final premises 4 and 5.

4. Environmental policy proposals that will compensate persons for violations of their non-marketable right to physical security of future persons violate the non-marketable right to physical security of future persons.
5. If an environmental policy proposal would compensate persons for violations of their non-marketable right to physical security of future persons, then that environmental policy proposal is morally objectionable and must not be implemented. (44)

Premise 4 seems obviously true: any policy that tries to compensate

persons for violations of their right to physical security would be treating rights to physical security as marketable, and so would violate the non-marketability of rights to physical security. Perhaps premise five needs further explanation though. Shue argues that because the non-marketable right to physical security has some moral value, then any policy violating that right is morally objectionable. From the above premises, Shue concludes the following:

6. From 1, 2, and 3, all future persons have a non-marketable right to physical security. (39)
7. From 4 and 5, environmental policy proposals that will compensate future persons for violations of their non-marketable right to physical security are morally objectionable and must not be implemented. (50)

Cases in which the marketing of the right to physical security may not be morally objectionable

I argue that the above argument fails because Shue’s claim that the fundamental right to physical security is a non-marketable right is not true in all cases. Indeed, there are cases in which a person’s marketing of their right to physical security is not morally objectionable.

So, for what reason does Shue argue that it is immoral to violate a person’s non-marketable right to physical security? I posit that it can be one of two reasons. The first is that, because these non-marketable rights are also inalienable (this was made clear in the outline of the premises above), there is no case in which it is morally permissible to violate a person’s non-marketable rights. The second is that, because harming a person’s body is presumably doing something unwanted to that person’s body, it is never morally permissible to violate a person’s non-marketable rights when the person whose rights are being violated has not formally consented to the violation.

This second reason differs from the first in an important way: violating the inalienable right to physical security is morally objectionable on the grounds that the violation is not consensual, as the victim did not voluntarily consent for his rights to physical security to be violated. On the first reason, any act that violates rights to physical security is immoral, regardless of the victim’s consent. However, both these reasons are open to a significant objection, and this objection is realized by considering the following case.

A patient, after experiencing pain in his abdomen, admits himself

into the hospital. The surgeon decides that in order to relieve any pain, he must perform surgery on the patient. The patient, wanting to be relieved of his abdominal pain, consents to the surgery, and undergoes successful surgery, relieving himself of his pain.

It seems reasonable to suggest that in at least some cases it is morally permissible for someone to voluntarily give up their right to physical security. In the above case, the patient is voluntarily trading his or her immediate physical security for another, significant long-term benefit. These cases are not limited to surgery; they can include medical experimentation, organ donations, and, to a lesser extent, sporting events such as football or boxing where the risk of injury is imminent to all participants.

Before I demonstrate how the case of the surgeon provides objections to both of Shue's reasons, let me respond to a possible objection to my claim regarding a person's trading of immediately physical security: some could claim the tremendous advancements in medical technology have rendered surgery nearly risk free, and routine surgery could no longer be considered a violation of one's physical security. I respond that just because the medical technology has advanced to the point of rendering most surgeries nearly painless does not mean that the surgeries no longer constitute a threat to physical security. There remains the likelihood that a surgeon could make an error, anesthesia fails to subdue the patient, or pain medication can become ineffective. The risk to physical security remains present, albeit at a smaller degree than in centuries prior.

The first line of reasoning, that an action is morally objectionable if it violates non-marketable rights to physical security because these rights are inalienable, seems to not be able to account for these cases. This line of reasoning suggests that it would be morally objectionable for the doctor to perform surgery. Shue concedes that this reasoning is not adequate, as he claims that a "surgeon may be given permission to cause temporary damage to one's body when ... [the surgery] is the best available means to longer-term benefit" (39). So, it does not seem that Shue is arguing that there can be no cases in which a person's marketing of his or her right to physical security is not morally objectionable.

The second line of reasoning, that an action is morally objectionable only if it violates a person's consent to using their right to physical security, can account for the moral permissibility of cases like the surgeon; the patient is voluntarily relinquishing his rights to physical security for some perceived benefit. Because the second reason allows for cases such as these, Shue would have to concede that there are cases in which it would

not be morally objectionable for a person to market his or her rights to physical security, particularly if marketing those rights would result in receiving a more significant benefit than would be received by not marketing them.

It seems then that neither line of reasoning supports the claim that there are no possible cases in which a person can market his right to physical security without that marketing being objectionable. The first does not support the claim because Shue concedes there are cases in which the marketing of rights to physical security would not be morally objectionable. The second does not support the claim because it too allows for cases in which a person's market rights to physical security would not be morally objectionable.

Two possible responses to the above objection

However, there are two responses to this objection. One response will consider my objection to his first line of reasoning, arguing that the case of the surgeon is altogether different from the case of industrial emissions, which is the case Shue has in mind when devising his argument about environmental policy proposals. The other will consider my objection to his second line of reasoning, arguing that the voluntariness of violating a person's right to physical security is irrelevant to the moral permissibility of such violations. I will first consider each of these responses, offering objections to each.

The first response Shue could offer would argue that the case of the surgeon is unlike the case of emissions. In the case of the surgeon, the patient is trading a right to physical security for something that would increase their physical security in the long term. But in the case of environmental policy proposals concerning compensation for industrial emissions, any affected persons are trading their right to physical security for financial benefits. These affected persons are trading a higher likelihood of skin cancer, malaria, and other diseases related to the potential harmful effects of global warming for money. In the case of the surgeon, the patient considers any potential health risks associated with a failed surgery in order to give him or her the best option to increase his long-term health.

The difference in the two cases lies in the difference of their respective benefits. In the case of industrial emissions, the person is marketing his or her physical security for money. In the case of surgery, the person is "marketing" his or her physical security for better health in the long term. In this way, the case of industrial emissions is most clearly a person mar-

keting their right to physical security for financial gain. Because rights to physical security are non-marketable, any environmental policy proposal that compensates violations of these rights is objectionable. So, my objection considering cases like surgery is not relevant to matters concerning environmental policy because the health benefits conferred by the “marketing” of rights to physical security in surgery differs from financial benefits conferred by the marketing of rights to physical security in environmental policy.

Because the surgery case is irrelevant to matters of environmental policy proposals, then my objection to his first line of reasoning does not hold. However, in light of this irrelevance, Shue would need to qualify this line of reasoning: an action is morally impermissible if it violates non-marketable rights to physical security because these rights are inalienable in all circumstances when marketing these rights would confer a financial benefit.

Shue’s second rebuttal considers the problem of voluntariness itself. Shue argues “voluntary agreement is immaterial because such agreements are ruled out by our fundamental attitude to the human body” (41). For evidence of this fundamental attitude, he recalls both cases where financial compensation is required for negligent bodily injury and various Federal statutes prohibiting the sale of bodily organs for use in transplants (41). He argues there is a qualitative difference between “ex-post compensation,” compensating someone after negligently causing bodily injury, and “ex-ante purchase,” buying from someone the right to violate their physical security (42). The public recognizes this qualitative difference, and this recognizing reveals that we just don’t think people can buy the right to hurt people, regardless of the consent of any parties involved. Voluntariness is not relevant to the non-marketability of rights to physical security in all cases; this view seems to be supported by some general intuition about the right to physical security.

Where These Responses May Fail

However, both of these rebuttals are faulty. To see how the first rebuttal fails, consider the following two cases of organ donation and organ selling. In the donating case, the patient donates an organ in order to save the life of a family member whose corresponding organ is no longer functioning properly. In the case of organ donation, the patient sells an organ in order to get money.

In organ donations, the person is voluntarily violating their right

to physical security by “marketing” their organ for a benefit. In this case, the benefit conferred to another individual is in the form of better long-term health. This case is similar to the aforementioned surgery case, but differs in that the person benefiting from better long-term health is not the one undergoing surgery, but the one receiving the donated organ. Perhaps we can also say that the person donating their organ also receives some benefit: he becomes happier because he has saved a family member from organ failure. As Shue seems to have conceded cases like these as morally permissible, we say that it is morally permissible for someone to donate an organ because the benefits conferred by the donating are benefits in long-term health.

On the other hand, Shue would argue that a person’s marketing their kidneys for sale in organ transplants would be morally objectionable because the benefits conferred by the marketing are financial. The argument for the moral impermissibility of this case is the same as Shue’s general argument regarding environmental policy.

Shue would have to agree that in both the donating and selling case, some benefit is conferred on the person marketing their right to physical security. In the donating case, it is the better long-term health of a loved one and (perhaps) greater happiness to the one donating for saving that loved one’s life. In the selling case, it is money.

But to what extent are these benefits qualitatively different? Both money and long-term health promote the person’s well being, in similar ways. With more money available, the person could use that money to enjoy a better quality of life. He could now afford more nutritious meals or live in better shelter. Perhaps he will even use that money to purchase medical insurance that would allow him to go to the hospital to have a medical ailment better treated. Similarly, with better long-term health, the person with the new kidney could enjoy a better quality of life without facing constant physical pain and the possibility of organ failure. In many cases, organ donation and organ selling similarly enhance a person’s well being.

In this way, organ donating and organ selling can not only share similar benefits, but oftentimes the same benefits. Distinguishing between types of benefits becomes even more difficult when considering benefits in quality of life that have been conferred by the technological advancements owing to industrial processes.

While it is inarguable that industrial manufacturing has emitted large amounts of atmospheric pollutants, it is also inarguable that indus-

trial manufacturing has increased the quality of life of people in both the developed and developing worlds exponentially. Given this, one could then argue it is morally permissible for a person to voluntarily market their rights to physical security to industrial manufacturers when the marketing of these rights will confer substantial benefit to that person's quality of life. If Shue concedes that the cases of surgery and organ donation are morally permissible, he would likely have to concede that, when framed in the above way, the case of industrial manufacturing and organ selling could be permissible too.

The distinction between types of benefits has been blurred under scrutiny. It is not clear whether marketing rights to physical security for money and marketing rights to physical security for long-term health benefits are all that different insofar as both cases of marketing similarly promote the well-being of the person whose right to physical security was marketed. This problem is only compounded when one considers the greater quality of life that has arisen from industrial processes. For this reason, it seems that Shue cannot definitively claim that one type of marketing is always morally impermissible while another is not.

Moreover, the second rebuttal fails because it is just plain contradictory to the concessions Shue has already been forced to make. Remember that Shue has conceded the surgeon case, whereby a "surgeon may be given permission to cause temporary damage to one's body when ... [surgery] is the best available means to longer-term benefit" (39). Yet, if issues of voluntariness are not relevant to the non-marketability of rights to physical security, then Shue could not concede cases like these. It just is not true that voluntariness is never relevant when determining the moral permissibility of cases when a person's rights to physical security are violated.

Perhaps Shue means that voluntariness is not relevant to those cases concerning a person's marketing of rights to physical security when marketing these rights would confer a financial benefit. In those cases, voluntariness would not be relevant; for Shue, it is always morally impermissible to violate one's rights to physical security for financial benefit, regardless of whether these rights were violated voluntarily.

Possible Amendments to Shue's Argument

In light of these objections to his rebuttals, I offer that Shue should amend his reasoning by retreating from his claims that voluntariness is not relevant to the non-marketability of rights to physical security in all cases.

Such a retreat would not even undermine his conclusion. He could argue that, in some cases, such as case of the surgeon or organ donation, it is morally permissible to violate someone's rights to physical security only if the person voluntarily agrees to such violations. Yet because future persons are not available (they don't yet exist) to voluntarily agree to such violations, then any environmental policy proposal that violates these rights is morally objectionable. His conclusion regarding the immorality of environmental policy proposal compensating future persons would still stand; Shue may just need to modify his argument.

However, this modification would indeed result in a weaker conclusion in the sense that it no longer says that violating rights to physical security are absolutely objectionable, but only conditionally objectionable. Yet, the upside of this modified argument is that it can account for cases like organ donation and surgery while still making compensatory environmental policy proposals morally objectionable for the reasons Shue wants them to be.

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**Neuropsychiatric Masquerades:
Implications for the Debate on Physician Assisted Suicide**

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I describe how primary medical conditions that are potentially treatable and at times even reversible, sometimes masquerade with psychiatric symptomatology which may eclipse the primary condition. As such, these “neuropsychiatric masquerades” are likely under-recognized, under-diagnosed, and under-treated by physicians. The “safeguards” of the Oregon Death with Dignity Act do nothing to prevent PAS candidates, who in addition to their terminal condition(s) may have a separate undiagnosed underlying treatable medical condition and thus a treatable secondary psychiatric condition, from being assisted in suicide. The safeguards are meant to ensure that PAS is carried out in an ethical manner and one of the safeguards is that PAS candidates must be aware of their full medical situation. Therefore, even those who have drafted the Act ought to view scenarios wherein un-diagnosed neuropsychiatric masquerades are present (thus neither the patient nor the physician is aware this fact) as a violation of the aforementioned safeguard that requires the patient to be fully informed of their medical status; as such this is an unacceptable result. I describe epilepsy as one example among many medical conditions that could potentially be a neuropsychiatric masquerade.

I. Introduction—an explanation of the safeguards in the Oregon Death with Dignity Act, followed by a description and brief analysis of several existing [in the literature] concerns regarding them:

In 1994, the Oregon Death with Dignity Act (Oregon Revised Statutes (“ORS”) 127.800, Section 1.01 et seq., the “Act”) was passed as part of Ballot Measure 16, making Oregon the first state in America to legalize physician-assisted suicide (“PAS”). Since its passage, various criticisms have arisen concerning the numerous safeguards the Act contains. These safeguards were included in the Act with the intention of preventing morally impermissible situations from occurring. That is, PAS when performed in accordance with the Act and its safeguards is thought (by those government officials who drafted and approved the Act as well as the citizens of Oregon who voted for the Act) to be ethically permissible. Accordingly, PAS undertaken in a manner prohibited by the Act’s safeguards

is thought to be ethically impermissible. In what follows I will highlight issues that I presume many (if not most) would consider highly immoral, irrespective of whether one is in favor of, or opposed to, PAS, and which are simultaneously compatible with the Act as it is written now. That is, I will attempt to show that the safeguards are not an exhaustive list of checkpoints, which if adhered to, would make those pre-disposed to be in favor of PAS, approve as morally permissible.

Paraphrasing[i], sections 2, 3, and 6 of the Act provide the following safeguards[ii]:

A. The patient must have a “terminal disease”, which is defined as a disease, confirmed by the reasonable medical judgment of the patient’s attending physician, to produce death of the patient within six months. ORS 127.800, Section 1.01(12).

B. The patient must be “capable”, which is defined as “in the opinion of a court or in the opinion of the patient’s attending physician or consulting physician, psychiatrist or psychologist, a patient has the ability to make and communicate health care decisions to health care providers, including communication through persons familiar with the patient’s manner of communicating if those persons are available.” ORS 127.800, Section 1.01(3).

C. The attending physician must make the patient aware of their medical situation, including their diagnosis and prognosis.

D. The attending physician must refer the patient to a consulting physician who must then confirm the following: (i) medical diagnosis and prognosis, (ii) that the patient requesting PAS, is doing so in a voluntary manner, (iii) that the patient is capable, and (iv) that the patient is making their request without “undue influence” (a term which goes entirely undefined/unspecified in the Act—see discussion below). Unduly influencing a patient to receive PAS, according to the Act, constitutes a felony. ORS 127.890, Section 4.02(2)

E. If either the attending physician or the consulting physician suspects that patient either (i) possesses a psychiatric disorder, or (ii) is depressed to the extent that the patient’s judgment is impaired, then the suspecting physician must refer the patient to either a psychiatrist or a psychologist. The person cannot be assisted with suicide until the consulting psychiatrist or psychologist determines that the patient’s judgment is not impaired. ORS 127.825, Section 3.03.

Before addressing the concerns with these safeguards in the Act, it is perhaps important to frame the scope of the implications of the discussion. Which is to say, if there are substantiated flaws with the Act, then not only are these flaws relevant to those who have or who will undergo a decision regarding PAS in Oregon, but moreover, they are relevant in the greater scheme of things in that as PAS is accepted on a state by state basis (as its current trajectory suggests it may be) in the United States, the Act, being that it is the only legislation to legalize PAS in the United States, will likely serve as a template for future legislation. Therefore, problems with the Act are problems that may potentially have an even wider application to all states that eventually adopt legislation that legalizes PAS.

One of the major criticisms of the Act is that it does not specify/delineate what constitutes “undue influence”. Bioethicist and legal scholar John Keown explains how this vagueness leaves us unsure as to whether or not doctors who “recommend” PAS to patients, are committing a felony in so doing [1]. That is, does “recommending” PAS to a patient, constitute “undue influence”? Physicians in Oregon, as well as its citizens, deserve to have this terminology clearly and distinctly delineated.

A famous report published in *Issues in Law and Medicine* (1998) by Hendin et al., which reviewed the very first case of PAS in Oregon, found other flaws with the Act. In the report Hendin et al. asserted, in reference to letter ‘E’ above (viz. ORS 127.825, Section 3.03. of the Act), that (H1) non-psychiatrists are not capable of diagnosing depression, and furthermore, that they are even less capable of determining whether or not a patient’s judgment is being impaired by depression [2]. A second assertion put forth by Hendin et al. is that (H2) even when patients are referred to psychiatrists to determine whether or not they have a psychiatric illness which is impairing their judgment, psychiatrists do not feel confident making such determinations in a single visit, which is all that the Act requires for physicians and patients to be in compliance. Psychiatrists and psychologists have the option to request more sessions to make their determination but it is not required. These concerns should be considered relevant even if they only affected one person, but they impact 2/3 of patients requesting PAS in Oregon are clinically depressed [1]. (H1) seems to be true objectively. An oncologist in Oregon that has a terminally ill patient dying of cancer is not trained to diagnose this patient’s depression—he/she is trained to refer the patient to a psychiatrist upon noticing signs and symptoms that are characteristic of depression. But even assum-

ing that non-psychiatrist treating terminally ill patients are bothering to notice symptoms of depression (and if having noticed them, not dismiss them as natural human responses for someone who is dying), then we still have to contend with (H2). The veracity of (H2) is supported by a 1996 (approximately two years after the Act was passed) survey of psychiatrists in Oregon published by Ganzini et al., which found that “when asked to rate their confidence that they could adequately assess with a single evaluation whether or not a psychiatric disorder was impairing the judgment of a patient who was requesting assisted suicide, 51% (N=154) were not at all confident, 43% (N=130) were somewhat confident. The psychiatrists’ confidence improved if the assessment were to be performed in the context of a long-term relationship with the patient. In this situation only 4% (N=13) were not at all confident, 41% (N=125) were somewhat confident, and 54% (N=165) were very confident.” [3].

While all of these concerns at the very least merit consideration and clarification, I will now introduce a set of novel concerns to the discourse about flaws with the Act. These novel concerns are ones that, perhaps unlike the ones listed above, may not be alleviated by legislative amendments, and as such, may have implications for the debate concerning PAS as a whole.

II. Novel Concerns:

The Act requires that a patient must not only have a psychiatric condition, but moreover that this condition must impair that patient’s judgment, in order to disqualify the patient from obtaining PAS. Therefore it follows that according to the Act, a patient can have a psychiatric disease (e.g. depression) that does not impair that patient’s judgment. Furthermore, this seems to imply that those who [ethically] approve of the Act, also approve a patient’s right to request PAS, notwithstanding their having a comorbid psychiatric condition in addition to their terminal illness so long as it does not impair that patient’s judgment.

Depression, when not effectively treated, would certainly seem to impair judgment in the usual sense of the phrase ‘impaired judgment’. Depression involves a loss of desire to participate in the world viz. a loss of the desire to live; judgments like the lack of desire to live, would seem impaired. But those who wrote the Act, intended their use of the phrase ‘impaired judgment’, to stipulate a markedly weaker definition of the phrase. In the Act “impaired judgment” is meant to imply “capable,” which is defined as “the ability to make and communicate health care decisions,” ORS

127.800 Section 1.01. Although I don't think it is, let us suppose for the moment, as those who approve of the Act do, that 'impaired judgment' in this weakened sense, is an appropriate "safeguard" against unethical conduct. That is to say, that it is ethical to allow those who are depressed (or who have other psychiatric conditions) in such a way that it doesn't remove their "ability to make and communicate health care decisions", to kill themselves. But what if a patient's depression (or otherwise psychiatric condition), although not impairing their judgment, was the result of an undiagnosed underlying medical condition, which if diagnosed properly could be treated, thereby (entirely or at least significantly) reversing not only the underlying condition, but the secondary manifestations of the condition viz. the depression? What if there were a lot of these underlying conditions, and that the medical literature suggests that these scenarios may occur quite frequently?

In a review article entitled "Mental Disorders Secondary to General Medical Conditions", Psychiatrist Linda Chuage, M.D., writes:

"Evaluation of patients who present to hospitals or physicians with altered behavior and/or mentation can be time-consuming and difficult and may lead to symptoms being quickly and prematurely dismissed as psychiatric in nature. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), the psychiatric presentation of a medical illness is classified as "the presence of mental symptoms that are judged to be the direct physiological consequences of a general medical condition." Therefore, understanding common psychiatric symptoms and the medical diseases that may cause or mimic them is of utmost importance. Failure to identify these underlying causal medical conditions can be potentially dangerous because serious and frequently reversible conditions can be overlooked. Proper diagnosis of a psychiatric illness necessitates investigation of all appropriate medical causes of the symptoms." [4]

A primary condition is one that is not caused by a previous condition. A secondary condition, by contrast, is one that is caused by a previous condition. Depression, anxiety, psychosis, and cognitive impairment, are all conditions that may either be primary or secondary. Primary depression may exist by itself (viz. as a primary condition), or it may be the result of some other underlying neurological/medical condition (viz. as a secondary condition). In the latter case, the underlying neurological/medical condition that gives rise to the secondary depression is the primary condition. This distinction is significant medically, because the efficacy of identical treatments for primary psychiatric conditions is often markedly

greater than for that of secondary psychiatric conditions. This is because failure to treat the underlying cause allows the secondary condition to persist.

It may be helpful to think of this in terms of an analogy. Suppose you were to go outside and shovel all of the snow off of your driveway after the snow momentarily stopped. As soon as you go inside, the snow begins to pour out of the sky again for hours, until it stops again. So you go back outside and shovel the driveway again, only to befall the same fate as you did before as soon as you finish. And on and on this cycle continues. In this analogy, shoveling the snow is like treating a secondary condition as a primary condition, while neglecting the underlying primary condition viz. that it keeps snowing.

In medical practice, psychiatrists mistakenly misdiagnose and treat psychiatric symptoms as primary, when in fact, these psychiatric conditions are merely secondary to a primary neurological/medical condition. An important review article entitled "Neuropsychiatric Masquerades: Medical and Neurological Disorders That Present With Psychiatric Symptoms," was published in the *Psychiatric Times* in 2008 by Manish Fozdar, M.D. Fozdar, a psychiatrist affiliated with Wake Forest Medical Center, delineates several diagnostic guidelines in an effort to reduce the occurrence of psychiatrists treating psychiatric conditions as primary condition, when in fact they are secondary to underlying neurological/medical conditions. Fozdar explains that "The mind-brain dichotomy has created 2 different disciplines in medicine: neurology and psychiatry. The training of psychiatric residents has focused on identifying and treating behavioral and psychological symptoms based on a cookbook approach using DSM. Unfortunately, the inadequate training of psychiatric residents in neurology, especially in behavioral neurology, has future implications for clinical practice." In referring to the "cookbook approach using DSM," Fozdar is referring to the *Diagnostic and Statistical Manual of Mental Disorders*, a heavily relied upon resource for practicing psychiatrists, which among other things, classifies diagnostic criteria for the diagnosis of all of the known mental disorders; thus, Fozdar is asserting that psychiatrists, in their residencies (training periods), are trained to diagnose psychiatric conditions based on their presence of specific symptoms as summarized in the DSM; this training however, does not involve training regarding the neurological conditions that present with (viz. masquerade behind) psychiatric symptoms. Fozdar continues that "this article illustrates some general concepts that may help a clinician differentiate secondary psychiatric manifestations

of underlying neurological and medical disorders from primary psychiatric disorders, using specific clinical disorders as examples,” [5]. Indeed, in response to the warnings of Fozdar and many others, the medical literature is becoming increasingly inundated with similar articles voicing these same concerns [6-8].

Perhaps an example will help to illustrate the point. Suppose a male patient is dying of lung cancer and is depressed and wants to request PAS. This patient is evaluated by a psychiatrist who has been following the patient for 5 years, whence they first diagnosed the patient with depression and since which point they have been ineffectively able to treat the depression with any combination of traditional antidepressants (ADs). The psychiatrist knows, since the patient has not responded well to any of the ADs in as much time as the patient has been on them, it is unlikely that the success in treating the depression will change in the future. Furthermore, the psychiatrist does not believe the depression is impairing the patient’s judgment in any way. In light of this, and the fact that the patient is likely to die within six months anyway, the psychiatrist gives the green light to the patient’s oncologist (who is following the lung cancer) to write the lethal prescription for the patient, which in fact occurs.

The patient is not in any particular pain from the lung cancer, in fact the Act doesn’t require that he be in pain. The Act only requires that he is terminal (defined as medically determined as likely to die within six months). However, the patient is severely depressed, and because of this depression, has lost interest in living life. Moreover, the patient’s depression is exacerbated by the realization that none of the ADs he has tried over the last 5 years have helped to alleviate his depression. So the patient takes the lethal dose and dies, not knowing that the source of their depression was a neurological condition that, if properly diagnosed and treated, would have been entirely reversible within several weeks (as is the depression that is secondary to this condition). So, for five months the patient could have been living without depression, and without pain, if his underlying condition had been properly diagnosed. Might not the knowledge of these facts have influenced the patient’s decision to commit suicide? Might not they have influenced the doctor who fulfilled the PAS request?

So how common are these medical/neurological conditions that masquerade as primary psychiatric conditions? In an editorial to *Psychiatric Annals* (one of the major high press journals in psychiatric medicine) in 2006, psychiatrist Jan Fawcett, M.D., wrote an editorial concerning this issue [9]; in the piece he says “Epidemiological studies of the incidence

of specific infectious diseases—or, for that matter, neurological diseases, including brain tumors, endocrine diseases, or other medical conditions, presenting as psychiatric syndromes—are not available, to my knowledge.” Indeed, the medical literature is inundated with case studies as well as reviews of such diseases that are thought to be under-recognized, under-diagnosed, and thus under-treated, but offers very little if any information, on exactly how often this occurs.

Isn’t this to be expected? If the psychiatrist knew they were missing the diagnosis of an underlying primary condition, then they obviously would refer the patient to the appropriate specialist—instead, they don’t realize they are treating a secondary psychiatric condition, not a primary one, and so these kinds of misdiagnosis statistics are not frequently generated (and when they are, their accuracy is may be called into question). As psychiatrist Jan Fawcett, M.D., graduate of Yale Medical School, rather humbly put it in reference to masquerading psychiatric conditions that are really primary underlying neurological/medical conditions, “I hope my threshold for recognition will be high enough when a case presents to me.” [Ibid]

Fawcett’s comment, which he made in a monthly medical journal that is read by most psychiatrists across the country, does not admit to any level of incompetence by merely ‘hoping’ he will recognize such cases, but rather more aptly reflects a level of uncertainty in making such diagnoses. Other psychiatrists likely share Fawcett’s concerns. As I will stress in the following section, by summarizing aspects of the literature that describe several underlying neurological/medical conditions masquerading as psychiatric conditions, these misdiagnoses are bound to happen, and they do.

III. Neurological/Medical Conditions that Masquerade as Psychiatric Conditions:

There are many medical conditions that are likely misdiagnosed due to the fact that such conditions have a low morbidity, and further, the symptoms for such conditions do not always readily present and lead to the proper diagnosis or such symptoms are so rare they might be missed by the diagnostic physician. The exhaustive list of neuropsychiatric masquerades, that is conditions that present psychiatrically when they are in fact a primary medical condition, is an extensive one. Psychiatrist Linda Chuang, M.D., provides a fairly comprehensive list in Table 1, of her review article ‘Mental Disorders Secondary to General Medical Conditions’ [4]. Chuang delineates all different infectious, metabolic, endocrine, CNS, cardio-

pulmonary, and other categories among which are numerous individual conditions [Ibid]. I will not, nor could I even, treat them all individually here. Instead, I will elaborate on a single neurological condition, namely epilepsy, which is quite prevalent (and which I am intimately familiar with having been a researcher in the field for four years). My focus on epilepsy in particular is meant to convey the depth, the likelihood of misdiagnosing many of these potentially masquerading conditions. Also, the reader is encouraged to bear in mind, as was stated earlier, that problems with the Act are problems that may potentially have an even wider application to all states and the people who populate them, that eventually adopt legislation that legalizes PAS.

Epilepsy is a broad medical term that is used to refer to a variety of specific seizure disorders. Epilepsy is clinically defined by two or more unprovoked seizures 24 hours apart. Epilepsy is a disease which affects 2.5 million Americans [10]. Studies show that 25-50% of patients with epilepsy (primary underlying neurological condition) have a comorbid secondary psychiatric disorder [11]. Studies furthermore, suggest that as many as 80% of patients with epilepsy are depressed [Ibid]. The effective treatment of epilepsy with anti epileptic drugs (AEDs) results in the complete remission of seizures with no adverse effects, in 60% of patients. A significant percentage of the remaining 40% are successfully treated with epilepsy surgery [iii].

In summary, a lot of people have epilepsy and a lot of those people have psychiatric comorbidities; epilepsy is treatable, and thus so are the comorbidities. Furthermore, because of the prevalence of depression in this patient population, there is no reason why a separate terminal medical illness could not exist simultaneously with (although unrelated to, and so not a part of the diagnostic work-up for the terminal disease), epilepsy and the comorbid psychiatric condition(s). So why would both the doctor responsible for a patient's terminal illness and the evaluating psychiatrist miss the diagnosis of epilepsy? Is this even likely to happen? While the following description of certain basic medical principles concerning epilepsy offers a slight detour from the main points of this paper, it is essential in order to understand the natural limitations in diagnosing epilepsy, which in turn demonstrates the limitations of the safeguards in the Act, as currently constituted or in the amended form proposed in Section I above.

A seizure is an electrical discharge among communicating neurons (or nerve cells) in the brain. Essentially the normal electrical communication from one neuron to the next gets distorted, which has the effect of

altering the proper function of the brain in the area where this distortion occurs. There are two major classifications of seizures which are distinguished by where this distortion (or signal abnormality) occurs; when the signal abnormality is in one specific area of the brain, this is the first category called a partial seizure. When by contrast the signal abnormality is all over the brain at once, this is the second category called a generalized seizure. When most any member of the general population, save for those with medical expertise or otherwise intimate familiarity with epilepsy, is asked to describe what they think of as a seizure, most will respond with some sort of description of a person who suddenly becomes unconscious and falls to the floor and begins to shake. This is but one type of a generalized seizure.

The category of partial seizures is further subdivided into simple partial seizures, and complex partial seizures. This distinction is made based on whether or not the seizure impairs any one of the following three criteria: (i) consciousness, (ii) awareness, (iii) memory. That is, if any one of those three is impaired by the partial seizure, then the seizure is considered a complex partial seizure. If none of the three are impaired, then it is a simple partial seizure. Furthermore, any type of partial seizure may last for only seconds at a time.

A partial seizure, depending on where it occurs in the brain, will manifest with what is referred to as an aura. Aura encompasses a wide range of manifestations, including sensory, motor, autonomic, and psychic. An exhaustive list is beyond the scope of this paper but here are a few common examples: a sudden feeling of intense fear, nervousness, anxiety, funny smells (like rubber burning, or ammonia), suddenly increased heart rate, hand tremor, a feeling of *déjà vu* ("I've experienced this before"), or a feeling of *jamais vu* ("I've never experienced this before").

It is plain to see from this, that many persons with epilepsy may be having auras frequently with no clue as to the fact that what they are experiencing is a partial seizure. This is especially true, when these partial seizures are simple, that is the patient has no loss of consciousness, awareness, or memory changes. It is also true of patients who are having complex partial seizures, as they are often completely unaware of the fact that their seizure/aura is distorting their consciousness, awareness, or memory—it takes the very skilled medical assessment of a neurologist to help to determine whether or not a patient is having complex or partial seizures. Thus in summary we have identified the first reason why epilepsy may go undiagnosed *viz.* because the patients are not reporting their symptoms to

physicians because they don't think that they are indicative of disease.

Surely, we all get startled and dismiss funny smells or sensations—and not always do we go running to tell neurologists about them. And if a patient is dying of cancer, surely they are not telling their doctor about the funny smell they get sometimes, or sudden feelings of fear. And if they are, isn't it plausible that such seemingly vague complaints like sudden feelings of fear or anxiety would be dismissed as psychiatric, particularly if the patient is depressed? And thus we have a second reason why patients with secondary psychiatric manifestations of epilepsy go undiagnosed *viz.* because the symptomatology associated with simple/complex partial seizures may be not only vague, but is consistent with psychiatric disorders characterized by this symptomatology. A patient who is depressed, and never has a seizure in a psychiatrist office is treated as depressed with ADs—but the ADs don't often alleviate the depression in such cases because the epilepsy is the driving force for the depression. Until the epilepsy is treated directly, the depression will often persist.

But let us be charitable now to the psychiatrists and assume that sometimes they are able to suspect that a certain presentation of psychiatric symptoms in a patient has a neurological cause, and thus they appropriately refer the patient to a neurologist. Can the neurologist, the specialist under whose realm epilepsy fall under, always diagnose epilepsy?

A 2008 review article by Chowdhury et al. cited the 7 most recent studies concerning the misdiagnosis rate of epilepsy among mostly specialists [iv] (neurologists and epileptologists who are neurologist that sub specialize in epilepsy), suggested that the misdiagnosis rate for epilepsy is between 4.6 and 30% [12]. Chowdhury et al. comment on these alarmingly high rates, suggesting “to some extent, this is because of factors which can be addressed. However, in some cases, even after complete clinical assessment, it can be difficult even for an experienced epileptologist or neurologist to make a definite diagnosis at presentation.”

Chowdhury et al. summarize the general reasons for misdiagnosis, citing “overlapping clinical features with other conditions, inadequate available history and limitations of investigations,” [Ibid]. The overlapping clinical features have already been discussed in part above; there are additional overlapping clinical features such as syncope, simple falls, transient ischemic attacks, and cardiac arrhythmias, which also contribute to the missed diagnosis of epilepsy [13]. While a full treatment of these topics is beyond the scope of this paper, the presence of overlapping clinical features resulting in all too frequent misdiagnosis (in this case, concerning epilepsy)

is no less apparent.

The second reason cited, namely “inadequate available history,” is something we can address now. Chowdhury et al. explain that “the diagnosis of epilepsy is based on a good history, not only from the patient but also a witness. Difficulty in reaching an unequivocal diagnosis of epilepsy may be due to inadequate witnessed history or atypical seizure presentation. Witnesses may find it difficult to recount events accurately, without priming, especially as they are likely to have been anxious at the time of the seizure. Inevitably, some seizures occur in the absence of witnesses,” [12] Their comment about the “difficulty to recount events accurately, without priming,” speaks to an issue already discussed; if a patient is not primed, *viz.* does not know what symptoms/manifestations, while they are having an episode, are relevant to a clinical diagnosis, then they are not going to be able to accurately report them to a physician. This may be better appreciated with an example.

Epileptologists, when suspecting epilepsy in a patient, will often ask a family member or friend of the patient to give the patient certain instructions during their next episode (*i.e.* suspected seizure). An example of one of these may be to ask the patient to tell them their name and where they are while having the seizure, or to tell them to remember the color yellow, and then ask them if they remembered it after the seizure has subsided [v]. Without the “priming” to look out for certain things like this, it may be difficult for a specialist to determine whether or not a patient is having seizures or merely, psychiatric symptoms. This priming begs the question, as one wants to know if there is some test all doctors can employ to find out if a patient has epilepsy?

While there are several tests that can help contribute to the diagnosis of epilepsy, there is no single gold standard test—that is, there is no blood test for example, that confirms epilepsy as there is with HIV. Instead doctors rely heavily on the medical history or events that may be seizures, brain MRI's which may show abnormalities in the brain that could be responsible for seizures, and electroencephalographs (EEGs) which record electrical activity in the brain and may capture seizures if one occurs while they are being recorded. But medical histories can be inconclusive, MRI scans can be negative in up to 30% of patients with partial epilepsy [14]. Furthermore even when MRI show abnormalities, MRI by itself does not by any means serve as a definitive diagnostic test for epilepsy by itself [15] Routine EEGs may be negative, that is no epileptiform discharges are observed, in up to 40% of patients with epilepsy.

But what if epilepsy is properly diagnosed? Orrin Devinsky, M.D., said in an article entitled *Psychiatric comorbidity in patients with epilepsy: implications for diagnosis and treatment* that “Psychiatric comorbidity is frequently encountered across all age groups of patients with epilepsy, having a serious impact on unfavorable outcomes, diminished quality of life and increased resource use and costs. Unfortunately, primary treatment providers often lack the clinical expertise to recognize, diagnose, and treat this comorbidity. Continuing educational efforts are needed to facilitate better recognition and treatment provided by treating physicians, and improved collaboration with psychiatrists when necessary,” [16].

Devinsky goes on to highlight another issue, which is the fact that the AEDs have side effects that may be misinterpreted as primary psychiatric conditions, which has the effect of masking the depression. Devinsky says “Knowledge about the tolerability profile of AEDs is essential in the proper diagnosis of psychiatric comorbidity in patients with epilepsy since use of, or withdrawal from, AEDs may be related to a variety of psychiatric adverse effects that may be erroneously interpreted as a primary psychiatric morbidity,” [Ibid]. Indeed, AEDs, specifically barbituates, have been heavily linked to depression and increased suicide rates. [Ibid] Thus we may have a situation wherein a patient, properly diagnosed with epilepsy and some terminal illness, but also improperly diagnosed, having failed to identify their depression, would be allowed under the Act to request PAS in a situation where the Act, if a proper and full diagnosis were in place, would have prohibited PAS.

As previously mentioned, there are several other medical conditions, which carry the exact same weight of my concern as epilepsy does viz. they may present and be misdiagnosed as primary psychiatric conditions rather than what they actually are, namely underlying primary neurological/medical conditions. These include, but are not limited, to brain tumors, Parkinson’s Disease, HIV/AIDS, and Autoimmune Encephalitis. Brain tumors affect 6.4 per 100,000 men and women per year in U.S. [17]. Parkinson’s Disease affects about 4.5-21 out of every 100,000 people, internationally [18]. “At the end of 2006, an estimated 1,106,400 persons (95% confidence interval 1,056,400-1,156,400) in the United States were living with HIV infection, with 21% undiagnosed,” [19].

IV. Conclusion

Neuropsychiatric masquerades place an inevitable limitation on how confident we can be about assuring that patients and doctors are mak-

ing truly informed decisions when they engage in PAS. The safeguards of the Act do nothing to address these limitations. Until advances in medicine alleviate the concern that I’ve illustrated, no legislation will be able to prevent it. Any legislation that would attempt to get doctors not to miss neuropsychiatric masquerades would be legislation that tells doctors how to be doctors, and clearly this is not a satisfactory result; for as John Keown has prudently asserted, “any law that creates bad medicine, is clearly bad law”. In light of this conclusion, I would recommend the immediate suspension of the practice of PAS.

[i] The sequence I have assigned to this list does not reflect the sequence of the Act itself. The bolded ORS #'s are accurate, however.

[ii] The full spectrum of what the Act provides for has not been included because those parts are not directly relevant to the discussion that will follow

[iii] The statistics that apply here are complicated, depending on a number of factors, the least of which being the number of AEDs tried unsuccessfully as well as the location of the seizure and how effectively it was localized via intra-cranial EEG monitoring, and whether its localization was fully respectable or intruded on functional cortex.

[iv] 6 of 7 studies described by Chowdhury et al. involved specialists. The misdiagnosis rates for each of these specialist studies were 23, 5.6, 26, 20, 4.6, and 30 % respectively.

[v] These particular questions are aimed at the distinction between a simple partial and complex partial seizure. The first question is aimed at ascertaining the patient’s level of awareness or orientation, whereas the second question is aimed at testing whether or not the patient’s memory is impaired during their seizure.

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***Ethics without Epistemology:
Virtues, Social Practices, and the Critique of Foundationalism***

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Almost every area of modern philosophy is characterized by a myopic concern with problems of epistemology. For much contemporary thought, knowledge consists simply in the correspondence of our mental representations to reality, and the only justification for such knowledge comes from the identification of some indubitable principle or foundation that can validate that knowledge. Just as in philosophy, this epistemological or “foundationalist” approach constitutes the methodology of most modern ethical theories, as well, most notably in utilitarianism and Kantianism. Such theories attempt to formulate a set of abstract ethical rules, binding on all rational agents, to determine good or bad actions. But, as this paper contends, a foundationalist approach in any field runs into immense problems – and a fortiori in ethics. Breaking away from foundationalism, this paper articulates a conception of ethics founded upon virtues, social practices, and the networks of goods that render them intelligible. This conception escapes the difficulties intrinsic to foundationalist epistemologies, and offers a more theoretically sound and practically effective guide for right action.

Introduction

Modern philosophy has concerned itself almost solely with problems of epistemology, attempting to provide some indubitable foundation upon which the whole edifice of reason may be constructed. This epistemological project is, of course, quite evident in contemporary metaphysics and philosophy of science (as well as, obviously, in the domain of epistemology proper). But it holds sway just as powerfully in the realm of ethical theory. However divergent in the substance of their beliefs, almost all modern moral philosophers, from utilitarians to Kantians to rights theorists of various kinds, share the assumption that ethics, to be rationally justifiable, must consist in a set of abstract rules or principles that (a) specify which actions are good and which actions are bad, and that (b) must be systematically applied to various individual cases or types of cases. Hence, as a concomitant of this conception of ethics, there has arisen the whole field of “applied ethics” and its subdivisions.

Since we live in an intellectual world pervaded by a post-Enlightenment rationalistic temper, this foundationalist epistemological approach to ethics seems unchallenged and, indeed, unchallengeable. Nevertheless, as I would like to argue in this paper, such a conception of an epistemologically grounded ethics faces serious philosophical difficulties, not only at the level of theory, but also at the level of practical applications. After articulating these difficulties, I will then sketch out a vision of ethics that is based not upon a foundationalist epistemology, but rather upon social practices and the virtues. Before fleshing out this vision, however, let me describe the epistemological project and delineate the problems that beset it.

I. Epistemology and Foundationalism

What do I mean by “epistemology”? In a very broad and formal sense, one may define epistemology simply as that “branch of philosophy concerned with the theory of knowledge.”¹ This is, of course, certainly true. But what “epistemology” – in the wider sense that I am using it – denotes or connotes in modern philosophy is not just a field of inquiry, but also a set of substantive views about how knowledge can, or ought to be, rationally verified. This set of views may, for more precision, be termed the “foundationalist” model of reasoning, for it embodies the search for a certain and immutable foundation for knowledge. But what views constitute this foundationalist model? They are threefold.

In the first place, this foundationalist model of reason hinges upon a conception of the mind in which all mental states – perceptions, thoughts, and so forth – consist in representations or images of reality. From this conception, it follows that “our only knowledge of reality comes through the representations we have formed of it within ourselves.”² Descartes, for example, asserts that our knowledge comes only through the clear and distinct ideas that we have in our minds, and Locke similarly posits that knowledge consists in the proper correspondence of our mental ideas or sense data to the real world. Indeed, as Charles Taylor has pointed out, this picture of knowledge still operates even in the work of those who attempt to break free from the foundationalist model of reasoning – such as Quine with his talk of “surface irritations” or Davidson and his theory of truth as “reconciling coherence and correspondence.”³ Under this notion of knowledge, then, mental ideas or representations mediate between mind

¹ The Oxford Companion to the Mind, ed. Richard L. Gregory (New York: Oxford, 1987), p. 225-6

² Charles Taylor, “Merleau-Ponty and the Epistemological Picture,” in *The Cambridge Companion to Merleau-Ponty*, eds. Taylor Carman and Mark B. N. Hansen (New York: Cambridge, 2005), p. 26

³ *Ibid.*, p. 28

and world, and it is only through them that we can have contact with reality. Knowledge of what is outer is possible only through what is inner.

This “mediational” picture of the mind, as we can call it, leads to the second crucial feature of the foundationalist model of reasoning – the abstract self. On this view, the self, or mind, is seen as being (at least notionally) independent of the material world and of the body; the self is a locus of freedom over against the deterministic laws of the physical universe. This line of thought, it must be noted, does not necessarily entail the ontological thesis that the mind is in fact separate from body and world; it merely maintains the epistemological position that one can imagine or cognize oneself in abstraction from body and world, even if, after such an abstract cognition, one reestablishes one’s connection to reality. There is, in other words, no necessary connection between the mind and the world, between what is outer and what is inner. And it is not hard to perceive why no necessary relation should obtain: if we know the world only through the mediation of representations, then the nature and existence of the external world become at least questionable and at most unknowable. Radical skepticism arises ineluctably from this picture of the self, as the history of philosophy bears out.

Attempting to alleviate this persistent doubt about reality is the third pivotal feature of the foundationalist model of reasoning, namely, the view that any justification for knowledge must come from some indubitable principle. If only such a principle could be found, goes the foundationalist logic, then knowledge will be preserved from all skeptical and relativist doubts; an unquestionable principle of this sort is the only means by which knowledge can be rationally justified. Furthermore, what that unquestionability means is that this kind of principle must be immediate, that is, not already interpreted or pre-structured in any way (such as conceptually). It must be a “Given,” to use Sellars’ term.⁴ But in what might such a principle consist? Descartes, again, believed this principle to be the putative undeniability that one is thinking (and if thinking, then existing), and for the modern scientific enterprise, it often lies in scientific “facts” or raw sensations.

II. The Problem with Foundationalism

These, then, are the three features that animate the foundationalist model of reasoning. But, as stated earlier, this notion of a foundationalist epistemology is fraught with problems, both as a general theory of

⁴ Cf. Wilfrid Sellars, *Empiricism and the Philosophy of Mind* (Cambridge: Harvard University Press, 1997)

knowledge and as a theory of ethical knowledge in particular. To flesh out precisely why the foundationalist project is inherently consigned to failure, let me put forth two arguments.

The primary reason that the foundationalist project cannot succeed is simply that its attempts to ground knowledge are vitiated by the positing of two irreconcilable theses. On the one hand, as we have seen, foundationalist epistemology rests upon the conception of knowledge as the correct correspondence between reality and the representations in one’s mind. On the other hand, it holds the criterion for rationally justifying knowledge to be some indubitably certain principle from which further knowledge can be deduced. The problem, however, is that these two positions are mutually undermining. Put sharply, the mediational picture of the mind precludes appeal to any indubitable, immediate principle. If everything in the mind consists in representations, then all mental phenomena, from bare perceptions to imaginative thoughts, are already mediated and interpreted according to some conceptual schema. But if this is so, then one cannot appeal to something immediate and un-interpreted. Pure immediacy is a pure fiction.

This argument seems to me to be enough to discredit the foundationalist program as a whole. Nevertheless, a foundational epistemologist might reply that one need not hold that all mental phenomena are mediated. Rather, one could argue that our raw sensations or bare “givens,” for instance, are not conceptually structured, and that therefore they, at least, can both provide access to reality and ground our knowledge. But this objection fails to rescue foundationalism. To see why, consider a second but similar argument, articulated by Alasdair MacIntyre. He writes:

[T]he substantive content required for statements which could function as the initial premises in a deductive justification of the sciences...precludes the kind of justified immediate certitude required for this kind of epistemological starting point, and vice versa. Epistemological principles, thus conceived, are mythological beasts.⁵

According to MacIntyre, then, the logical links in any chain of reasoning purporting to ground knowledge must already possess conceptual content, however minimal; they must, in other words, be mediated. However, since (on the foundationalist view) only those things that are immediate can also be certain, one cannot use raw sensations to justify knowledge claims.

⁵ Alasdair MacIntyre, “First principles, final ends, and contemporary philosophical issues,” in *The Tasks of Philosophy: Selected Essays, Volume 1* (Cambridge, UK: Cambridge, 2006), p. 147

Sensations qua sensations simply lack propositional content.⁶

Taken together, these two arguments demonstrate the conceptual difficulties symptomatic of any foundationalist epistemology, whether wholly mediational or not. But if this incoherence is present in foundationalism in general, how is it also present in foundationalist approaches to ethics in particular? To see how this is so, let me examine for a moment the problems inherent in the two most typically modern forms of ethical reasoning – utilitarianism and Kantianism. Through this examination, it will become clear that both of these ethical theories fall prey to precisely the same criticisms raised above.

III. Problems with Foundationalist Ethics

1. Utilitarianism is a polysemous term. One could be, among other things, an act utilitarian, a rule utilitarian, a two-type utilitarian, or a negative utilitarian. Yet the different species of utilitarianism all bear a family resemblance to one another. Quite broadly, we may speak of utilitarianism as the philosophical position that enjoins one to act always so as to maximize, as the result and aim of one's actions, some predetermined ethical category, usually characterized in terms of pleasure or happiness. On this view, then, a moral action must be judged only according to its utility in producing a certain outcome; no acts can thus be moral or immoral in themselves. Despite this apparently rational structure, however, utilitarianism thus formulated faces at least two fundamental problems.

First, as several philosophers have noted,⁷ ends such as pleasure or happiness cannot be rationally maximized for the very reason that they cannot be rationally compared. Which pleasures or conceptions of happiness are to be maximized? How can the pleasures or happiness of individuals be quantified in any non-arbitrary way? That utilitarianism cannot answer these questions satisfactorily derives from its (failed) attempt to ground an ethical system upon something as non-propositional and immediate as pleasure, or upon something as vacuously abstract as bare happiness. Its failure in this respect mirrors the general failure of foundationalism seen above. But, second, utilitarianism also fails to provide sufficient reasons for action. For if consequences are the sole criterion for action, how can one possibly foresee what consequences will result necessarily from one's actions?⁸ The supposed practicality of utilitarian ethics

⁶ One could, of course, validly employ propositional claims *about* sensations in arguments. But sensations themselves cannot become propositions in an argument.

⁷ See, e.g., John Finnis, *Fundamentals of Ethics* (Washington, D.C.: Georgetown, 1983), ch. 4; and Alasdair MacIntyre, *After Virtue* (Indiana: Notre Dame, 1984), ch. 6

⁸ G.E.M. Anscombe makes this point in "Modern Moral Philosophy," in *Human Life, Action, and*

thus collapses into a merely theoretical and speculative system with little practical application.

2. Like utilitarianism, Kantianism embodies the search for an abstract principle that can specify what actions one should and should not perform on a particular occasion. As a form of deontology – concerned with one's duty to perform actions irrespective of their consequences – Kantianism purports to derive an absolute moral law from the mere concepts of reason and freedom. In nuce, this conception of ethics is encapsulated by Kant's formulation of his basic ethical principle, the categorical imperative: "Act only according to that maxim whereby you can at the same time will that it should become a universal law."⁹ In other words, only those reasons for action (maxims) that one could will everyone, in the same situation as oneself, to perform are morally justifiable.

The problem with Kantianism is that, when a moral principle is taken to such heights of abstraction, it can be used to warrant almost any particular reason for action. By means of the categorical imperative, one can validly will the maxim either that one ought always to keep every promise (which Kant argued for) or that one ought always to keep every promise except for one.¹⁰ It can, in other words, be employed in the service of mutually contradictory reasons for action. Like the maximization procedure of utilitarianism, the theoretical abstraction of the categorical imperative, as Hegel argued, robs it of any practical value.¹¹ The failure of the categorical imperative as a principle of ethics, then, is simply the obverse of utilitarianism's inability to arbitrate the claims of competing pleasures and happinesses. While utilitarianism cannot ground ethics because it starts from concepts that lack substantive content, Kantianism cannot provide a foundation for ethics because, at such a level of abstraction (and mediation), any first principle is as good as any other. So, if utilitarianism provides no first principle of ethics, then Kantianism provides too many of them.¹²

What is common to both of these modern theories of ethics – utilitarianism and Kantianism – is that they attempt to found ethics upon something that either (a) *ex hypothesi* cannot provide any first principles or (b) provides too many of them. In attempting to do so, both theories

Ethics (Charlottesville: Imprint Academic, 2005), p. 169-94

⁹ Immanuel Kant, *Grounding for the Metaphysics of Morals*, transl. James W. Ellington (Indianapolis: Hackett, 1993), p. 30

¹⁰ MacIntyre, *After Virtue*, p. 45-6

¹¹ Cf. Hegel, *Natural Law*, transl. T. M. Knox (Philadelphia: University of Pennsylvania, 1975)

¹² In this discussion of modern ethics, due to constraints of space, I have left out human rights theories. Such theories, however, also face problems of excessive abstraction.

become quickly entangled in deep ethical aporiai. The reason for their woes is that, to be minimally intelligible, they depend upon a broadly foundationalist epistemology of justification, whereby every bit of knowledge must be justified by reference to some indubitable first principle. We have seen briefly why such a picture leads to immense difficulties – and thus why it needs to be overcome. But in order to articulate an ethics without epistemology, what might this picture be replaced with? The answer, as I will contend in what follows, lies in a vision of ethics rooted in social practices and the virtues. “[J]ustification,” as Richard Rorty remarks (though in a slightly different sense), “is not a matter of a special relation between ideas (or words) and objects, but of conversation, of social practice.”¹³ To see why this is so, it is useful to turn first to an argument set forth by Wittgenstein.

IV. Wittgenstein on Following Rules

In his *Philosophical Investigations*, Wittgenstein raises the problem of following a rule. Speaking of a foreigner whom he might wish to teach the use of a word, he writes:

Suppose I give this explanation: “I take ‘Moses’ to mean the man... who led the Israelites out of Egypt...” – But similar doubts to those about the name “Moses” are possible about the words of this explanation... These questions would not even come to an end when we got down to words like “red,” “dark,” “sweet.”¹⁴

What Wittgenstein attempts to display in this passage is that words – or, more generally, rules – cannot by themselves specify when and how they are to be used. To specify the application of a particular rule would require appealing to a further rule; but that further rule would need its application specified by appeal to yet another rule – and so on. This process of specification would seem to lead on to the conclusion that there are an infinite number of rules in our heads. But this is plainly absurd. So the question then becomes: how can explanatory rules be aids in understanding, if they always require further rules to be understood? As Wittgenstein says, the worry in this situation is that “‘the explanation is never completed; so I still don’t understand what he means, and never shall!’ – As though an explanation, as it were, hung in the air unless supported by another one.”¹⁵

¹³ Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton, NJ: Princeton University Press, 1979), p. 170

¹⁴ Ludwig Wittgenstein, *Philosophical Investigations*, 4th edition, transl. G.E.M. Anscombe et al. (Blackwell, 2009), §87

¹⁵ Ibid.

Rules can thus be infinitely misunderstood. Even using ostensive definitions (pointing, gesturing, etc.) to teach a foreigner the use of a word would be of little help. For how would he know whether you were indicating some object by pointing your finger, or whether the finger itself was being emphasized, or whether you were performing some irrational action? And, indeed, how would he know that you were trying to teach him something in the first place, and not just playing a sort of game? At some point, you would reach the bedrock of your most basic words, rules, and concepts, and your explanations would have to cease. If someone does not “get” how to use a word, how could we ever teach him?

The reason we commonly believe that we can, by means of explanations, teach the foreigner the use of a particular word is that we also believe that our own understanding of the word consists in the articulated explanation. In other words, we ascribe to our explanatory formulae causal efficacy in our actions.¹⁶ But this, Wittgenstein contends, is false. What connection is there, he asks, between “the expression of a rule – say a sign-post – [and] my actions?” The answer is that “I have been trained to react to this sign in a particular way... [A] person goes by a sign-post only in so far as there exists a regular use of sign-posts, a custom.”¹⁷ The use of a sign-post, therefore, involves a more basic mode of understanding that provides the precondition for that use. This sort of understanding, Wittgenstein argues, consists in a social practice that cannot be fully articulated into rules, simply because it lies beyond all rule-formulations.¹⁸ It is a “practical sense,” as Pierre Bourdieu calls it, by means of which we can formulate and follow rules.¹⁹ Of course, one might object that this sort of social practice should not be considered a form of understanding at all, but rather a brute mechanism for applying and obeying rules. But what this objection ignores, to put it briefly, is that such social practice allows us not only to use rules, but also to make sense of them. This fact is something that the “brute mechanism” model cannot easily account for.

It should be clear by now that this sort of practical sense runs athwart the foundationalist picture of knowledge. On that conception, all understanding is in terms of fully explicit mental representations or ideas that connect up with one another in networks of rules and explanations. But, as we have seen in examining the arguments advanced by Wittgenstein, such a picture of the mind cannot account for how we could use

¹⁶ This point is made clear by Charles Taylor in “To Follow a Rule,” *Philosophical Arguments* (Cambridge: Harvard, 1995), p. 175

¹⁷ Wittgenstein, *Investigations*, §198

¹⁸ I follow Charles Taylor in this interpretation of Wittgenstein.

¹⁹ Pierre Bourdieu, *The Logic of Practice*, transl. Richard Nice (Stanford, 1990), p. 66

or learn rules, for rule-use requires a practical sense that cannot be fully expressed conceptually. What this means for ethical thought, then, is that ethical principles must be embedded in particular social contexts, divorced from which they become distorted and, indeed, unintelligible. But what also results from the foregoing considerations is that ethics itself cannot consist merely in rules; it must also concern practical sense.

What precisely does it mean that ethics concerns or requires practical sense? From the Wittgensteinian reflections above, we can see that this practical sense possesses two salient features. First of all, it is distinct from rule-use. [But can it be said to exist independently of rule-use? Or is it rather that we come to grasp the practical sense by being in contact with a society in which certain rules are operative?] It is a form of understanding that cannot be wholly articulated in terms of rules. Second, it is necessarily and essentially social. Rule-use makes sense only in social contexts, and so the mode of understanding (practical sense) needed to follow rules must be, in very large part, social. Any theory of ethics that avoids the pitfalls of foundationalism, then, must take these two crucial features of practical sense into account. In considering these features, I will attend first to the necessity of practical sense (or virtue) in a sound anti-foundationalist ethic. In so doing, let me draw from Aristotle's *Nicomachean Ethics*.

But third, as I would like to argue, the sociality (and virtue) dimension of anti-foundationalist ethics requires some substantive conception of the good. It is this conception of the good that forms the "background," as MacIntyre says, to the rule-use of societies. It is this background that enables us to revise or reformulate rules...

V. Aristotle on Practical Wisdom

In Book II of the *Ethics*, Aristotle writes that his "present discussion does not aim...at [theoretical] study; for the purpose of our examination is not to know what virtue is, but to become good, since otherwise the inquiry would be of no benefit to us."²⁰ For him, the aim and result of reasoning about the good is to act upon it; its end is action, not discovering facts about the world. Ethics, according to Aristotle, does not concern abstract theorizing, as it does for most modern ethicists. The sort of wisdom or knowledge acquired through ethical reflection ought to be practical, not theoretical. As Aristotle writes, practical wisdom (*phronêsis*) is "a state of grasping the truth, involving reason, concerned with action

20 Aristotle, *Nicomachean Ethics*, transl. Terence Irwin (Indianapolis: Hackett, 1999), p. 19; 1103b20-1

about things that are good or bad for a human being."²¹ *Phronêsis* does not involve broadly theoretical or metaphysical conceptions of the good (like Plato's Ideas), for such conceptions are "not the sort of good a human being can achieve in action or possess; but that is the sort we are looking for now."²² *Phronêsis* deals with the good at the ordinary human level.

That *phronêsis* precludes appeal to abstract notions of the good follows from the fact that it is concerned with human action. For human actions, as Aristotle states, deal not with necessary truths, but with contingent affairs. He therefore argues that *phronêsis* is not just about universals; rather, "[i]t must also acquire knowledge of particulars, since it is concerned with action and action is about particulars."²³ In other words, a practically wise man (*phronimos*) must know not only that X is good in general, but also that this is a particular instance of X. He must be able to identify the morally relevant features of each situation and act accordingly. Consequently, Aristotle contends that *phronêsis* involves a kind of perception, for one "must have perception of these [morally relevant] particulars, and this perception is understanding."²⁴ As a true form of "understanding," this ethical perception in *phronêsis* thus connects back to the Wittgenstein-Bourdieu concept of practical sense. What this means for Aristotle is that, in the realm of ethics, *phronêsis* "is inseparable from virtue of character, and virtue of character from prudence..."²⁵

Phronêsis, the precondition of any upright ethical action, is therefore inextricably bound up with the virtues, which provide a practical sense of how to act.²⁶ This emphasis on virtues as essential determinants of ethical action, of course, marks a sharp break from the foundationalist approaches considered earlier. But it should be noted that this focus on the virtues does not completely abandon moral rules (though perhaps it may very well do away with something as contentless as the categorical imperative). Rather, it integrates them with the virtues, thus providing the degree of concreteness necessary for action. So when Aristotle writes that the virtuous man "sees what is true in each case, [and is] himself a sort of standard and measure,"²⁷ one must not conclude that what *phronêsis* dictates cannot be articulated into reasons or communicated to others. As the preceding sentence of the text displays, the virtuous man delights in

21 Ibid., p. 89; 1140b5-7

22 Ibid., p. 6; 1096b34-35

23 Ibid., p. 92; 1141b15-17

24 Ibid., p. 96; 1143b7-9

25 Ibid., p. 165; 117817-19

26 With Aristotle, we may define "virtues" here as habituated dispositions of character.

27 Aristotle, *Ethics*, p. 37; 1113a34-6

the good because it is good. But what must be denied emphatically is (a) that this good can be fully expressed in terms of rules, and (b) that one needs only ethical rules to know how to act correctly. For each situation involves too many particularities and contingencies for abstract rules to be sure guides for right conduct. Virtue, in other words, cannot be taught. Rather, as Aristotle says, it comes through experience and habituation. It is, in other words, a social practice.

...But here one might object that, once one has been properly habituated in the virtues, acquires *phronêsis*, and thus possesses the requirements for proper moral rule-use, then is not morality just a matter of applying abstract rules to individual cases – the task of what is today called “applied ethics”? Let me briefly indicate why this is not so – and why, as MacIntyre says, applied ethics rests on a mistake. And so insofar as bioethics is taken to be a subdivision of applied ethics, it, too, rests on a mistake...

VI. *The Mistake of Applied Ethics*

The project of specifying rules and then applying them to particular cases, in the way that the foundationalist epistemological project supposes, is bound to fail. MacIntyre suggests a reason why:

[I]t cannot be the case that we can first and independently comprehend the rules of morality as such as then only secondly enquire as to their application in particular specialized social spheres. For, were this to be the case, the rules of morality as such would be effectively contentless.

Such rules of morality in this case would lack content because there is no such thing as a rule that exists independent of its particular applications. Rules are, in fact, understood in their applications; applications and rule-use exist in a dialectical relationship...

But, to return to the issue of the virtues, how are we to choose which virtues to consider as virtues? How can we justify deciding upon a particular catalogue of virtues? To come to an answer to these questions, we must consider the second salient feature of anti-foundationalism in ethics: sociality.

VII. *The Sociality of Rules*

Part of what has provided the philosophical justification for foundationalism is the belief that we can acquire knowledge by turning inward.

Exemplifying this powerful belief, Descartes thus writes that he is “certain that I can have no knowledge of what is outside me except by means of the ideas I have within me.”²⁸ But just as this notion of inwardness has held sway over properly epistemological concerns, it has also strongly influenced ethical thought. Perhaps the most evident way in which this inward turn is manifested is in the notion that what is good and bad can be determined solely by the power of pure thought – through one’s ethical “intuition.” Indeed, a widespread philosophical approach among ethicists today is to appeal to their everyday, commonsense intuitions in order to validate their particular sets of ethical rules. What is operative in this approach is the unquestioned assumption that ethical reasoning can reach true conclusions simply by introspection in abstraction from social practices. This assumption, however, is deeply misguided – and for two reasons.

First, there is often a sharp divorce between what people think that they believe in abstractly theorizing about ethics, and what they implicitly demonstrate that they believe in the various forms of social activity in which they are daily engaged.²⁹ Therefore, when ethical intuitionists assert that the ethical axioms derived from speculative thought capture their real beliefs about right and wrong, there is reason for much doubt. Second, as Alasdair MacIntyre writes, one’s self-knowledge comes only as “a consequence of one’s having made oneself with part of oneself into an observer.”³⁰ There can be no truly first-person sort of self-examination; we always must adopt, at least implicitly, a third-person point of view. And what we observe from this standpoint is not “an individual self in isolation, but an individual involved in some specific and particularized network of social relationships, whose modes of participation in those relationships express her or his moral commitments.”³¹ In other words, when ethical intuitionists derive norms from their supposed introspection, they are in fact formulating those norms from reflection upon the social practices in which they are engaged. That one can derive ethical knowledge from introspection is therefore a foundationalist myth.

What these arguments show is that, whether acknowledged or not, all ethical theory is simply reflection upon practice. And this makes plain sense; for what we learned earlier from Wittgenstein is that our fundamental mode of understanding is active and practical, not passive and theo-

28 Letter to Gibieuf, 19 January 1642, *The Philosophical Writings of Descartes*, Vol. III, AT III 474, quoted in Taylor, “Merleau-Ponty and the Epistemological Picture”

29 Alasdair MacIntyre, “Moral philosophy and contemporary social practice: what holds them apart?” in *The Tasks of Philosophy*, p. 107

30 Ibid., p. 108

31 Ibid.

retical. Rule-use or -formulation is possible only by means of a practical sense, and this is as true of ethical rules as it is of linguistic rules or of sign-posts. This means, then, that in order to justify any particular ethical theory, we must do so by explicitly relating it to the sorts of social practices in which we are engaged. To return to the questions posed in the last section, we must justify or condemn virtues by how well they aid in the sorts of characteristically human social practices in which we participate or could participate. For example, to grasp fully why a just action is good, we must see that it “is only through the exercise and promotion of the virtue (justice) that enjoins this action that individuals and communities can flourish in a specifically human mode.”³² Goods are social goods.

VIII. Backgrounds and Goods

But what renders these practices intelligible as practices? Like rules, practices require a shared background against which they become intelligible. What is this background? As MacIntyre suggests, it is the shared conception of the good that subtends social relations. This is the third salient feature of anti-foundationalist ethics...

These goods are presupposed by the practices, and hence by those rules. Rules in the absence of a substantive conception of the good only distort...

IX. Conclusion

Throughout this paper, what has arisen from the critique of foundationalist epistemology is a vision of ethics founded not on rules, but rather on social practices and the virtues, and the goods that render them intelligible. Since it rejects foundationalist abstraction, such a vision cannot set down principles of action a priori or exhaustively, but only a posteriori and minimally. Nevertheless, as we have seen, this conception of ethics provides more theoretical consistency and practical efficacy than utilitarianism, Kantianism, or any other foundationalist ethic.

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32 Alasdair MacIntyre, *Dependent Rational Animals* (Chicago: Open Court, 1999), p. 112

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***Taking the Next Step in Stem Cells:
Small Molecule Reprogramming for Production of
Induced Pluripotent Stem Cells***

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Advances in the production of induced pluripotent stem (iPS) cells are rapidly changing the nature of the bioethical and political conversation on stem cell research. Novel methods of somatic cell reprogramming developed by Kevin Eggan, Doug Melton, and colleagues have improved the possibility of efficacious iPS cells as an alternative to embryonic stem (ES) cells. The potential exists to quell many of the ethical concerns about stem cell research by avoiding use of the human embryo through iPS cells. This potential is accompanied by a danger that iPS cells—which are as yet largely unproven—will cause funding for ES cell research to remain stagnant or decrease. It is the responsibility of scientists and politicians alike to proceed forward with both iPS and ES stem cell research in order to realize the immense medical benefits that stem cell treatments present.

Scientific progress is often a long plod, replete with detours and potholes. In the realm of stem cell research the pace seems to resemble more of a dead sprint. There are pitfalls and challenges to be sure, but the achievements of the past few years have generated exciting prospects for the future of stem cell research. The emergence of induced pluripotent stem (iPS) cells presents an alternative to the embryonic stem (ES) cells that originally had the scientific community buzzing. The topic of the day has become how to improve the efficacy and therapeutic potential of iPS cells. This is the next step in stem cells, and researchers are already in the process of making that stride. The path of iPS cell research is an intriguing one, with a fascinating recent history and a promising future. The scientific, socio-political, and ethical questions that it raises are important ones, and the answers may well be dictated by the frenetic pace of progress and the immense promise of the field.

The starter's pistol that sent stem cell researchers around the globe off on a race to develop therapy-ready iPS cells was Shinya Yamanaka's 2006 breakthrough paper on the reprogramming of mouse adult somatic cells into pluripotent stem cells. By introducing just four factors—the

genes Oct3/4, Sox2, cMyc, and Klf4—Yamanaka succeeded in getting his cells to exhibit “morphology and growth properties of ES cells.” The discovery was revolutionary; it amounted to the ability to produce cells with all of the utility of ES cells, but without the use of an embryo. Yamanaka’s team at Kyoto University in Japan introduced the four genes by infecting the cells with four retroviruses carrying a gene apiece. This process produced novel results, but nevertheless has several important flaws that have inspired the drive for improvements in iPS cell production methodology.

The retroviral reprogramming technique employed by Yamanaka is hampered by legitimate concerns about the efficiency of the reprogramming process and even more pressing worries about the long-term clinical potential for iPS cells developed in this way. An inherent problem in retroviral reprogramming is that the viruses that carry the four reprogramming genes work the same way that many viruses do: by inserting their genome into that of the host cell. This increases the risk of tumorigenicity; the tissues produced from the iPS cells are more likely to become cancerous. Such a characteristic is an obvious deal breaker for clinical use, and severely limits the therapeutic potential of virally reprogrammed iPS cells. In addition to the oncogenic tendencies of the iPS cells, efficiency concerns also plague reprogramming. The reprogramming process was terribly inefficient, with less than 0.1 percent of cells infected with the four viruses developing into pluripotent stem cells. It is the combination of both inefficiency and cancer risk—20 percent of Yamanaka’s mice died of cancer—that has tempered the excitement created by the breakthrough. The characteristics of iPS cells have been shown to be nearly identical to those of ES cells, but the crippling factor of tumor formation necessitates a different method of reprogramming. Ideally, the need for gene introduction would be eliminated entirely, instead employing small molecules that could enter the nuclei of cells and enact the reprogramming. This crucial next step is being taken by a lab at Harvard.

The need to reprogram without using viruses presents an interesting problem to the scientific community, and to the lab of Kevin Eggen and Doug Melton. The goal—to replace some or all of Sox2, Oct3/4, cMyc and Klf4 in the reprogramming process—requires finding a small molecule that would achieve the desired results, even though the exact method by which it would do so was unknown. The situation was strikingly similar to those facing drug designers, and the eventual approach taken resembled a modern drug discovery plan. Rational small molecule design was not an especially promising route to take because it was unclear

if a small molecule replacement for one of the virally introduced genes would act directly on the genes of the cell or modify the cell through some alternate method. The prevailing wisdom in drug design is that when established knowledge cannot inform the discovery process, the best approach is to assay a large quantity of potential drug candidates in the hopes of finding a small molecule with the desired effect. In the case of small molecule reprogramming, this same logic encouraged Eggen and colleagues to develop a chemical screen to obtain a replacement for Sox2— the gene on which they had decided to focus. Instead of using a random assortment of molecules, they chose a library of molecules with known bioactivity. The targets of the molecules were diverse, ranging from kinases to extracellular receptors, but the fact that they were selected from a “well annotated” database meant that, should any succeed, the mechanism through which they worked would be suggested. According to the paper “A Small Molecule Inhibitor of Tgf- Signaling Replaces Sox2 in Reprogramming by Inducing Nanog,” this approach was favored especially “because it was unbiased with respect to the mechanism by which a given chemical functioned . . . [it] would not only deliver chemical compounds with translational utility but would also provide novel insights into the pathways and mechanism controlling reprogramming.” The roulette approach of trying a multitude of molecules was academic on more than one level. Not only would a hit present a new way of reprogramming, it would also suggest in greater detail the mechanism through which this new way of reprogramming worked. This in turn could suggest further improvements to the process. The approach was sound, but what made the experiment noteworthy was its success.

In discovering a small molecule replacement for Sox2, the Eggen lab showed that it was possible to create iPS cells by means other than gene insertion via viruses. There were still viruses involved in this new reprogramming procedure, to be sure, but this early success suggests that the remaining viruses might be eliminated from the process by discovering small molecule replacements in similar ways. The actual process by which the molecules were screened was quite simple. Oct4, Klf4, and cMyc were introduced to cells, followed by the introduction of a small molecule. If reprogramming proceeded in the absence of Sox2, the small molecule was a potential replacement for Sox2. The chemical screen yielded three hits, but two of them were unable to successfully cause reprogramming without valproic acid, which had been used in the initial screening. The remaining small molecule was renamed RepSox, for its ability to replace Sox2 in the

reprogramming process. Since cMyc has been found to be unnecessary for reprogramming, despite increasing efficiency, it was proven that reprogramming is now possible with the introduction of only two retroviruses and a small molecule. If small molecule replacements could be found for the remaining virally introduced genes—Oct4 and Klf4—the risk of cancer in tissues created with iPS cells would be greatly reduced or even eliminated, and the clinical utility of iPS cells would be immense.

The mechanism through which RepSox works in reprogramming was determined through its known status as a Transforming Growth Factor- β Receptor 1 kinase inhibitor and further experiments by the Eggen group. Unlike the genes inserted into the cell genome by the retroviruses, RepSox works indirectly by inhibiting Tgf- β signaling. This inhibition induces the transcription of Nanog, a gene important to maintaining pluripotency, effectively bypassing the need for Sox2. Experiments measuring the expression of Nanog, which was observed to increase by 1000% within 48 hours of RepSox treatment, determined the mechanism of the reprogramming process. This realization added to the success of finding a small molecule replacement for Sox2 by outlining the process by which that small molecule is able to do so. Not only did they find something that worked, but they also found out why it worked. If the metaphorical stock price of iPS cells was high when they entered the market in 2006, it rose higher in 2009 with the RepSox breakthrough. As with any game-changing technological development, the ramifications of iPS cells have extended outside the science world, in this case impacting the moral and political issues inherent in the stem cell conversation.

Embryonic stem cells have been persistently embroiled in controversy for obvious reasons. An embryo can develop into a human being, and this simple fact has led critics to decry playing around with what could be construed as a human life. On the other side of the coin, stem cell proponents see the vast potential of stem cell therapies as a way to save human lives, and posit that many of the embryos used to procure ES cells would be destroyed anyway, as they are primarily left over from in vitro fertilizations. Even within the scientific community, the ambiguous status of the human embryo has caused hesitation, or at least contemplation. Yamanaka himself was first inspired to look for ways of inducing the formation of pluripotent stem cells by an image of an embryo that reminded him of his young children. The new development of somatic cell reprogramming, followed shortly by the first small molecule replacement, has been thrown into the firestorm of the ES cell debate. Some analysts have claimed that

Yamanaka, Eggen, and company have sounded the death knell for ES cells. “The embryonic stem cell debate is over,” declared Charles Krauthammer, who formerly served on the President’s Council on Bioethics. “Scientific reasons alone will now incline even the most willful researchers to leave the human embryo alone.” What amounted to a way to avoid using human embryos should have settled the debate in theory, but the realities of iPS cells have complicated the issue. The current necessity of two retroviruses represents the biggest roadblock on the road to efficacious iPS cells. Even if other small molecule replacements are found that can eliminate the need for viruses entirely, the future is uncertain, and it is unclear whether iPS cells will ever have the full utility of ES cells. Some go so far as to claim that even virus-free reprogramming won’t be able to produce cells as valuable as ES cells. iPS cells “can’t possibly be used for therapies,” asserts Thomas Okarma, President of stem cell company Geron Corp. Somatic cells could be damaged by age or toxins, as opposed to “pure crystal-clear” ES cells, says Okarma. These claims may be somewhat overblown, but they underline the uncertainty about the future of iPS cells, an uncertainty that complicates the juxtaposition of iPS cells and ES cells. Bioethical concerns aside, the potential of iPS cells has an impact on funding for all stem cell research, which is of great practical importance as researchers look to move forward.

Despite being out of the headlines due to the economic crisis, health care, oil spills, and Midterm elections taking center stage, the debate over stem cell research funding is by no means over. President Obama did reverse former President Bush’s executive order banning federal funding for ES cell research, but his executive order approving new cell lines did not resolve the issue. The first human ES cell lines since Bush’s ban were approved on December 3, 2009. While many assumed that the issue of stem cell funding was over with a liberal administration in Washington, legal challenges to the authority of the executive order have been successful, and federal funding for stem cells is very much up in the air following the Midterm elections, in which it was swept under the rug in favor of more politically palatable issues. It is also important to remember that growth of the body of stem cell knowledge depends on more than the major research institutions of the United States. The race for effective stem cell therapies is an international one, with scientists in the United Kingdom and Japan playing especially vital roles. While the UK is typically open to stem cell research, Japan has historically been stringent when it comes to human ES cell restrictions. The emergence of iPS cells changed the face of stem

cell research funding almost overnight. Yamanaka, who once considered moving his research to California to obtain freer access to ES cells, has said he now feels obligated to stay in Japan by the sums of money the government is investing in iPS research. Likewise, the US Congress has shown strong bipartisan support for iPS cell research that ES cell research has never enjoyed. Everyone seems ready to invest in a procedure that has the potential to provide all of the benefits with none—or at least fewer—of the bioethical concerns, and scientists are certainly not going to turn down the money. “I would welcome any infusion of resources,” said George Daley of Harvard Medical School, “as long as it’s not used as an excuse to further delay funding for the methodology we know works today. You move ahead on all fronts. Scientists will in the end use what works best.” The question then becomes: will iPS cells kill ES cell research? Probably not. As long as scientists view ES cells as a worthwhile area of study, enough politicians will defer to the men and women in the laboratory to keep ES cell research alive. Certainly iPS cells present enormous potential and will inevitably be pursued by scientists as a novel tool of regenerative medicine and a solution to the constant bioethical and political headaches of ES cell research. Funding for iPS cells should be sought vigorously, but ES cell research should be pursued as well. As Daley suggests, the best and most likely scenario is to proceed on all fronts. iPS cells may be the exciting future of stem cell research, but ES cells are the equally exciting, if somewhat more controversial, present.

In reality, the political and social questions related to stem cells may well be rendered moot as the science progresses rapidly in new directions. Nevertheless, the onus is on scientists and policy makers alike to ensure that stem cell research proceeds as responsibly and rapidly as possible. The stakes are too high and the potential benefits too great not to continue moving forward. There is a long road ahead for stem cells, but the pace of progress is swift and showing no signs of slowing down. The next steps are already being taken.

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Abortion: The Unjustifiable Killing of an Equal Moral Person

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I shall first argue that the premise that science shows that a fetus is unquestionably a human being is true. I shall, then, consider whether humanity should be equated with personhood by critically evaluating the work of Michael Tooley. I shall find that, based on common moral intuitions, self-awareness is a sufficient but not a necessary condition for personhood and argue that membership in a species of beings that are generally self-aware is also a sufficient condition. From these two sufficient conditions, it will follow that the necessary condition for personhood is that a being have a rational nature. I shall, then, argue for an unconditional duty not intentionally to kill innocent persons. I shall, finally, examine Judith Jarvis Thompson's work and show that she misunderstands the degree to which one, after voluntary intercourse, is responsible for the fetus' state of dependence, and the level of positive duties one would have for fetuses as moral equals, even if the pregnancy did start with rape. To do the latter, I shall suggest a Rawlsian account of positive duties that will show that one would have positive duties to carry the baby, at least up to any threshold of burdens that would not be worse than death. Even beyond this threshold, however, I shall suggest that one could never be justified in violating one's duty not to intentionally kill an innocent person and that one might even have a positive duty to accept death so that the unborn baby may live.

“The scientific evidence establishes the fact that each of us was, from conception, a human being. Science, not religion, vindicates this crucial premise of the pro-life claim.

From it, there is no avoiding the conclusion that deliberate feticide is a form of homicide.” The statement that a fetus is a human and that to kill a fetus is “homicide,” as posited by Professor Robert George, cannot be reasonably refuted, at least when one interprets homicide in the most literal sense as “the killing of a human.” The implications of this truth, however, require further discussion; one cannot merely prove that a fetus is a human; one must also show that one has an inflexible duty not to kill human beings.

Indeed, one cannot credibly deny that a fetus is a human being. Science tells us that at the moment of conception, two haploid gametes

fuse to form a separate organism with its own unique DNA that will independently guide its development from a single-celled zygote to a well-developed fetus, and eventually to a child, adolescent, adult, and elderly citizen. Science further informs us that this new organism is a member of the species *homo sapiens*, and therefore a human.

The claim that the fetus is actually part of the mother is also readily refutable. Science certainly views a chicken in an egg as a separate organism from the mother, and a chicken at that. One could not reasonably argue that mother and child are one organism simply because mammals incubate internally rather than externally. Arguing such, one must consider any parasites living within a human to be a part of the same human organism, even though they are of completely different species.

The only remaining problem one might have in proving that human life begins at conception is the challenge of explaining the case of a fetus that divides into two identical twins.¹ To deal with this problem, imagine that this fission took place with an adult named Bob. The use of an adult aids us in tracking personhood because identity is generally regarded as a matter of mental, rather than physical states. If Bob suddenly divided in two, Bob would clearly survive in both twins because both twins would not only be genetically and physically identical, but would also have all of the same memories and attitudes as Bob that constitute his identity. Because the twins would lead separate lives, they would inevitably have different experiences, which would cause them to instantly become different persons. Nevertheless, each of these persons would still be a genuine continuation of Bob because they would have a concept of the same self that predates the split. So, it would seem that twins were once a single person whose life began at conception. The possibility that this single person might become multiple persons in the future does not make it any less of a person in the present. Even if one rejects this notion, however, one is forced to acknowledge that one human life began at conception and ended in fission, when two new lives began; this does not undermine the pro-life claim, because it would seem that we would still regard every adult “Bob” as an equal person, even if we knew that there was a 1% chance that he would die and split into two new persons.

Thus, since it has been established that a fetus is a human, if one wishes to maintain that an infant has personhood, while a fetus at any particular stage of development does not, one is faced with the insurmountable task of discovering a non-arbitrary moment when the

fetus acquires traits that confer personhood upon it. One cannot find a morally significant difference between an infant that has just been pulled out of the birth canal, and one that is partially born, just about to be born, or delivered weeks pre-maturely. Suggesting moral significance in the infant's dependence, via the umbilical cord, can be aptly refuted by noting that one would not deny that infants have personhood simply because they are fully dependent on adults for survival, nor should one deny personhood to patients who are temporarily dependent on an IV or an oxygen tank, or a dependent Siamese twin.

If one suggested that personhood came from the presence of a brain, or the ability to experience pleasure and pain, or "quickenings," then one would have to grant that many species of animals are fully persons, because many animals have brains, seem to experience pleasure and pain and are motile. Indeed, one would certainly expect to find more of the rational characteristics of a human mind in an adult chimpanzee than in a newborn baby. Even if one held the highly unpopular view that certain animals were persons, one would still face the difficulty of selecting an inevitably arbitrary moment to grant the fetus personhood in the midst of all of the fetus' characteristics being shaped through such gradual processes.

These arguments have forced most serious pro-choice philosophers to retreat into allowing for infanticide. Michael Tooley offers reasons for holding this view that seem at first compelling. He rightfully asserts, "To ascribe a right to an individual is to assert something about the prima-facie obligations of other individuals to act, or to refrain from acting in certain ways."² He says, however, that these obligations only exist if the person who might exercise this right desires that they exist, or, at least, would desire that these obligations be fulfilled if he were not temporarily incapacitated.³ Tooley then suggests that the right to life is not merely the right of a biological organism to continue to exist, but also the right of a "subject of experiences and other mental states to continue to exist." His basis for this claim lies in noting that if one were to erase all of a man's memories and attitudes and reprogram his mind, it would seem that one was violating his right to life without preventing the continued existence of a biological organism.⁴ From these premises, it follows that since a person only has a right to life if he desires that others act in accordance with their obligation to not infringe upon this right, and since the right to life

2 Michael Tooley, "Abortion and Infanticide," *Philosophy and Public Affairs*, Vol. 2, No. 1 (Blackwell Publishing, Autumn 1972) 62. <http://www.jstor.org/stable/pdfplus/2264919.pdf>

3 Id. at 47

4 Id. at 46

includes the right "of a subject of experiences and other mental states to continue to exist," then one cannot have a right to life if one is not such a subject. One cannot desire to continue to exist as a self-conscious being unless one believes oneself to be a self-conscious being; and if one were not self-conscious, one would not have a concept of self-consciousness to desire. As proof, he suggests that while a cat has no right to life, it has a right not to be tortured because while it cannot desire self-consciousness, a component of a right to life, it can desire not to endure pain.⁵

Tooley's premises are problematic. First, it is unfortunate that so many moral debates are framed in terms of rights, rather than duties, because this creates confusion. Rights cannot exist without duties, because rights are merely claims one can make that a certain action or inaction is obligatory because of the other's duties. The only reason that a person has a "right to life" is because it is widely accepted that humans have a duty not to kill innocent humans. Such a right would be meaningless if one were to encounter a wild lion, because a lion has no duty not to kill humans. Thus, one only has rights when others have reciprocal duties. Since rights presuppose duties, it follows that duties remain even if rights are not asserted. If it seems that one can relieve another of a duty by forfeiting a right, that particular duty was actually simply too narrowly understood. Property rights, for example, come from one's duty to respect another's property; when a man invites his neighbor to have some of his food, he is not relieving his neighbor of his duty to respect his property; instead the requirements of the duty of respecting his property have shifted from not taking any of his property, to only taking the property he was offered. While duties such as respecting one's property may allow for different actions depending on the wishes of the person to whom one's duty is owed, other duties are entirely inflexible.

For example, if one believes that humans have a duty not to intentionally kill other persons, then it would not matter if the would-be-slain has a rational desire to die; killing him would still be a breach of duty, even if he sought to forfeit his right to life. Of course, one could reasonably disagree that humans have such a duty and instead favor the notion that one has a duty not to kill an innocent person unless he rationally desires to be killed; while such a position would create an impasse over the issue of euthanasia it would not lead to the permissibility of abortion because clearly a fetus cannot desire to be killed. It seems, however, unreasonable to claim that humans have a duty not to kill only

5 Id. at 63

persons who desire not to be killed. There are likely many people who find life about as painful as it is pleasurable. They don't desire to live or to die, but they desire not to starve, so they continue to nurture themselves and go about their lives. It seems that most would agree that it would be wrong to kill such people. Even if one thought it acceptable to kill a human who desired to die, it would seem that one would want to allow apathetic individuals the right to make up their minds on the matter, and that usurping this right would unduly violate their autonomy. The fetus should be considered a member of this category; if it had reason it would probably want to live, but until it acquires reason, it is driven purely by instinct to pursue a course of action that sustains its life; as such the duty not to kill a human unless it desires to be killed would prohibit abortion.

Tooley's claim that a right to life must include the right to continue to maintain self-consciousness, because it would seem that scientists would violate one's right to life if they reprogrammed one's mind, does not necessarily follow. Instead, there are two separate rights that arise from two separate duties. One has a right to life and a right to autonomy that come from other's duties not to kill and not to violate autonomy, respectively. So, if one were to reprogram his mind, one would violate his most basic rights and annihilate his autonomy, but one would not, strictly speaking, violate his right to life. Consequently, a right to life does not depend on self-consciousness, though a right to autonomy conceivably could. As for the case of the kittens, kittens have no rights because they can make no rights claims; humans, however, have a duty to not needlessly cause pain. This is why it is acceptable to kill a cat but not to torture one.

One must now confront Tooley's claim that personhood comes from self-consciousness, rather than mere membership in the human species. Perhaps the most compelling support for this view lies in the apparent arbitrariness of "speciesism," which one might view as akin to racism, and the examples one might imagine of non-humans who should be seen as having a serious right to life. Indeed, if one were to make an animal self-conscious in the same way that humans are, it would seem morally wrong to kill it. It would also seem wrong for humans to deny personhood to any aliens we might encounter with a human level of self-consciousness, simply because they are not members of our species. However, just because self-consciousness is a sufficient condition for personhood, does not mean that it is a necessary condition. It seems that the basic moral principle must be that all humans are equal moral persons and that we, therefore, have a duty not to kill innocent human beings;

but if science fiction forced us to modify this principle, we would simply be forced to add that we also have a duty not to kill any self-conscious organisms as well.

The reason I hold this contention is simple: the reason that Tooley elicits that one might have to not kill a talking and thinking cow is simply a matter of revulsion. As Hume noted, when contemplating an act such as murder, one cannot find in the act itself "that matter of fact or real existence" called vice; instead one must turn towards one's "own breast and find a sentiment of disapprobation which arises... toward this action."⁶ To construct moral philosophy, one must first take the cases in which people, based on these intuitions, are certain of what is morally obligatory. The obligatoriness of certain actions in these situations then becomes a first principle beyond rational criticism. From these cases, one must then seek to rationally discover what non-arbitrary principles of morality must be true to be consistent with these natural impulses. If the principles of morality one develops would cause one to do that which is wrong in a case where one is equally sure of what is morally right, then this simply means that one needs to further modify one's principles until one has developed a plausible and non-arbitrary model for morality that is consistent with what humans, based on desires and emotional responses, find obligatory.

In this case, the reason that we are inclined to believe that we have a duty not to kill innocent, self-conscious organisms is because we experience feelings of disapprobation at the thought of killing a sentient alien or a talking cow. However, it is clear that this principle alone is not sufficient, because almost everyone should experience a much greater revulsion towards the prospect of killing an infant human, or a seriously mentally disabled person. Thus, one must modify one's principle to the more plausible: "humans have duties not to kill other humans or other self-conscious beings." If, however, we came into contact with sentient Martians, for example, we would likely include them in our moral community and regard their fetuses as moral persons too. If one agrees that we would need to regard a Martian infant as a person too, it is clear that not even this principle is expansive enough.

Thus, to solve the problem of the apparent arbitrariness of species distinction and acknowledge that the infants of a species that shared our rationality would also be moral persons, it seems clear that what it means to be a person is to be a being of a rational nature. A being has a rational nature if an essential component of its ordinary fulfillment as the sort of

⁶ David Hume, "Morality and Natural Sentiment," *Moral Philosophy: Selected Readings*. Second Edition. Ed. George Sher, New York: Harcourt Brace College Publishers, 96.

being that it entails the development of a rational capacity. As humans, we all possess a rational nature; our bodies begin to develop our rational capacity from the moment of conception; it is an essential component of our fulfillment as rational beings that we pursue knowledge and act according to reason. We can point to a sleeping or comatose person and note that the exercise of reason is a part of that being's ordinary fulfillment, even if it currently lies dormant. Furthermore, if a person suffers from a disease or injury that permanently impedes reason, we know that that person's fulfillment as a human will be severely limited. We do not think of such people as being like animals, which lack a rational nature and can, thus, lead lives that are fully perfective of their nature without reason. Rather, we know that there is a genuine privation in these humans, and it remains intelligible for us to say that it would be "good" for them, or perfective of their nature, if they received treatments that could restore or create their capacity to reason in a way that it would not necessarily be "good" for a worm or a refrigerator to develop the capacity to reason. The origin of the notion, then, that persons are owed reasons for acts that bear upon them can then be understood as the notion that one must always act according to universalizable principles that all beings of a rational nature, were they disinterested and in a position to evaluate the decision, would regard as just.

Since possession of a rational nature is the only formulation of personhood that would protect the infants and the infirm of every species like ours, we would have to adopt it in a fictitious world. Since, however, humans are the only beings we know to have a rational nature, for the purposes of the abortion debate, one may now proceed with the abbreviated principle: "humans have a duty not to kill innocent humans." Since fetuses are innocent and equal humans, it follows that humans have a duty not to kill fetuses. The only remaining question is: "are there any circumstances that might excuse one from this duty?"

Judith Thompson raises the possibility that the duty not to kill persons may be limited if it becomes an excessive burden. She creates a case wherein a person wakes up to find that an unconscious violinist, with kidney failure, has had his circulatory system attached to his, because "music lovers" have discovered that he has the only kidneys in the world that could support both himself and this violinist, and if they were attached for nine months, the violinist would recover. Surely, Thompson suggests, one would be entitled to detach oneself from the violinist.⁷

7 Judith Jarvis Thompson, "A Defense of Abortion," *Philosophy and Public Affairs*, Vol. 1, No. 1 (Blackwell Publishing, Autumn 1971) 47-48. <http://www.jstor.org/stable/pdfplus/2265091.pdf>

It is first worth noting that there are serious problems with this case as an analogy for abortion. First, because the violinist is attached to the person externally, he remains foreign to the person's body. Thus, to detach the violinist is just like "pulling the plug" on a life-support system; unlike the case of abortion, this is a case of allowing one to die, rather than direct killing.

Secondly, this analogy, wherein the victim is kidnapped and mutilated to allow for the violinist's survival, is only valid for cases of rape. In any other circumstance, the woman voluntarily engages in a procreative act that biologically evolved for the purpose of creating new human beings. Thompson tries to evade this problem by proposing a case, in which people originate as seeds that grow in carpets. A woman opens her window and "people seeds" blow into her house and take root in her carpet. Thompson posits that the woman is not obliged to let these people use her carpet to grow and may thus kill them.⁸ This conclusion does not follow. Admittedly, the woman was not seeking to capture "people seeds" by opening her window, but she, nonetheless, did capture people seeds, and to suggest that she has a right to kill people so that she can enjoy the comforts of an open window and a carpet is simply absurd. Placing a screen on the window, which would greatly reduce but not eliminate the likelihood of seed entry,⁹ and which is analogous to using contraception, does not make one any less responsible for destroying lives, although it does perhaps make one less reckless. Studies show that condoms fail about 3% of the time¹⁰; if one engages in contracepted intercourse multiple times, there is a very serious chance that one will become pregnant. It is generally viewed as profoundly wrong for people to take any serious chances with another's life, unless other lives are at stake. Certainly, a person seeking a thrill would not be justified in putting a single bullet in one of fifty pistols, randomly selecting a pistol and then pulling the trigger on another person. If this caused him to kill someone, the fact that there was only a 2% chance that he would kill would certainly not excuse this murder. This is morally no different from having sex for pleasure, while knowing that if one became pregnant, one would kill this fetus. The fact that in both cases these people were just seeking a pleasure or thrill does not change the fact that they are fully culpable if and when they do kill. This logic would not lead one to accept the often-suggested counter-example that a woman is responsible

8 Id. at 59.

9 Id. at 59.

10 Guttmacher Institute, "Failure Rates of Male and Female Condoms Fall with Use," *International Family Planning Perspectives* Volume 31, Number 2, June 2005. <http://www.guttmacher.org/pubs/journals/3109405.html>

if she is walking on the street and is raped, because she knows that there exist rapists and she could always stay home.¹¹ Walking and driving are necessary and they are not seriously reckless because the chances of rape and fatal accidents are astronomically lower. A reasonable threshold for determining whether the benefits of an action would outweigh their risks to others would be to ask oneself, in a Kantian manner, if one would will that that practice become universal law even though one might be its victim.¹² It would seem that most would accept the slim chance of dying in a car crash, in exchange for the benefits to mobility. It would, however, seem very unlikely that people would universalize allowing abortions after promiscuous sex if they knew that each time there was even a one in one thousand chance that they or a fellow human would die. Thus, the woman has a positive duty to carry the fetus to term in any non-rape scenario, because she is negligent and liable for its state of dependence.

The third and most serious problem with Thompson's analogy comes from the much greater burden of being bedridden and attached to a fully-grown adult, as opposed to carrying a baby for about nine months, which generally allows for much more functionality, comfort, happiness, and mobility. She, further, takes the extremely natural and wonderful relationship between mother and child and, for prejudicial value, distorts it into a case that is very disturbing and alien to us. Thompson uses the shock of her most extreme example, the person who must be bedridden for life to support the violinist, to convince her readers that people must volunteer in order to incur any positive duties whatsoever and concludes that if a man had only to touch a woman on the other side of the room to save her life, his failure to administer it would not render him unjust.¹³ Thompson is correct that the two cases are only separated from one another by differences in degree, not in kind, but this does not prevent one from discovering a moral difference. In both of these cases, because it is morally arbitrary that one has a healthy body while the other does not, perhaps the fairest way of determining the limits of one's positive duties, in a relationship where one is uniquely able to help, would be to imagine that two people are behind a modified Rawlsian veil of ignorance¹⁴, not knowing which of them will be a fetus and which will be a mother. It would seem that they would certainly agree that the mother should raise

the baby to term. The limits they would place on this duty would be no less than such a degree of burden as would render the healthy person worse off than the sick person would be if left to die. The way to apply this principle to the case of the violinist would be to ask oneself if one would rather die than remain attached. It would seem that one could only reasonably reach this conclusion if the attachment were much longer and more painful than any pregnancy, or would cost one's life. So, it would seem that, even in the case of rape, a mother would have a positive duty to care for her child unless it would cause her own death or such anguish that she would rather die. Even then, however, her lack of a positive duty to care for the fetus does not eliminate her duty not to kill; so, while it would be justified to unplug oneself from the violinist to save one's life, it would still not be permissible to kill a fetus.

If a man owned a submarine and, deeply submerged, discovered that terrorists tied up a child onboard and stuffed her in the cargo-hold and sabotaged the oxygen generators, leaving only enough oxygen for one of them to survive until the vessel emerges, it would be clear that, even though the man who owned the sub might not have had a duty to keep the child alive at the expense of his own life, he clearly would not be justified in killing the child. The fact that the man owns the submarine is morally irrelevant; the child did not choose to be on the submarine and he has a duty not to kill the child, as a moral equal. Beyond the man's duty not to kill the child, however, if he could jettison the girl and leave her to die, that too would be wrong according to the principle of fairness, because if one really were to choose in Rawlsian fairness who should live, knowing that one could, by random chance, be either, it would seem that one would choose the girl because she has not gotten to experience much of her life, while he has experienced much of his. Likewise, in choosing between the mother and the fetus, it would seem that one would choose the fetus because it has had no chance at life, while the mother has experienced the prime of her own life. Thus, the intentional killing of the fetus would never be allowed, and the principle of fairness would allow one to accept the death of a fetus as an unintended but foreseen consequence of saving the mother's life, only if it was very likely that the fetus would die anyways.

11 Thompson, "A Defense of Abortion," 59.

12 Immanuel Kant, "Morality and Natural Sentiment," *Moral Philosophy: Selected Readings*. Second Edition. Ed. George Sher, New York: Harcourt Brace College Publishers, 392.

13 Thompson, "A Defense of Abortion," 61.

14 John Rawls, *Theory of Justice*, (Cambridge, Massachusetts, Harvard University Press, 1971), 15-21.

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**Better Brains for Some:
An Ethical Analysis of Access to Neurological Medication**

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The use of neurological medication, both prescribed and off-label, is becoming increasingly prevalent. This new age of medicine breeds ethical concerns with access to mind-enhancing drugs. It is necessary to consider the ethical implications that restricted access has on society as well as the potential widespread dissemination of these drugs. Understanding the capabilities of neurological medication and the impact use could have on society leads to the conclusion that dissemination of nootropics is ethically justifiable.

The age of neuropharmacology is upon us and holds great potential while concurrently raising a multitude of ethical considerations--one of which is the distribution of brain enhancing medications. Medical technology is very expensive as it stands, and advancements are likely to carry a high price tag during their introduction. With the increased understanding of mental faculties, we are already able to boost learning ability, and it is likely that this trend will continue in the future--leading to untold possibilities. The concern is advances in neurotechnology coupled with the problems associated with access to medical care could widen an already large gap between those able to afford treatment and those without access. It is necessary to proactively confront this issue and determine if it is acceptable to allow privileged individuals to receive a cognitive boost while others go without. It is my opinion that it is not only ethically permissible to allow this but also irresponsible to prevent access to this technology.

It is first necessary to consider the actual capabilities of the technology so that it may be put into the proper scope. Currently, brain-enhancing drugs come in a variety of forms. One class is amphetamines, such as Ritalin and Adderall, which are used to control attention deficit disorder symptoms in affected individuals but can also be used by healthy individuals to augment focus and stimulation as well as increase academic productivity (1). Another class of medication has been shown to actually increase learning. An example of this type is Donepezil, which, when taken, allows an individual to actually comprehend content more

effectively. In one landmark study, pilots given Donezpil were better able to remember what they learned in training sessions as compared to a control group (2). This drug has since been used for Alzheimer's and dementia patients, but the off-label use of this cognitive technology for healthy patients is intriguing because it has already been shown to be effective in individuals unaffected by Alzheimer's disease.

In the future, if the aforementioned medications, or similar medications for that matter, are allowed to be used for individual improvement as opposed to purely medicinal purposes, then it is possible a rift will be created between, as named by Ackerman (3), the chemical "haves and have nots." The possibility he mentions is that well-to-do middle or upper-class children would receive the medication while those in the lower economic classes would not be able to experience these benefits. This is already evidenced by the prescription of antidepressants: almost all patients are in the upper class of society (4). Such a disparity would widen the gap between economic classes in the realm of scholastic competitions--such as applying to college.

With terms such as off-label use and scholastic advantage, it seems an argument for the use of cognitive enhancers becomes very difficult. Part of the difficulty in constructing an argument for neuroenhancement is the lack of knowledge on the subject and the fact that people have not yet assimilated this idea. This can only be resolved with time and education on the topic, and for now, the focus narrows to potential ethical issues.

On the other hand, the argument for the distribution of these drugs is based on the premise that we should not stifle intelligence by handicapping some to prevent them from outperforming others; the benefits to society are too great to prevent increased distribution of a medication that is not deterministic and thus would not be able to create a class schism in itself. It is unethical to prevent someone from pursuing intellectual excellence even if others are unable to obtain that level of knowledge. Not providing the neuroenhancing medication would be similar to attaching weights to one runner because he has developed more speed than his slower counterparts. To make the situation more similar, the faster runner may have access to better facilities than others, but he should not be penalized because he is provided superior facilities. In the same vein, we have to allow people who have access to neuroenhancers to indulge so that they may reach their full potential; it is unethical to stifle their pursuits in an attempt to level the playing field for others.

Drawing from the potential argument, it is necessary to allow

enhancement through nootropics because it can benefit the world. Advancements in science, technology, art, and even athletics are made through the acquisition of knowledge. There has been an evolution of knowledge throughout the time man has spent on this earth, and the practical applications of this knowledge occur only as fast as we allow our minds to grow. The Renaissance was a time of great development because of the increase in introspection that led to an increase in knowledge and, consequently, advancement in the fields of science, art, and philosophy. If the capacity for intelligence can be increased even slightly with a synthetic aid, over time, our understanding of the world will increase greatly. Those still concerned with the gap of the chemical "haves and have nots" should receive some comfort from this argument because the greater understanding of the brain will bring about more benefits in the field of neurology and create more competition for patents and production of these medications, bringing cheaper prices and ultimately the opportunity for the "have nots" to enjoy the same benefits that the "haves" experience. It seems now that a continuous cycle will take place: more knowledge brings cheaper neuromedications, which brings more widely available drugs, returning us to the starting point of more knowledge. A cure for cancer may be the most highly pursued goal in medicine today but remains out of reach of current research. I have no doubt the cure will one day come as more studies proceed and more possibilities are explored. If it is possible to speed up this process by increasing brain capacity synthetically, then it is irresponsible and unethical to allow people to die waiting for this cure when the process can be sped up at little risk.

The final consideration concerns how deterministic these medications actually are. In discussing the possibilities, the medications are sometimes portrayed as smart pills that will immediately make a child of average intelligence a genius. This is assuredly not the case. These medications would give the capacity to learn but would not destine people for brilliance. So much of what individuals do is dependent on their passions. If Michael Jordan applied his efforts to physics instead of basketball, he may have been the greatest physicist the world has seen (4). What this medicine would do, then, is give people the opportunity to accomplish their desires and reach their potential. The onus would still lie on the individual to carry out their pursuits. The possibility does exist that medication would provide someone the ability to be successful, yet they would reject the opportunity--choosing to live the life of a degenerate. This provides a strong counter to the argument of the chemical separation

of classes because we are not providing a direct advantage but simply the ability to achieve an advantage. This medication would in no way guarantee a user would out-compete a non-user in the academic world; the responsibility would depend on the drive of the individual, something for which there is no enhancement drug.

Neurological enhancement is an exciting advancement in pharmacology. Already drugs exist that can favorably modify brain activity but off-label use for healthy individuals is either illegal or discouraged. A large concern over the proliferation of this technology is the widening of an intelligence gap between those who can afford the medication and those who cannot. While this is a logical concern, it is wrong to allow this to stifle the distribution of this technology. Allowing neurological enhancement would provide a growth in our understanding of the world and advance nearly every facet of human life. In addition, one cannot ethically handicap another person's ability simply because of unavailability to others. Farmers are not required to use the same universal equipment to harvest crops, and likewise, we should not subject everyone to the same medications or lack thereof. Also, these drugs would not cause deterministic qualities. Desire and will would ultimately decide the fate of an individual, but their mental capacities will be increased. Rejecting neuroenhancing medications on the grounds that some will not have access is morally wrong and irresponsible. Human knowledge is an incredible tool--and we have the opportunity to sharpen that tool.

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Instantiations of Biological Emergence: In Search of a Biochemically Rigorous Description of the Blastocyst Stage Human Embryo

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Professors Patrick Lee and Robert George have advanced a comprehensive scientific justification for the belief that human embryos are human beings. However, George and Lee's scientific evidence has been repudiated by members of the scientific community, claiming that it neither rigorously scientific, nor falsifiable. Yet, the very substance of biology proceeds via recognition of emergence—the idea that the activity, properties, and dynamics of a system is greater and distinct from that of the sum of its parts.

If the case for believing that human embryos are human beings is restated in exclusively molecular, biochemical terms, drawn up from experimental results and with recourse made to future experiments, it may be able to be scientifically evaluated as another instantiation of the emergent behavior that patterns the thought of molecular biology. To this end, I will translate Lee and George's reasons for believing a priori that a human embryo is a human being into biochemical terms. Biochemically, to say that an embryo is a whole, distinct human organism is to say that it possesses all of the developmentally relevant organizational structure. I will define chemically the embryonic developmentally relevant organizational structure as the establishment of chemical and electrical gradients which break embryonic symmetry and allow for spatial patterning. I will then show how this biochemical picture answers the strongest scientific objections to embryonic stem cell research.

Introduction

In the November 6, 1998 issue of *Science*, James Thomson at the University of Wisconsin-Madison reported the first derivation of human embryonic stem cells from human blastocysts. Unused cleavage stage human embryos produced through In Vitro Fertilization (IVF) were donated and cultured to the blastocyst stage. A blastocyst is an 100-150 celled structure whose formation begins approximately 5 days after fertilization, defined by an inner cell mass, whose cells develop into the embryo proper, and a trophoblast, whose cells go on to form the extra embryonic tissues.

Thomson isolated the inner cell mass from the trophoblast and cultured the resulting pluripotent¹ cells which were shown to be stable throughout months of undifferentiated proliferation. In the paper, Thomson described the three-fold utility of this discovery. From the standpoint of basic science, Human Embryonic Stem Cells (hESCs) offered insight into aspects of early human pre-implantation development not adequately represented by the standard murine (mouse) model. Of more clinical relevance, hESCs allow one to observe real time tissue differentiation and screen for substances that block that differentiation. RNA expression profiling² then allows one to quickly locate the gene targets of those substances. Additionally, embryonic stem cells provide access to limitless varieties and quantities of adult cell types that can be used for pharmaceutical screening and direct creation and harvesting of donor tissue.³

Thomson presents the derivation of human embryonic stem cells from blastocyst stage embryos as a basically morally innocuous scientific tool, simultaneously imbued with challenges to be overcome and possibilities to be realized. Trained to impose the simplifications of a parsed molecular view of life, the vast majority of those within the scientific community felt that the moral questions implicated by human embryonic stem cell research were, in fact, rather ordinary—how can one conduct the research with a sufficient amount of respect for the potential life utilized? How can one guard against the excesses of scientific curiosity resulting in things that would cross moral lines, like growing fetuses for spare parts, human cloning, and germ-line modification?⁴

On this view, opponents of human embryonic stem cell research seemed like opponents of innovative research in general, seeking to impose an unnecessary constraint on scientific liberty to protect an idiosyncratic belief that human embryos are human persons. The perceived incomprehensibility of this objection prompted some advocates of human embryonic stem cell research to posit that there must exist some crucial missing premise in the formulation of the belief that a human embryo is a human person and worthy of whatever dignity we afford human life. Some claimed that the

1 Pluripotent cells have the potential to form mesodermal, ectodermal, and endodermal tissues. As such, they differentiate into any fetal or adult cell type. However, they are distinguished from totipotent cells in that they are by definition incapable of producing a whole organism, as they have lost the potential to form extra embryonic tissues.

2 mRNA expression profiling identifies and quantifies global mRNA transcripts within the cell. mRNA is transcribed from DNA and later translated into proteins. This technology is useful because it provides insight into a cell's epigenetic state, or its differential gene activation and inactivation which determines its actual unique function, because mRNA is only transcribed from a DNA sequence if the gene is active.

3 Thomson, James A., et al., *Science*, 282, 1998, 1145-1147.

4 Sandel, Michael J. *The New England Journal of Medicine*, 351 (3), 2004, 207-208.

missing premise must be a religious one, invoking concepts of ensoulment, creation in the Divine image, or the sanctity of human life.⁵ Though rarely articulated in concrete terms, advocates seemed to hold that these presumed religious arguments were inadmissible to the public sphere according to the criterion of reciprocity in Rawlsian Political Liberalism.⁶

Yet consistently, the strongest opponents of embryo destructive research have, far from requiring reference to the dogma of a particular religious faith, held two fundamental beliefs about what ought to be done to ascertain the moral permissibility of human embryonic stem cell research. The first is that a sound and stable resolution to the question of what kind of thing an embryo is ought to be reached. After the first scientific question is answered, then it is necessary to consider whether, if a human embryo is considered a human being in the sense of one of the youngest members of the species *Homo sapiens*, that human being is also a human person, worthy of whatever moral respect and protection we deem comes with that status.

Emergence

Professors Patrick Lee and Robert George have advanced a comprehensive scientific justification for the belief that human embryos are human beings. According to George,

“the human embryo possesses all of the genetic material and other qualities needed to inform and organize its growth. The direction of its growth is not extrinsically determined, but is in accord with the information within it. Nor does it merely possess organizational information for maturation; it actively uses this information in an internally directed process of development. The human embryo, then, is a whole and distinct human organism—an embryonic human being.”⁷

George is arguing that, distinct from somatic cells, gametes, teratomas, and most importantly, human embryonic stem cells, human embryos are human beings in that they are whole, complete human organisms. His scientific evidence for this claim is that they direct their own “integral organic functioning”⁸ and “posses the genetic and epigenetic primordia and the active

5 Silver, Lee, *Challenging Nature: The Clash of Science and Spirituality at the New Frontiers of Life*, Harper Collins Publishers, New York, NY, 2006, pg. 118.

6 Rawls, John, “The Idea of Public Reason Revisited,” *University of Chicago Law Review*, 64:3, Summer 1997, pg. 769.

7 George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pg. 26.

8 Ibid, pg. 25.

disposition for self directed growth.”⁹ Yet as illustrated through their National Review Online exchange with Professor Lee Silver, George and Lee’s proposed scientific evidence for their belief that a human embryo is a human being is fiercely resisted by an overwhelming majority of biology faculty at major research universities.¹⁰

This is interesting because the very substance of biology proceeds via recognition of emergence—the idea that the activity, properties, and dynamics of a system are greater and distinct from that of the sum of its parts. It is through precisely this language that the behavior of the cell, the fundamental model and impetus for the molecular view of life, is understood. Two examples immediately come to mind: the collective behavior of the units of the cellular membrane and the aggregate of cellular organelles. The self-directed assembly of thousands of diacylphosphatidylcholine molecules into lipid bilayer¹¹ allows the maintenance of a “dissipative nonequilibrium”¹² whereby a reducing environment is retained against significant osmotic pressure. Yet, the cell is still allowed to engage in dynamic contact with its environment through cellular junctions and an unfathomable diversity of interacting macromolecular receptors. Using our second example, each type of cellular organelle plays a precise and defined role within the cell, and the majority are even partitioned off from the rest of the cell via their own lipid bilayers. Mitochondria harvest the energy that allows ribosomes to translate mRNA into protein, and the Golgi apparatus then packages that protein to be secreted to interconnected cells. On what basis do we recognize the unitive principle identifying these primarily membrane bound cellular organelles as constituents of a greater whole, but fail to recognize that same unity when we simply transfer our attention from intracellular to intercellular communication? Both of these examples represent remarkable instantiations of the same concept of emergence that Lee and George invoke in their description of the human embryo as a whole, integrated human organism. It is—of course—described differently within the nano-world of the interaction of small molecules and protein receptors, and veritably created exclusively through and open to effacement by experimental results.

9 George, Robert and Lee, Patrick, “Bad science, worse philosophy, and McCarthyite tactics in the human-embryo debate,” *National Review Online*, 03 October 2006, pg. 5 (online).

10 Silver, Lee M., “Embryonic Issues,” *National Review Online*, 22 January 2007.

11 These molecules have a polar headgroup and a non-polar tail. They form lipid bilayers, which sandwich the non-polar tails between two layers of polar headgroups, because doing so minimizes the energy of their interaction with the polar solvent molecules.

12 In chemistry we generally conceive of chemical systems as tending toward equilibrium. However, the complexity of the emergent behavior of the cell is such that it can avoid this pull toward equilibrium, for instance, as defined below, maintaining a reducing environment inside of the cell, rather than equilibrating with its environment.

Perhaps, then, if the case for believing that human embryos are human beings is restated in exclusively molecular, biochemical terms, drawn up from experimental results and with recourse made to future experiments, it can be scientifically evaluated as another instantiation of the emergent behavior that patterns the thought of molecular biology. To this end, I will translate Lee and George’s reasons for believing a priori that a human embryo is a human being into biochemical terms. As Lee and George present the argument, their “scientific” reasons (that the embryo is a “distinct... complete human organism,” “directs his or her integral organic functioning,”¹³ and has the “genetic and epigenetic primordia and the active disposition for self-directed growth”¹⁴) are defined recursively. An embryo is a whole distinct human organism because it directs its own integral organic functioning according to its epigenetically defined developmental trajectory, but it has a defined developmental trajectory because it is a whole, complete human organism.¹⁵ In order to translate these terms into interrelated but not self-referential molecular events, they need to be defined far more rigorously.

I will instead use these terms to connote successive, constructive biochemical concepts. Biochemically, to say that an embryo is a whole, distinct human organism is to say that it possesses all of the developmentally relevant organizational structure. In order to define what that structure is, I will present a definition of the requisite biochemical terms. Once I have done this, I will describe the embryo’s direction of its own integral organic functioning as directed cellular differentiation understood as a continually evolving proteome’s inaction of heritable epigenetic changes. In describing the embryo’s active disposition for self-directed growth, I will introduce the concept of proteomic responsiveness to intracellular and extracellular signaling factors and illustrate how this imparts well controlled embryonic plasticity. With recourse to these concepts, I will then define chemically the embryonic developmentally relevant organizational structure as the establishment of chemical and electrical gradients which break embryonic symmetry and allow for spatial patterning. I will then show how these biochemical pictures

13 George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pg. 26.

14 George, Robert and Lee, Patrick, “Bad science, worse philosophy, and McCarthyite tactics in the human-embryo debate,” *National Review Online*, 03 October 2006, pg. 5 (online).

15 Though the structure I cited earlier is the most common form of the argument, with the observations that a human embryo directs his or her own integral organic functioning and has an active disposition for self directed growth as the scientific evidence that the embryo is a whole, human organism, in other statements of the argument it appears there is an equivocation about in which direction the argument ought to proceed. See *Ibid* 14,

“A human embryo — precisely because it is a *complete member of the human species* — can develop towards maturity, given a suitable environment and adequate nutrition. The embryo possesses the genetic and epigenetic primordia and the active disposition for self directed growth towards the next more mature stage.”

answer the strongest scientific objections to embryonic stem cell research. Finally, on the basis of the results just discussed, I will propose a number of experiments that have the potential to answer the question of what type of thing a human embryo is at the molecular level by drawing distinctions between it, and embryonic stem cells.

Distinct, whole human organisms: Possession of a developmentally appropriate organizational framework

If human embryos are human beings, then it must be established that, in contrast to embryonic stem cells, adult stem cells, gametes, or adult somatic cells, they, and uniquely they, are distinct, whole human organisms. While recognizing a difference in form between parts of a whole and the whole itself is an immediately intelligible concept in philosophy¹⁶, it is surprisingly more difficult to describe the morphological and molecular prerequisites for this concept in scientific terms. This confusion is evidenced by Silver's assertion that embryonic stem cells can form whole organisms, presumably via tetraploid complementation, which will be discussed more fully later.¹⁷ We will therefore need to construct our own definition, and ought to construct it such that it draws correct distinctions between relevant test cases. For instance, we would like the definition to coherently distinguish between adult human organisms that have had their gallbladder removed but are still in the relevant sense of the terms functioning, whole members of the human species from "individuals" who have recently undergone brain death and are no longer functioning, integrated, whole members of the human species. The importance of the "brain death" criterion as marking the end of integrated human life illustrates a crucial distinction. In the first case, while an organ has been lost, the individual still possesses the organizational framework—at the adult stage of development, central nervous system function—that allows for the integration of the remainder of that organism's biological activities. In the second case, brain death has marked the irreversible inactivation of that central organizational hub of organismal function, such that the remainder of the organism's biological activities will continue only temporally and in an unintelligible, undirected manner.¹⁸

Adapting this definition to immature, developing organisms, then what it is to be a whole organism at that stage of development is to possess

16 Aristotle, *Metaphysics*, Book 8.6.1045a:8-10... The totality is not, as it were, a mere heap, but the whole is something besides the parts..."

17 Silver, Lee M., "The Biotechnology Culture Clash," *Science and Technology News*, 18 July 2006.

18 George, Robert, *Embryo Ethics*, Daedalus, Winter 2008, pgs 30-31. This would appear to be Michael Gazzaniga's position.

the entire organizational framework active at that stage of development that can catalyze development through sequentially further and continuous stages. If this is the case, then what's needed to show that human embryos exclusively are distinct, whole human organisms, while somatic cells, gametes, and embryonic stem cells are not, is a demonstration that they alone possess the complete organizational framework appropriate for their stage of development. An application of this definition to somatic cells and gametes is not difficult. Because somatic cells and gametes are derived from a human being at an advanced developmental stage, they are according to this definition, parts of an organism, rather than a whole organism, because they lack the central nervous system organizational framework of an organism at that developmental stage.

If there is a distinction to be drawn in organismal wholeness between a human embryo and a group of human embryonic stem cells (to look at the most exacting case it is pertinent to consider a group of embryonic stem cells that has formed an embryoid body and is about to begin differentiation), we need to understand what the developmentally appropriate organizational framework for a human embryo is, and show that the embryoid body does not have that framework. In order to understand the biochemical substance of that developmentally appropriate organizational framework, we first need to understand the molecular attributes of embryonic self-directed growth.

Biological Background

The biological definition of species prompts us to identify an embryo begotten from the gametes of human parents as a human type of life, rather than, for instance, a murine type of life, in part because of the embryo's genetic homology with the other members of the human species. However, while useful in explicating the ecological category to which some biological presence belongs, it cannot answer the question as to whether that living thing or group of things is actually an organism in the sense of being an integrated, whole member of that species. Ronald Bailey has argued that if human embryos are human organisms in the sense that they have the potential to develop into human life, then all of our somatic cells must be human organisms as well. They contain the full human genetic code, and have only taken on differentiated, specialized forms, as portions of that genetic code

have been turned off.¹⁹

While this argument can be defeated, it does highlight a central difficulty of selecting one thing as opposed to other similarly constituted things as an organism of a certain type with regard to mere genomic similarity. A factor much more central in defining the existence of a biological substance is its epigenetic state, a concept which has been understood with varying specificity as our understanding of the molecularity of molecular biology has evolved. Once comprehended as the series of non-genetic changes that explain the process of differentiation of all phenotypes of cells from one initial embryonic cell, epigenetics now connotes “the study of changes in gene function that are mitotically and/or meiotically heritable and that do not entail a change in DNA sequence.”²⁰ Those changes usually take the form of an alteration in miRNA expression²¹, DNA methylation patterns, or chromatin structure.²² DNA methylation usually refers to the methylation of cysteine residues in CpG islands.²³ CpG islands are regions with a high frequency of CpG repeats and are usually found in promoter regions where they function to regulate gene transcription. The methylation of CpG cytosine residues generally down-regulates transcription of the downstream gene.²⁴

In turn, alternation in chromatin structure is mediated by post translational modification of histones, the nuclear alkaline proteins that compact and organize DNA by forming hetero-octamers which form the core DNA-binding component of nucleosomes, which are heteromeric protein structures around which DNA is wound to compact and organize it. Those

19 Therefore, procedures like SCNT, somatic cell nuclear transfer, (or, more recently, induced pluripotent stem cell derivation) that activate those deactivated genes are the means by which this potential life is realized. But clearly, we would think it unreasonable to extend the moral significance of human life to each of our somatic cells, so it must be the case that we should not view embryos as morally significant forms of life because of their potential to become human persons. This argument can be attacked from two grounds. First, the analogy itself does not hold up—a more accurate correlate for the relationship of somatic cells to human existence would be gametes, not embryos; for in embryos, the process of fertilization and the subsequent initiation of self-directed growth and development has already taken place. Second, the analogy includes an equivocation on the meaning of the word “potential.” An embryo is a potential human life in the sense that, if development progresses according to its self-directed plan, it will mature into a fetus, an infant, a child, and an adult. According to George, “potential” here merely expresses the lack of certainty of the outcome of already initiated biological events. Human somatic cells represent potential human life only in so far as they have the “potential” to be acted upon by an extrinsic outside force which can transform them into an entity with a substantially different developmental plan. The resulting entity, importantly, is equivalent to a human embryo and is thus a “potential” human life in the same way that an embryo is a “potential” human life. (George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pgs 29-30.)

20 Wu C, Morris JR. *Science* 293:1103-1105. 2001.

21 miRNA expression is expression of 18-25 base pair RNA sequences that prevent translation of RNA transcripts by binding to their 3' regulatory regions

22 Altun, G. *Journal of Cellular Biochemistry* 109:1-6, 2010.

23 The CpG nomenclature connotes that on a single 5'-3' stand of DNA, a cysteine residue is connected via a phosphodiester bond to a guanine residue. This is to distinguish this single stranded sequence from hydrogen bonding between cysteine and guanine residues on complementary strands.

24 Bibikova, M. *Genome Research* 16: 1075-1083, 2006.

nucleosomes are then organized into higher order structures, such as the 30 nm and 100 nm zig-zag fiber structures that are usually found in cells and that are the structures partitioned during mitosis and meiosis.²⁵ There are multiple hypotheses for how histone modification affects gene transcription²⁶, but the consensus seems to be that this modification involves alterations in histone tertiary structure that collectively affect the strength and reversibility of histone binding to DNA. However, the process is actually more dynamic than this simple picture connotes, as the presence of transcription factors that attempt to bind to the upstream regulatory sequence of genes to be transcribed actually influences chromatin structure by altering the binding dynamics of the histones and DNA.²⁷ It seems clear, then, that while epigenetic changes certainly constitute an important part of heritable cellular phenotype, the molecular basis of such changes are intimately bound up with the proteomic state of the cell, or the aggregate state of expressed cellular proteins, encompassing their post-translational modifications and interactions. It is histone (protein) post-translational modification, and transcription factor (protein) binding, which influences chromatin structure. Epigenetic changes themselves are phenotypically meaningful only in that they influence the identity and amount of proteins transcribed. Proteins are the units that actually carry out diverse cellular functions, from harvesting energy through the hydrolysis of ATP bonds to acting as the elements of cellular organization through cytoskeleton formation and protein and organelle translocation. Recent research indicates that most cellular processes are carried out by complexes of 10 or more distinct proteins, so protein-protein interactions define the kinetically fluctuating cellular microenvironment.²⁸ Describing cellular phenotype in terms of the proteomic state of the cell, then, reveals information that an epigenetic description does not convey. Epigenetic differences describe mitotically and meiotically heritable non-genetic changes observed among different cell types with a single genetic code and proteomic differences describe the dynamic in large part extra-nuclear changes that simultaneously affect epigenetic information and carry the cell from one epigenetically static nuclear state to another and, as such, define the actual physiological continuity of

25 Luker, K. *Nature* 389 (6648): 251-260. 1997.

26 The three most common hypotheses are the charge neutralization hypothesis, which claims that histone modifications affect the charge of the protein which affect its electrostatic interactions with the negatively charged DNA and thus the tightness of chromatin packing. The histone code hypothesis claims that histone modifications act collectively within a given region to signal or repress the transcription or translation of a downstream gene. The signaling pathway hypothesis is similar to the histone code hypothesis, except that in this account, collective histone modifications within a certain region allow for the binding of enzymes which act to alter chromatin structure.

27 Stros, Michal, *Biochimica et Biophysica Acta—Gene Regulatory Mechanisms*, 1799:1-2, 101-113, 2010.

28 Alberts, Bruce, *Cell*, 92, 291-294, 1998.

cellular differentiation and difference. If we want to look at the differences between two closely related groups of cells and posit that one has a different developmental trajectory than another, we should examine proteomic differences between those two types of cells or distinct organisms. Those proteomic changes are an extraordinarily sensitive and dynamic and sensitive assay of differential cellular physiology and collectively and sequentially define the continuity between epigenetic states we would usually identify with particular cellular phenotypes.

Directs his or her own integral organic functioning: cellular differentiation understood as a continually evolving proteome's inaction of heritable epigenetic changes

From this vantage point, we can understand what it means in biochemical terms to say that an embryo “directs his or her own integral organic functioning.” This implies that embryonic differentiation is regulated by continual epigenetic changes, most notably through DNA methylation and chromatin packing mediated silencing of genes, affected by proteomic changes. However, the proteomic alterations themselves are not heritable, so it is the coordinated epigenetic modification that allows this differentiation process to progress continually through an untold number of cell divisions. This description makes one difference between human embryos and human embryonic stem cells and teratomas apparent. Recent research has indicated that embryonic stem cells have a unique epigenetic signature distinct from that of adult stem cells, embryonal carcinoma cells, lymphoblastoid cells, and adult somatic cells. In particular, human embryonic stem cells show differential CpG methylation in the promoter regions of genes relating to nuclear and extracellular signaling, stress response, apoptosis, cell cycle control, and growth factor receptor genes.^{29, 30} The methylation state of the studied genes did change slightly with prolonged culture, but the changes were not predictable and were minimal in comparison to the epigenetic differences that clearly separated the cell types into distinct classes. Like embryonal carcinoma cells, embryonic stem cells have an epigenetic state and proteomic profile that remains relatively consistent with time³¹. This is in marked contrast to the epigenetic state of the human embryo, which is dynamically changing as regions within the embryo become more and more epigenetically and proteomically distant from one another with each successive cell division.

29 Ibid 22.

30 Nuclear and extracellular signaling: THBF2, IL13, IL16, TNF, MSF, P13; stress response: ASC, CASP8; cell cycle control: CDK1B, RASSF1; growth factor receptor: FGFR3, TGFBR1

31 Excluding, of course, the possibility that they have been induced to differentiate.

One could argue that embryonic stem cells form embryoid bodies in culture when the culture conditions are not sufficient to allow for embryonic stem cells to adhere to the surface of the culture medium, and that these embryoid bodies recapitulate the differentiation events observed in embryonic development. However, if allowed to progress, embryoid body formation involves the generation of a mass of disorganized cell types, progressing with a clear lack of developmental trajectory. Once the trophoblast has been removed, the cells of the inner cell mass are no longer receiving the precise cocktail of secreted growth factors and signaling molecules responsive to their own growth and development that facilitates their further growth. Thus, even when spatially reunited, the embryonic stem cells derived from the blastocyst inner cell mass can no longer operate as a cohesive unit. Thus, the epigenetic and proteomic changes are random rather than dynamic within the bounds of an organizationally predictable plan. Embryonic stem cells, then, in contrast to the complete human blastocyst, cannot be said to direct their own integral organic functioning. While they “posses organizational information for maturation,” they cannot be said to “actively use this information in an internally directed process of development.”³²

Genetic and Epigenetic Primordia and the Active Disposition for Self-Directed Growth: Proteomic responsiveness to intracellular and extracellular signaling factors imparts well controlled embryonic plasticity

Closely related to this discussion is the fact that human embryos, unlike embryonic stem cells and embryonal carcinoma cells, can be said to have the “genetic and epigenetic primordia and the active disposition for self-directed growth.” Biochemically, “genetic and epigenetic primordia” connotes an epigenetic and related proteomic state in which the embryonal cells are responsive to precisely controlled extracellular signaling factors. Those extracellular signaling factors are either maternal hormones that are particularly important in regulating blastocyst implantation into the uterine lining, or simply components of the secretome (the aggregate of a cell's secreted proteins) of adjacent cells. It is this responsiveness which characterizes embryonic well-controlled plasticity. Because upon blastomere isolation from the inner cell mass the spatial gradient of transcription factors and epigenetic alterations has been lost, this information cannot be regained when embryonic stem cells are simply subjected to differentiation appropriate culture conditions. This proteomic plasticity has been illustrated through Katz-Jaffee's work on large-scale proteomic analysis of pre-implantation embryos. Katz-Jaffee has shown

32 George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pg. 26

that six proteins are correlated with distinct blastocyst developmental stages and are differentially expressed among early blastocysts, expanding blastocysts, and degenerating blastocysts. Among these are parathyroid-hormone related peptide and epidermal growth-factor-like growth factor precursor, which are both implicated in embryogenesis.³³ In contrast, taking the human stem cell epigenetic state to be indicative of its proteomic state (as there have been no direct proteomic measurements), major changes in epigenetics only occur through laboratory-induced differentiation, which is by definition not proteome mediated self-direction along a developmental trajectory.

A developmentally appropriate organizational framework: directed inter-cellular transport facilitates the establishment of chemical and electrical gradients which break embryonic symmetry

Now that we have established a description of the early embryo's basic functions, we can return to our original question by asking what sort of organizational framework is necessary to coordinate these functions. The answer lies in the mechanism of embryonic patterning by which a symmetrical, single-celled zygote, through successive cell divisions, establishes three orthogonal axes of asymmetry and, as such, lays down the body plan for its own development. This is accomplished via the asymmetric partitioning of transcription factors, secreted small molecule signaling factors, and ions such that intercellular transport becomes directional, meaning that it can only occur in one way. This is accomplished in the embryo primarily via two mechanisms: specific cytoplasmic receptors and gap junctions.³⁴ Thus, to say that a group of embryonic stem cells initially derived from the inner cell mass of a human embryo and that has now formed an embryoid body is not a distinct, whole human organism, while the human embryo from which it was derived was a distinct, whole human organism, is to assert that, with digestion of the trophoblast or microsurgical removal of the inner cell mass, the blastomeres have lost their spatial asymmetry. With the loss of that asymmetry comes the loss of their ability to contribute in a regulated manner to the body plan of the developing embryo.

In order to describe how the isolation of blastomeres from the inner cell mass and the removal of the trophoblast contributes to the loss of spatial asymmetry in transcription factors, intercellular signaling molecules, and ions in more concrete scientific terms, it is necessary to briefly review how membrane receptors for specific relevant signaling pathways and gap junc-

tions establish embryonic patterning.

The Notch signaling pathway has been known to be active in embryonic post-implantation development, but recent results suggest that it may be involved in a much earlier establishment of asymmetry. The Notch gene family encodes a group of transmembrane receptor proteins that, when activated by one of its ligands, Delta or Serrate, are cleaved by cellular proteases and translocate to the nucleus where they interact with CSL DNA binding proteins (types of transcription factors) that regulate expression of target genes.³⁵ A pre-established ligand spatial gradient would then lead to further directional gene activation. It has thus been suggested that Notch signaling relies on Wnt pre-patterning, buttressed by known molecular interactions between signaling cascade partners.³⁶

The role of the Wnt and Notch signaling pathways in the establishment of embryonic asymmetry has been extensively studied. Wnt signaling is highly involved in body axis specification and the establishment of morphogenetic signaling gradients in the early embryo. Briefly, beta-catenin is a protein component of adherens junctions, another type of cellular interface which facilitates cellular growth and adhesion. However, when beta-catenin builds up in the cytoplasm, it is translocated to the nucleus, where it interacts with the TCF and LEF family of transcription factors to mediate transcription of certain genes. Wnt proteins are secreted proteins that, when they interact with their cell surface receptor, Frizzled, prevent the phosphorylation of beta-catenin (a post-translational modification) that targets it for destruction. The formation of these Wnt gradients, then, breaks the symmetry of the early embryo and allows for spatial patterning.³⁷ -catenin has been hypothesized to interact with Cx43, a connexin, in cardiac myocytes and osteocytes. This interaction implies that gap junction transport may facilitate Wnt regulation of embryonic preimplantation development. Though the precise nature of the interaction is unknown, their colocalization may imply that the Wnt ligand is transported through gap junctions.

Gap junctions describe the hydrophilic interface between two hexameric protein channels, called connexons, on neighboring cells. Gap junctions can be formed between either homotypic (identical) connexons, or heterotypic (non-identical) connexons. The connexons themselves are called homomeric if the connexin monomers from which they are formed are identical, and heteromeric if they are not. The connexin transmembrane regions and extracellular loops are usually conserved, and connexin diversity is imparted

33 Katz-Jaffee, M., *Fertil. Steril.* **2006**, 85, 101-107.

34 Levin, M., *The Journal of Membrane Biology*, **185**, 177-192, 2001.

35 Cormier, Sarah, *Gene Expression Patterns*, **4**, 713-717, 2004.

36 Hayward, Penelope, *Development*, **135**, 411-424, 2008.

37 Niehrs, Christof, *Development*, **137**, 845-857, 2010.

via variation in the intracellular domains. The intracellular domains are also post-translationally regulated by the cell.³⁸ A variety of classes of cellular proteins have been shown to interact with and regulate connexin function, including zona occludens-1 protein, cadherins, -catenin, claudins, tyrosine kinases and phosphatases, serine kinases and phosphatases including mitogen-activated protein kinase, and cytoskeletal proteins such as microtubules and tubulin.³⁹ It is this proteome mediated post-translational modification of connexins that determines which gap junctions can interact with each other and which cannot. Additionally, gap junction post-translational modification allows for the establishment of spatial gradients within the developing embryo by changing a given gap junction from an open channel to a one way valve for small molecules. At the multicellular level, this would imply the establishment of a morphogen gradient which would then induce differential gene expression according to this gradient and further spatial specification.⁴⁰ Gap junction mediated directional diffusion of chemical signaling molecules at the embryonic midline has been proposed as the mechanism by which left-right asymmetry is established in the embryo.^{41, 42} Pharmacological agents can turn off gap junction transport, and it has been demonstrated that pharmacological inhibition of gap junction transport between the morula and gastrula stages of embryonic development results in heterotaxia, or an abnormal patterning of internal organs and body parts.⁴³ Thus, destruction of spatial asymmetry within the blastocyst stage and randomization of the established morphological gradients via inner cell mass isolation and dissection destroys the functional organizational network of the embryonic stage of human development. Embryonic stem cells, thus, are not whole human organisms, while human embryos are, because they lack this fundamental organizational network. Without it, although they possess the raw “organizational information for maturation,” they cannot “actively use it.”⁴⁴

Answering Objections

“A thing either is or is not a human being”

A fundamental test of the validity of this molecular reformulation and experimental description of Lee and George’s claims is how it deals with the strongest scientific objections to the formulation they have put forth.

38 Raymond, CB., *Stem Cell Rev*, 4, 283-292, 2008.

39 Giepmans, BN, *Cardiovascular Research*, 62:2, 233-245.

40 Levin, M., *The Journal of Membrane Biology*, 185, 177-192, 2001.

41 Levin, M., *Genes Development*, 12, 90-105.

42 Levin, M., *Development*, 126, 4703-4714.

43 Levin, M., *J. Membrane Biol.*, 185, 177-192, 2001.

44 George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pg. 26.

One objection is an immediate and far-reaching one, striking at the very coherence of the desire to understand what kind of entity a human embryo is. Silver claims that the belief that “a thing either is or is not a human being” is a theological or philosophical notion, ill-suited toward describing the complexities of current molecular biology.⁴⁵ Silver’s outright rejection of this seemingly apparent truth can be understood in one of two ways.

First, one could attack the concept of a discrete “human species.” This denial could come about either through nominalism, which denies the existence of universal forms, or through a mere recognition of the fact that if species is defined in large part by genetic homology, then because of the natural genetic variation among individuals from different geographic locations and historical periods, it’s difficult to conceive of a threshold level of homology required to carve out the human species. If Silver’s objection is to the concept of a human species, then it is difficult to conceive of a biological reason for his advancing that semantical objection exclusively in this case. Molecular biology is an experimental science, with its precepts dictated and revised via experimental results in model systems. To attack the concept of species and assert that a biologist is not really describing anything when he explains that one is using an *E. coli* model system to study Thioredoxin Reductase seems a foggy attack on linguistic forms in general, not a pointed invalidation of the biologist’s experimental results.

Second, he could be saying that organisms below a certain age do not qualify as organisms, and so the question as to whether an embryo is or is not a human organism is poorly put. It is difficult to conceive of a biological justification for this idea, or of an explanation for the way in which a unitary organism with a consistent developmental trajectory becomes identifiable member of its species only after certain necessarily arbitrary biological events have taken place. It is tempting to return Silver’s imploration to “Tell me what the molecular correlates are for such an event.”⁴⁶ It seems that, here, Silver and others have conflated the idea of personhood with that of biological identity.

Finally, Silver could attack the very idea of emergent behavior, claiming that a human embryo is fundamentally a group of cells, but defined exclusively as the sum of its parts. If we consider each of those cells separately, then molecular biology itself traces and defines the emergent behavior of its complex microenvironment. Protein-protein interactions, DNA methylation and chromatin remodeling, plasma membrane receptor signaling, temperature and voltage control, mitosis and meiosis, and the directed interactions of cellular organelles all represent the complexity of intracellular dynamics. Yet if

45 Silver, Lee M., “The Biotechnology Culture Clash,” *Science and Technology News*, 18 July 2006.

46 Silver, Lee, “Human Issues,” *National Review Online*, 19 October 2006.

we admit the phenomenon of intracellular communication, it becomes clear that these cells are not simply interacting with their environment, but in a dynamic non-equilibrium with each other, responding and reacting according to a larger developmental plan. To reject the principle of emergence on the organismal level denies the possibility of multicellular life, which is clearly not the result of a sound recourse to biological reasoning. It seems, then, that if we are to reject the idea that human embryos are human organisms, it is specifically because they are not human organisms, as opposed to affording ourselves the biologically questionable luxury of claiming that they are some other unspecified thing entirely.

Embryonic Spatial Differentiation Controlled by Maternal Signaling at Implantation

The majority of studies on embryonic pre-implantation development have been done in non-human model systems, most commonly in mice. Manipulation of murine embryos does not implicate the same moral questions as manipulation of human embryo and the temporally defined gene expression profiles are more precisely defined. However, the inherent limitation in the direct applicability of these studies is that lack of complete correspondence between murine and human pre-implantation development.

Many have argued that, while in other species, we see indications of bilateral symmetry from the oocyte stage onward, the lack of this delineation in human oocytes and early blastocysts implies that the embryo is dependent upon maternal signaling in order to establish its asymmetric body plan. The argument proceeds, then, that we cannot therefore cite the establishment of embryonic patterning and asymmetry as evidence of a unified organism, because this crucial step is something that happens to the organism, not something that the organism itself actively directs.⁴⁷ Others have claimed that a malleable embryonic polarity is actually established considerably sooner, with the penetration of the spermatozoon into the oocyte.⁴⁸ If embryonic polarity is established sooner, then the argument goes, it is easier to conceive of the embryo determining its own self-fate in the determination of the embryonic body axis. As George has described, this is still an actively debated concept in molecular biology.

However, the biochemical picture expressed here renders the outcome of this debate insignificant. In order to understand why, it is helpful

47 George, Robert, *Embryo Ethics*, Daedalus, Winter 2008, pg. 34. Quoting Hans-Werner Denker, "Early Human Development: New Data Raise Important Embryological and Ethical Questions Relevant for Stem Cell Research," *Naturwissenschaften* 91 (1), 2004: 21ff.

48 Ibid.

to examine just what would be implied about embryonic wholeness and self-integration were maternal signaling factors (during implantation or otherwise) to influence specification of the embryonic body axis. What would be different if the original chemical gradient to which the embryo responds were maternally rather than self-generated? The answer is, very little. What is important here is not the origin of the original chemical gradient to which the embryo responds, but its ability to respond with a remarkable degree of directed proteomic plasticity to the differential activation of its transmembrane receptors. The protein post-translational modifications and protein-protein interactions brought about by the embryonic response to that gradient catalyze epigenetic changes which entail differential gene expression and the establishment of further orthogonal morphological gradients. It is not the identity of the original gradient, but the embryo's ability to dynamically respond to it that defines its existence as a unified, whole, human organism.

Further, the signaling pathways and signal transduction events described in this paper are active in the human blastocyst in *in vitro* culture. If the human blastocyst were not an integrated, whole human organism, continually realizing proteomic mediated epigenetic changes that carry it from one developmental state to another through successive cell divisions, than it would not be able to thrive in *in vitro* culture, where molecular signaling gradients are absent.⁴⁹ But because this progressive development clearly does take place, distinct from the disorganized differentiation of an embryoid body, we have no reason to assert that the human blastocyst can direct its own integral organic functioning only after exposure to maternal signaling gradients.

Tetraploid Complementation

Tetraploid complementation is a molecular biology technique used to more easily produce animals with foreign genes or significant genetic mutations. In this technique, a two-celled embryo is fused via an electrical current, such that the resulting unicellular embryo now has 4 sets of chromosomes and is tetraploid. Though it can develop to the blastocyst stage and implant into the wall of the uterus, a tetraploid embryo is not capable of proper subsequent development into a fetus. However, it can effectively form the extra-embryonic tissues. This extra-embryonic tissue can be added to an inner cell mass like structure grown from embryonic stem cells to produce "chimeric" embryos. Silver has (indirectly) claimed that the feasibility of tetraploid complementation fundamentally challenges the belief that human

49 Intimately related to the cell fate decisions inherent in the transition to the blastocyst stage is the intercellular communication described in this paper which lay the foundations of embryonic asymmetry.

embryos are distinct, whole members of the species homo sapiens, while human embryonic stem cells are something less than that, asking,

“If there are a million cells in the dish, and you separate all the cells, then you have a million human beings. But you can then put them back together to form a single organism. What happened to the 999,999 human beings?”⁵⁰

The argument is that human embryonic stem cells, in forming the constituents of the ICM in tetraploid complementation, are able to form all embryonic tissues. If this is true, then it does not make sense to say that there is a fundamental difference between a human embryo and a group of human embryonic stem cells. Silver’s dubiously stated initial challenge can be restated in more feasible terms. If a human embryo is destroyed by isolating the blastomeres from the inner cell mass, grown up as a group of embryonic stem cells, and then somehow “recreated” by surrounding those now aggregated stem cells with other cells capable of forming the extra-embryonic tissue, then it seems we’re introducing an alarming amount of complexity to claim if we must hold that the initial embryo has died and then been somehow recreated. Consistent with the search of scientific simplicity, it would make much more sense to hold that the potential of the embryo to continue to grow as a dynamic, developing entity has been destroyed, but in a sense not significantly different from that in which the same potential is destroyed through the cryogenic freezing of excess embryos in IVF. In both cases, the revival of the embryo’s ability to actively develop and differentiate itself relies on human action, whether it is controlled thawing or culturing with previously derived tetraploid cells, both precipitate a substantial change in the embryo’s growth.

A feasible answer to this objection is that while the claim that a human life has ended and been created may be undesireably complicated, it is the simplest, and most scientifically valid, description of the events that have taken place. Dye-labeling experiments have been used to assess the intercellular communication between blastocyst cells and have revealed significant gap junction permeability between cells of the inner cell mass and trophoblast.⁵¹ This implies that there is significant exchange of transcription factors, chemical morphogens such as Wnt proteins and the Notch ligands, and ions, resulting in the establishment of dynamic chemical and electrical gradients across cell types. As previously described, these gradients, encom-

50 Silver, Lee, M., “The Biotechnology Culture Clash,” *Science and Technology News*, 18 July 2006.

51 Dale, B., *Molecular Reproduction and Development*, 29, 22-28, 1991.

passed when describing the proteomic state of the cell, promote differential gene activation and facilitate further cell fate decisions. Though it appears that when the embryonic stem cells are able to reform into an inner-cell-mass-like entity they can regain their spatial asymmetry, they do so through dynamic signaling with an entity of different genetic and epigenetic identity. Thus, the resulting embryo is not numerically continuous⁵² with the one that has been destroyed, and the most scientifically valid description of the process is, in fact, to hold that embryonic death has occurred and another embryo has been created.

As Lee and George describe, while it has been possible to produce murine trophectoderm stem cells simply by allowing the cells isolated from the trophoblast to grow in appropriate culture media, similar success has not been met in attempts to produce human and non-human primate trophectoderm stem cells.⁵³ While OCT4, CDX2, NANOG, AND FOXD3 are thought to have some role in trophoblast stem cell differentiation, the precise nature of that role, as well as the delicate balance of expression that would partition cells toward a trophoblastic pluripotent state rather than an embryonic pluripotent state, has not been identified. In addition, attempts to create trophoblastic stem cells from overexpression of these transcription factors have not been successful.⁵⁴ Were these efforts successful, and it became practically feasible to grow trophoblastic stem cells out of the removed blastocyst trophectoderm, then the question of whether the resulting entity was numerically continuous with the embryo destroyed via the process of isolation would be a different one. It is true that it certainly would have undergone a substantial change, an induced disaggregation into a state where it is no longer able to direct its own integral organic functioning, and then a radical re-aggregation into a state where that again becomes possible. If the technology developed to a point where we could say with certainty that no significant epigenetic changes were introduced in the isolation of the trophoblast and inner cell mass (unlikely, given the importance of the signaling processes reviewed here), it is at that point that we would first be faced with the question of whether a singular human life was destroyed and then recreated, or simply forced into some latent state and then revived, as is the case with the cryogenic freezing and thawing of IVF embryos. However, it would still be incorrect to say that a human embryo is equivalent to a group of embryonic stem cells. Rather, a human embryo would be equivalent to

52 George, Robert and Lee, Patrick, “Human Beings Are Animals,” *Body-Self Dualism in Contemporary Ethics and Politics*, Cambridge University Press, 2008, pgs 8-9.

53 Lee, Patrick, and George, Robert., “A Reply to Lee Silver,” *National Review Online*, 3 October 2006.

54 Douglas, *Endocrine Reviews*, 30:3, 228-240, 2009.

disaggregated groups of embryonic stem cells and trophoblastic stem cells, derived from that same human embryo, so long as no significant genetic or epigenetic changes have ensued, if and only if they will eventually be recombined with no genetic or epigenetic consequences of that recombination, which clearly significantly weakens the claim.

Even if this watered down form of the claim, the belief that two parts of a whole, physically separated from one another, are equivalent to the whole if no alteration in the whole's functioning is induced upon separation and reintroduction, still seems to introduce metaphysical uncertainties that the generally applied reductionist, molecular description of life avoids. Further, it seems peculiar that a molecular biologist must recognize a dynamic property of emergence in the cell that is the substance of the molecular microenvironment on which their inquiry is based,⁵⁵ and fail to translate this recognition to an organismal level of complexity.

Monozygotic Twinning

Some have argued that the possibility of monozygotic twinning, or the splitting of the blastocyst into two structures that develop into separate but genetically and epigenetically identical embryos, entails that the blastocyst must not be a unified, whole organism, but only a group of loosely connected and contingently interacting cells.⁵⁶ The belief is that if the intercellular interactions were so definitive as to mandate the description of this entity as a complete organism, then the cleavage event should either not be able to occur or should be so disruptive as to render the associated production of two healthy embryos an impossibility. This argument is similar to the argument from tetraploid complementation. There, the question was what the ability to put parts back into a supposedly functional whole says about the equivalence of the whole and its constituent parts. Here, the issue is what the ability of a functional whole to divide into functional parts says about the self-integration of the whole. Naturally, then, the refutation will follow a similar format.

As discussed throughout this paper, what defines the "wholeness" of the blastocyst stage embryo is its possession of its developmentally relevant organizational information, molecularly defined as the spatial organization of chemical and electrical gradients. This is made possible via the proteomically mediated epigenetic changes that induce and repress certain genes, coding for proteins which secrete these small molecules and transcription factors.

55 Mann, Stephen, *Angew. Chem. Int. Ed.*, 47, 5306 – 5320, 2008.
56 George, Robert P., *Embryo Ethics*, Daedalus Winter 2008, pg. 26.

Continuity of cellular development is facilitated by the proteomic plasticity which assures that the cell can be responsive to these gradients. So long as the blastocyst is viable, that is, adequately progressing along its developmental trajectory, then these factors exist in the blastocyst prior to the twinning event.

Research on IVF embryos indicates that we have no indication that insufficient intercellular communication or integration results in the twinning event. Rather, twinning usually results from a natural or artificial weakening of the zona pellucida.⁵⁷ If the zona pellucida is weak in some places, then instead of degrading uniformly during zona hatching, a hernia type structure develops where the ICM begins to protrude through the weakened area. In the process of hatching through this weakened zona pellucida, the ICM splits into two separate structures. This splitting is not a result of insufficient intercellular communication between blastomeres, rather, it is a direct consequence of the limits of the physical strength of the association between adjacent cells, weakened significantly by the process of herneation. Hence, it tells us nothing about the self-integration and wholeness of the blastocyst prior to the twinning event.

Proposed Experiments

Far from being a matter inaccessible to science, when rephrased in more experimental biochemical terms, the claim that a human embryo is a different kind of thing than a group of human embryonic stem cells, or less relevantly, a somatic cell, a teratoma, or a gamete admits multiple sources of experimental verification.

In testing the claim that an embryo is uniquely a whole, distinct human organism, which contains the total of its developmentally appropriate organizational framework via the gradients of transcription factors and chemical morphogens established by protein-protein interactions with trans-membrane signaling receptors and translocation through gap junctions, two types of experimental designs can immediately be envisioned. The first involves monitoring the localization of chemical morphogens through fluorescent probes and confocal microscopy. A signaling protein of interest, for example, Wnt1 (one of the human Wnt proteins), can be tagged with Green Fluorescent Protein, and its distribution throughout the inner cell mass of a human embryo can be statistically compared to its distribution throughout an embryoid body formed via the aggregation of embryonic stem cells. Likewise, fluorescent dyes have been used to monitor transport of proteins

57 Alikani, Mina, *Human Reproduction*, 9:7, 1318-1321, 1994.

through embryonic gap junctions.⁵⁸ The distribution of Lucifer Yellow, a large organic dye, can be monitored throughout the inner cell mass of an embryo and contrasted with its distribution throughout an embryoid body. Alternatively, co-immunoprecipitation experiments can be preformed that can look for proteins which interact with gap junctions in the inner cell mass of human embryos and in embryoid bodies. If the interacting partners are different, or if the inner cell mass reveals significant spatial organization that the embryoid body does not, then we would conclude that the trophectoderm must have some kind of regulatory effect on the inner cell mass, such that an embryo is an entity substantially different from simply an aggregated group of embryonic stem cells. As such, we would conclude that something has been lost, a nascent form of human life, in blastocyst disaggregation.

To test the related claims that, unlike a group of embryonic stem cells, an embryo directs its own integral organic functioning, and has the epigenetic primordia for self-directed growth along its developmental trajectory, two sets of experiments can be envisioned. One experiment would look at the CpG methylation state of genes known to be important in embryonic development. Looking at the methylation state of the entire genome would not be experimentally feasible given current technology.⁵⁹ The other experiment, more telling because it captures cellular dynamic fluctuation, is to construct a comparative proteomic analysis of a human embryo and a group of embryonic stem cells. If this analysis reveals differential expression of a statistically relevant number of proteins, indicating that the difference in expression is substantial rather than resulting simply from genetic differences between the embryo considered and the embryo from which the embryonic stem cells were derived, then one would conclude that embryos are not equivalent to embryonic stem cells, and must be described as some other type of scientific entity.

A practical issue with these experiments becomes immediately apparent. To conduct a proteomic analysis on an embryo, that embryo must be destroyed. Thus, the same ethical considerations we would be trying to test the scientific basis for, would govern the gestational age of the embryos we may examine and threaten to render the examination itself undesirable. However, Katz-Jaffee has developed a protocol whereby the secretomes of human embryos, or the signaling proteins secreted into cellular culture medium, can be examined and compared with a previously established fingerprint of embryonic viability.⁶⁰ A comparative analysis of the secretomes of human

embryos and human embryonic cells would both reduce the computational cost of the data collection and eliminate the destruction of possible human life necessary for the other protocol.

Types of Knowledge

Interestingly, Katz-Jaffee established this method so as to assess the viability of human embryos considered for implantation in IVF. Interpretations of experimental evidence can only go so far as to claim that a human embryo appears to be a different type of thing than a group of embryonic stem cells, a teratoma, a somatic cell, or a gamete. When examined in exclusively reductionist terms, the jump from the claim that there exists a significant possibility that a human embryo is not the same thing as a group of embryonic stem cells to the claim that it is not equivalent to a group of human embryonic stem cells, nor to any other type of cell, and that it represents the unique, nascent beginning of human life is a large one. Perhaps, rather than attacking a principle as fundamental as biological emergence, Silver and other proponents of embryo destructive research would attack this crystallization of experimental evidence into a statement about human life as being a step unmandated and therefore unsupported by scientific reasoning.

This more powerful line of attack can be answered, however, if we remember the necessity of applying other types of reasoning, including that from which the scientific theories themselves were constructed, and the kind we use to describe concepts in our everyday world. That the purpose of Katz-Jaffee's research on the embryonic secretome is to identify embryos with the highest chance of implantation and successful development through and beyond healthful human birth implies a recognition of numerical continuity between the human embryo, the human fetus, the human newborn, the human child, and the human adult. It is only by recognizing, as Katz-Jaffee here implicitly does, that the other forms of human knowledge, expressed through a comprehension of things logical, spiritual, and emotional, have their own independent sovereignty, that we can hope to frame the answer to any scientific question in a way that is actionable for multifaceted human beings and in accord with integral human fulfillment.

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