

ATTITUDES ABOUT HUMAN EMBRYOS, EMBRYONIC STEM CELL RESEARCH, AND RELATED MATTERS

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I. INTRODUCTION¹

Human embryonic stem cells (“hESCs”) were first isolated in 1998.² A year earlier, Dr. Ian Wilmut had cloned an adult sheep to create Dolly.³ These developments are not unrelated.⁴ Each engendered

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1. We are grateful to many people who helped with various stages of the study. Dr. Stephen E. Levick, author of *CLONE BEING: EXPLORING THE PSYCHOLOGICAL AND SOCIAL DIMENSIONS* (2004), participated in the study’s early stages. In particular, he worked with Janet L. Dolgin and Catherine Fisher in designing the survey instrument. Judith Tabron, Director of Faculty Computing Services, Hofstra University, gave support to this project that was invaluable to its success. The programming skills of Howie Hamlin, Advanced Technology Coordinator, Hofstra University, were essential to development of the online survey questionnaire. Toni Aiello, Reference Librarian, Hofstra Law School, provided consistently intelligent assistance with bibliographic research. Scott Crawford, psychology graduate student, Hofstra University, assisted with data analysis and with assessment of respondents’ embryo drawings. The insightful intelligence of Shoshana Streiter, Columbia University, was of great help in framing the interview stage of the project. We are deeply grateful to Ms. Streiter for participating in, transcribing, and assisting with analyzing the interviews.

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The study would not have been possible without the resources made available to us by Hofstra Law School. For that, we are grateful to Dean Nora Demleitner, Vice Dean Miriam Albert, and then-Interim Vice Dean Michelle Wu.

2. *Timeline of Stem Cell Debate*, WASHINGTONPOST.COM, July 18, 2006, <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/18/AR2006071800722.html>; see also THE NAT’L ACADS., UNDERSTANDING STEM CELLS: AN OVERVIEW OF THE SCIENCE AND ISSUES FROM THE NATIONAL ACADEMIES 4 (2006), available at http://dels.nas.edu/dels/rpt_briefs/Understanding_Stem_Cells.pdf (defining “embryonic stem cells” as cells that “can be derived from a very early stage in human development, [and] have the potential to produce all of the body’s cell types” (emphasis omitted)).

3. Gina Kolata, *Scientist Reports First Cloning Ever of Adult Mammal*, N.Y. TIMES, Feb. 23, 1997, at A1 (announcing the success of Dr. Wilmut’s research team in cloning Dolly, a feat that

widespread debate about the practical and moral implications of hESC research and cloning.⁵

In the United States, debate about research using hESC was rapidly conflated with debate about abortion.⁶ That was almost inevitable insofar as pro-life adherents, in the years following *Roe v. Wade*,⁷ had successfully focused debate about the right to abortion around the ontological status of embryonic and fetal life.⁸

About five years after stem cells were isolated and six years after Dolly was born, Professor Irving Weissman, a developmental biologist at Stanford, told a reporter that, in attempting to understand public attitudes toward ESC research, he had approached people at random on the street and asked them to draw an embryo.⁹ “Invariably,” he reported, “they draw a fetus with a face.”¹⁰ That was in 2003. Professor Weissman’s experiment suggested that at least some public opposition to embryonic stem cell (“ESC”) research reflects an inaccurate understanding of the embryo at the developmental stage during which stem cells are extracted.¹¹

The present study was originally developed to test Weissman’s informal social experiment. We wanted to know whether, in fact, people’s drawings of early embryos would correlate with their attitudes toward ESC research.¹² We aimed to discover whether the results

“shocked leading researchers” and describing initial calls that the cloning process was subject to abuse).

4. Among other things, stem cells can be extracted from cloned embryos. *See Study Reports Successful Cloning of Human Embryo Using Adult DNA*, GENETICS & ENVTL. L. WKLY., Feb. 2, 2008, at 68. That possibility offers unusual medical benefits because it allows stem cells to be created from a patient’s own DNA. *Id.* That promise was rendered more real with the announcement in early 2008 by a team of California researchers that a human embryo had been created from DNA taken from a skin cell and placed inside a human egg. *Id.* The development was reported by Andrew J. French and his team. *See generally* Andrew J. French et al., *Development of Human Cloned Blastocysts Following Somatic Cell Nuclear Transfer with Adult Fibroblasts*, 26 STEM CELLS 485 (2008), available at <http://stemcells.alphaedpress.org/cgi/reprint/2007-0252v1>.

5. *See* Kolata, *supra* note 3; I. Wilmut et al., *Viable Offspring Derived from Fetal and Adult Mammalian Cells*, 385 NATURE 810, 810-12 (1997).

6. *See* Janet L. Dolgin, *Embryonic Discourse: Abortion, Stem Cells, and Cloning*, 31 FLA. ST. U. L. REV. 101, 154-59 (2003); Steven Kotler, *The Final Frontier*, L.A. WKLY., Jan. 31, 2003, at 24.

7. 410 U.S. 113, 154, 158 (1973) (recognizing a qualified right to abortion, and holding that “the unborn” are not given the protections afforded by the Fourteenth Amendment), *modified by* *Planned Parenthood v. Casey*, 505 U.S. 833 (1992), and *Gonzales v. Carhart*, 550 U.S. 124 (2007).

8. Dolgin, *supra* note 6, at 128-29.

9. Kotler, *supra* note 6.

10. *Id.*

11. *See id.* ESCs are extracted at the blastocyst stage of development. Blastocysts form at five days after fertilization. THE NAT’L ACADS., *supra* note 2, at 4.

12. *See supra* note 9 and accompanying text; *see infra* Part III.B.1 (discussing respondents’ drawings of early embryos).

Weissman reported would be replicated if people were asked in a more formal setting to draw an embryo and then answer a set of questions about ESC research and related issues. Generally, the study was designed to investigate shifting social responses to ESC research.

Part II of this Article summarizes the social and cultural parameters of the debate about ESC research in the United States. It situates that debate in the context of the older debate about abortion. Parts III and IV then describe the parameters of and data obtained through the present study. Part III describes the survey questionnaire and reviews the data collected through distribution of that questionnaire. Part IV then reports on a series of interviews with a small set of respondents who agreed to be interviewed in greater detail about their attitudes toward hESC research and related issues.

II. THE CONTOURS OF DEBATE: THE IDEOLOGICAL¹³ HISTORY OF “EMBRYOS”¹⁴

Public discourse about the moral status of “embryos” is more recent than public discourse about the moral status of fetuses.¹⁵ The embryo gained ideological significance only in the last decades of the twentieth century,¹⁶ largely as a result of technological developments “that made it possible to visualize embryos and fetuses *in utero*”¹⁷ and to conduct research on living embryos.¹⁸

13. The term “ideology,” as used in this Article, refers to a set of deeply held beliefs in terms of which people act in and think about the world. This use follows that of the French Indologist, Louis Dumont. Dumont wrote:

Our definition of ideology thus rests on a distinction that is not a distinction of matter but one of point of view. We do not take as ideological what is left out when everything true, rational, or scientific has been preempted. We take everything that is socially thought, believed, acted upon, on the assumption that it is a living whole, the interrelatedness and interdependence of whose parts would be blocked out by the a priori introduction of our current dichotomies.

LOUIS DUMONT, FROM MANDEVILLE TO MARX: THE GENESIS AND TRIUMPH OF ECONOMIC IDEOLOGY 22 (1977).

14. This Part provides a summary of material presented in *Embryonic Discourse: Abortion, Stem Cells, and Cloning*. Dolgin, *supra* note 6.

15. *Id.* at 129-31.

16. Simon B. Auerbach, Comment, *Taking Another Look at the Definition of An Embryo: President Bush’s Criteria and the Problematic Application of Federal Regulations to Human Embryonic Stem Cells*, 51 EMORY L.J. 1557, 1567-68 (2002). Even among scientists, there is debate about the point of demarcation between the embryo and the fetus. *Id.* at 1567 & n.102 (citing Glen McGee, Address at Emory University Stem Cell Panel (Oct. 5, 2001)).

17. Dolgin, *supra* note 6, at 129.

18. *Id.* Before the development of in vitro fertilization, most embryos used in research were the products of miscarriages. Lynn M. Morgan, *Materializing the Fetal Body, or, What Are Those Corpses Doing in Biology’s Basement?*, in FETAL SUBJECTS, FEMINIST POSITIONS 43, 50 (Lynn M. Morgan & Meredith W. Michaels eds., 1999). The first child born as a result of in vitro fertilization

Ironically, from a contemporary perspective, Kristin Luker, in her 1984 book about the abortion debate in the United States, chose the term “embryo” (rather than “fetus” or “baby”) to refer to “the form of life that exists between conception and birth” because “embryo” seemed far more neutral than the alternatives.¹⁹

After *Roe v. Wade*, the 1973 Supreme Court decision that granted pregnant women a limited right to abortion,²⁰ the pro-life movement displaced an earlier focus on the preservation of traditional family life and began, at least in public debate, to focus on the ontological status of fetuses and embryos.²¹ By the end of the twentieth century, focusing debate on the sanctity of traditional family life met an unresponsive ear among large segments of the population. By then, the so-called “traditional family” had been significantly transformed into the modern family of “choice.”²² Moreover, the focus from the moral attributes of traditional family life to the moral status of fetuses and embryos proved effective as pro-life adherents used images of fetuses (and sometimes, but less often, embryos) in public appeals to suggest that personhood commences long before birth.²³

Focus on the status of embryonic life in public discussions about ESC research led, almost inevitably, to a conflation of that debate with the much older debate about abortion. Having placed fundamental importance on the status of embryonic life in the debate about abortion, many pro-life adherents immediately opposed the possibility of using embryos in research that would destroy those embryos.²⁴

was born in Oldham, England in 1978. Sandra Ratcliffe, *Louise Brown Talks About Life Under the Microscope from Day 1*, SCOTTISH DAILY REC., Jan. 17, 1994, at 2/21.

19. KRISTIN LUKER, *ABORTION AND THE POLITICS OF MOTHERHOOD* 2 & star footnote (1984).

20. 410 U.S. 113, 154 (1973) (“We, therefore, conclude that the right of personal privacy includes the abortion decision, but that this right is not unqualified and must be considered against important state interests in regulation.”), *modified by* *Planned Parenthood v. Casey*, 505 U.S. 833 (1992), *and* *Gonzales v. Carhart*, 550 U.S. 124 (2007).

21. See Dolgin, *supra* note 6, at 128-29.

22. See, e.g., *Troxel v. Granville*, 530 U.S. 57, 63 (2000) (plurality opinion) (noting that “[t]he demographic changes of the past century make it difficult to speak of an average American family”); MILTON C. REGAN, JR., *FAMILY LAW AND THE PURSUIT OF INTIMACY* 35-36 (1993) (remarking that “family law has steadily moved toward contract as its governing principle”); NAT’L COMM’N ON CHILDREN, *BEYOND RHETORIC: A NEW AMERICAN AGENDA FOR CHILDREN* 18-21 (1991) (describing changes in American families as a product of new adult choices, such as the choice to divorce or to have children outside of marriage).

23. Dolgin, *supra* note 6, at 129.

24. See, e.g., United States Conference of Catholic Bishops, *Pro-Life Activities: What is Human Cloning?*, <http://www.usccb.org/prolife/issues/bioethic/clonfact202.shtml> (last visited Mar. 28, 2009) (noting that cloning for any purpose creates a human embryo and that the term “therapeutic cloning” is a “euphemism for experimental cloning in which embryos are created to be destroyed”).

However, the contours of concern underlying the debate about ESC research have not in fact proved identical with those underlying the debate about abortion. And so, positions in both debates often seem inconsistent or murky, when the two debates are read side-by-side. In particular, the debate about abortion poses embryonic life against the rights and interests of a pregnant woman. The debate about ESC research poses embryonic life against the promise of startling medical benefits, including treatments or even cures for a variety of serious human ills.²⁵ That promise, it seems, has moved a number of pro-life adherents to favor ESC research despite continuing commitment to the notion that abortion is immoral or sinful. New conceptions of “embryos” are being elaborated. And new lines of debate are emerging.

So, for instance, comparatively early in the debate about ESC research, a number of adamantly pro-life politicians announced support for the research. Even President George W. Bush’s 2001 compromise position about ESC research suggests the complexity of the new debate.²⁶ President Bush provided for use of federal funds in doing research only on embryos created before August 9, 2001 (the date of his statement).²⁷ In doing that, he balanced two interests. First, he invoked the promise of research:

I’m a strong supporter of science and technology, and believe they have the potential for incredible good – to improve lives, to save life, to conquer disease. Research offers hope that millions of our loved ones may be cured of a disease and rid of their suffering. . . . [L]ike all Americans, I have great hope for cures.²⁸

This part of President Bush’s statement suggests appreciation for medical and scientific progress. Then, however, President Bush outlined a second, contrasting concern:

I also believe human life is a sacred gift from our Creator. I worry about a culture that devalues life, and believe as your President I have an important obligation to foster and encourage respect for life in America and throughout the world. And while we’re all hopeful about

25. See Dolgin, *supra* note 6, at 135.

26. See Press Release, Office of the Press Secretary, Remarks by the President on Stem Cell Research (Aug. 9, 2001) (on file with the Hofstra Law Review).

27. *Id.* In March 2009, as this symposium issue goes to press, President Barack Obama revoked President Bush’s August 9, 2001 Executive Order that precluded federal funding for most hESC research. President Obama’s Order permits “scientifically worthy human stem cell research, including human embryonic stem cell research, to the extent permitted by law.” Exec. Order No. 13,505, 74 Fed. Reg. 10,667 (Mar. 11, 2009).

28. Press Release, *supra* note 26.

the potential of this research, no one can be certain that the science will live up to the hope it has generated.²⁹

President Bush's compromise—though disappointing to almost everyone³⁰—betokened new lines of debate. The contours of the debate have been shaped in many places, including Congress, which has entertained a variety of bills involving ESC research.³¹ Twice Congress passed a bill that would have provided federal funding for ESC research beyond that allowed by President Bush's 2001 compromise. Twice, President Bush vetoed the legislation.³²

Most interestingly, from the perspective of the larger ideological debate, a number of staunch pro-life politicians have supported efforts to expand federal funding for ESC research. In doing that, they have re-defined the debate about embryos, and they have separated its implications for abortion from its implications for stem cell research.

For instance, former Republican Senator Connie Mack of Florida,³³ long an opponent of legalized abortion, suggested that the embryo at issue in the debate about abortion differed from the embryo at issue in the debate about stem cell research.³⁴ Mack explained the apparent contradiction between his positions in the two debates: "You're using an egg that has never been fertilized by sperm and is never placed in a uterus. The words that we're using were defined in a former age."³⁵ Thus, for Senator Mack embryos have one set of meanings and implications in the debate about abortion and a different set of meanings and implications in the debate about ESC research.³⁶

29. *Id.*

30. At first, those opposing ESC research were most vocal in criticizing President Bush's compromise. Rachel Benson Gold, *Embryonic Stem Cell Research—Old Controversy; New Debate*, THE GUTTMACHER REP. ON PUB. POL'Y, Oct. 2004, at 4, 6. Those favoring the research soon found, however, that of sixty-four promised cell lines presumably available for research as a result of President Bush's 2001 decision, only fifteen stem cell lines were, in fact, available for federally funded research. *Id.* at 5-6.

31. Jeannie Baumann, *Medical Research: Bush Vetoes Stem Cell Bill, Issues Order Authorizing Study of Non-Embryo Alternatives*, 12 HEALTH CARE DAILY REP. (BNA) (June 21, 2007). In addition, in the last several years, a number of state governments have committed state money to fund ESC research. Mina Alikani, *The Debate Surrounding Human Embryonic Stem Cell Research in the USA*, ETHICS, BIOSCIENCE & LIFE (Dec. 2007), at 7, available at www.rbmonline.com/Article/3019.

32. See Baumann, *supra* note 31.

33. Aaron Zitner, *Cloning Receives a Makeover*, L.A. TIMES, June 17, 2002, at A1.

34. *Id.*

35. *Id.*

36. See *id.*

Similarly, Republican Senator Orrin Hatch of Utah, strongly opposed to the legalization of abortion,³⁷ has supported ESC research.³⁸ Indeed, Senator Hatch has described non-reproductive cloning³⁹ as “pro-life and pro-family.”⁴⁰ Thus, defying familiar understandings of the terms that previously rendered these debates sensible, Hatch defined his positions about abortion and about ESC research as fully consistent: both, he contended, are “pro-life.”⁴¹

The data collected for the present study suggest a similar realignment of familiar lines of debate among survey respondents. Many of the respondents who completed the survey questionnaire hold strong views about ESC research. Yet, those views do not always harmonize with their views about abortion. Moreover, many of those who oppose ESC research imagine the early embryos accurately. A few respondents, but far fewer than we had expected, attributed the physical characteristics of babies (or even older children and adults) to the early embryo.⁴² Most of the respondents drew the embryo as a cell or collection of cells.⁴³

III. THE SURVEY QUESTIONNAIRE

As noted above, we were originally interested in investigating the correlation between attitudes toward ESC research and images of embryos.⁴⁴ We designed the study to examine that issue specifically, as well as to explore some of the more general parameters of the larger debate about ESC research in the United States.⁴⁵

The first item of the survey asked respondents “to draw an embryo as you imagine it looks on the fifth day of development.”⁴⁶ After completing the embryo drawing, respondents provided information

37. See Ron Seely, *Abortion Debate Shifts: Stem Cells Could Become a Factor Before the Supreme Court*, WIS. ST. J., Jan. 19, 2003, at A1.

38. Ceci Connolly, *Waging the Battle for Stem Cell Research*, WASH. POST, June 9, 2002, at A6.

39. One avenue for obtaining embryos for ESC research is through non-reproductive cloning. See French et al., *supra* note 4, at 490.

40. Connolly, *supra* note 38.

41. *Human Embryonic Stem Cell Research—Sen. Hatch Joins Group of US House Republicans to Support Bill Loosening Restrictions*, MEDICAL NEWS TODAY, May 14, 2005, <http://www.medicalnewstoday.com/articles/24309.php>.

42. See *infra* app. III.A.

43. See *infra* app. III.A. Among the respondents who did not view the early embryo as a cell or collection of cells, a significant majority (three out of five) drew an embryo with only a few fetal features (for example, a crescent shape). See *infra* app. III.A.

44. See *supra* note 12 and accompanying text.

45. The survey instrument appears *infra* app. IV.

46. See *infra* app. IV.

about their attitudes toward embryos, ESC research, and abortion.⁴⁷ In addition, they answered questions aimed at collecting basic demographic information about the sample surveyed (for example, information about age, gender, and income).⁴⁸

About three-quarters of survey respondents drew an embryo and answered survey questions online.⁴⁹ One quarter received and responded to the survey in hard copy. The online version of the survey was generated through the use of survey software.⁵⁰ Incorporation of a program language providing for animation allowed respondents to depict their understanding of the early embryo in picture form on the survey questionnaire.⁵¹

Online respondents were unable to proceed to Part II of the survey without submitting a drawing.⁵² Moreover, they were not able to return to or modify the embryo drawings after they submitted them. Those who completed the survey in hardcopy were able to return to, and alter, their drawings after submitting Part I and moving on to subsequent survey questions.⁵³

We did not expect survey results to reflect the broad trend suggested by Professor Weissman's informal efforts to discern how people view embryos. We did, however, expect that people who oppose ESC research would be likely (or at least more likely than others) to view the embryo⁵⁴ at the blastocyst stage as having features that, in fact,

47. See *infra* app. IV.

48. See *infra* app. IV.

49. We relied on "Snap," a Windows-based software program to create the survey tool. This graphical user interface program generates HyperText Markup Language ("HTML") code.

50. See *supra* note 49.

51. A Flash program, allowing online respondents to draw on the survey, was added to Snap's HTML code. An instruction journal program, written in HTML, relied on the Flash-generated instructions to recreate the drawing. Drawings were analyzed by an analytic team. We are grateful to Howie Hamlin for incorporating the Flash program.

52. A few of the surveys do not include an embryo drawing. Presumably, the respondents in question (if they took the survey online) made a mark (or marks) and then deleted it. The program accepted the mark once made (even if deleted) as adequate to allow the respondent to continue to Part II of the survey instrument.

53. All of the surveys completed in hardcopy were completed by students and by a few faculty members at Lone Star-Montgomery College in Texas. We are very appreciative to Professor Kathleen Monahan for overseeing the distribution and completion of these surveys.

54. See PRESIDENT'S COUNCIL ON BIOETHICS, MONITORING STEM CELL RESEARCH 149 (Jan. 2004). The Council defined "embryo" as:

(a) In humans, the developing organism from the time of fertilization until the end of the eighth week of gestation, when it becomes known as a fetus. . . . (b) The developing organism from the time of fertilization until significant differentiation has occurred, when the organism becomes known as a fetus. An organism in the early stages of development.

Id.

develop later in the gestational process (for example, during the fetal, rather than the embryonic, developmental stage).⁵⁵

Insofar as the ontological status of embryos and fetuses has been central to the debate about abortion in the United States,⁵⁶ we further expected that people who oppose the legalization of abortion would be more likely than others to imagine early embryos having fetal features or even features generally associated with a neonate.

In fact, results of the survey suggest a more complicated and more nuanced perspective among those who oppose ESC research. In particular, a far greater percent of the survey population than we had expected, in light of Professor Weissman's informal survey, imagines early embryos with some accuracy. This may be a consequence of the significant attention public media has paid to ESC research, cloning, and related issues in recent years. Through stories in the media, the public has increasingly been exposed to drawings and photographs of early embryos.⁵⁷

A. The Survey Population

We distributed the survey questionnaire to three groups of respondents and received 279 completed surveys.⁵⁸ Two groups of respondents received and responded to the survey online. A third group received a paper version of the survey questionnaire and responded in hardcopy. Online survey questionnaires were distributed by Luth Research.⁵⁹

55. *Id.* at 2 & star footnote (noting that stem cells “are grouped together as the ‘inner cell mass’ of the embryo, at the blastocyst stage of development”). The report’s glossary defines a blastocyst as: “A preimplantation embryo of about 150 to 200 cells. The blastocyst consists of a sphere made up of an outer layer of cells (the trophoctoderm), a fluid-filled cavity (the blastocoel), and a cluster of cells on the interior (the inner cell mass).” *Id.* at 148. The blastocyst stage is: “An early stage in the development of embryos, when (in mammals) the embryo is a spherical body comprising an inner cell mass that will become the fetus surrounded by an outer ring of cells that will become part of the placenta.” *Id.*

56. See *supra* notes 9-10 and accompanying text.

57. See, e.g., Nancy Gibbs, *Stem Cells: The Hope and the Hype*, TIME, Aug. 7, 2006, at 40, 42-43.

58. Sample size for each of the analyses we report may be less than the total sample size because some respondents may have skipped a particular question or set of questions. We were concerned that online respondents, unwilling to answer a particular question on the survey, might terminate their participation if not allowed to skip the discomforting question. Thus, the online survey was constructed so that, in general, respondents were permitted to continue with the survey despite having failed to respond to an earlier question. For a discussion of our statistical analysis of the online survey responses, see *infra* footnote 98.

59. Luth Research distributed the surveys (as SurveySavvy.com) to its “online community.” LuthResearch.com, <http://www.luthresearch.com/> (last visited Mar. 6, 2009); SurveySaavy.com, https://www.surveysavvy.com/ss/ss_index.php?action=home (last visited Mar. 6, 2009). Luth has

1. Distribution of Survey and Demographics of Respondents

a. Distribution of Surveys

Luth distributed the survey online to two distinct groups of respondents.⁶⁰ One group (“Group 1”) included only people living in the South (from Florida in the East to Texas in the West).⁶¹ From this group, 106 people completed and submitted survey questionnaires.⁶² The second set of online respondents included people residing throughout the United States (“Group 2”).⁶³ We received 100 completed survey questionnaires from this group. A third group of respondents filled out hardcopies of the questionnaire at a community college in Texas (“Group 3”).⁶⁴ There are 73 completed survey questionnaires from this group. Respondents in Group 3 resided in the part of the country from which Group 1 respondents were selected. They were, however, significantly younger than Group 1 respondents—almost all of the respondents in Group 3 were students.⁶⁵ Thus, at least 64% of the full set of submitted questionnaires were completed by people who resided in the southeast or southern part of the Midwest.⁶⁶ In selecting these groups, we aimed to include people whom we expected were more likely than the United States population as a whole to oppose hESC research.⁶⁷

recruited more than 3.1 million individuals throughout the world to participate in its panels. E-mail from Candice Hinds, Luth Research, to Janet L. Dolgin, Professor of Law, Hofstra Law School (Oct. 29, 2007, 17:15 EST) (on file with the Hofstra Law Review). The “[g]eneral demographics” of those on Luth’s panels in the United States is “representative of 2000 U.S. Census.” *Id.*

60. Luth sent the survey to 3268 potential respondents. *Id.* All were at least eighteen years old. *Id.* From that group, 206 people completed and submitted the survey. *Id.*

61. The group resided in an area of the United States covering “much of the area stretching from Texas in the southwest, northwest to Kansas, north to most of Missouri, northeast to Virginia, and southeast to northern Florida.” E-mail from Candice Hinds, Luth Research, to Janet L. Dolgin, Professor of Law, Hofstra Law School (Jan. 9, 2008, 19:45 EST) (on file with the Hofstra Law Review).

62. E-mail from Candice Hinds, *supra* note 59.

63. This second group of respondents came from Luth’s “online community” in the United States. E-mail from Candice Hinds, *supra* note 61; E-mail from Candice Hinds, *supra* note 59. The larger online community is representative of the general United States population. *See supra* note 60.

64. Distribution of surveys in Group 3 was arranged by Kathleen Monahan, a psychology professor at Lone Star-Montgomery College in Conroe, Texas. We are appreciative to Professor Monahan and to her students and colleagues who completed the questionnaire.

65. Professor Monahan informed us that a few of the questionnaires were completed by staff or faculty at the college but that the vast majority were completed by students.

66. The percentage may be larger than this insofar as some of the respondents in Group 2 (a general United States population) may live in the geographic area in which Groups 1 and 3 respondents reside.

67. Evangelical Christians and Fundamentalist Christians are more likely to oppose hESC research than other groups. KATHY L. HUDSON ET AL., GENETICS & PUB. POL’Y CTR., VALUES IN

In contrast, Group 2 respondents were selected from the general United States population⁶⁸ and provided a comparative base for analyzing survey data from Groups 1 and 3.

The decision to seek a substantial proportion of respondents from groups we presumed to be more likely than most people in the United States to oppose ESC research reflected the character of the questions we hoped to address.⁶⁹ Equally important, our decision to target a non-representative population was justified by the availability of recently collected data about attitudes toward ESC research within the general United States population. In 2005, the Genetics and Public Policy Center (“GPPC”) collected and reported on data about attitudes toward ESC research from over 2000 people.⁷⁰ Thus we were able to assess our data in light of that collected by GPPC.

b. Description of Sample⁷¹

The sample consisted of 165 (59.1%) females and 113 (40.5%) males.⁷² Two hundred thirty-four (83.9%) were Caucasian.⁷³ Respondents ranged in age from eighteen to over sixty-nine years of age.⁷⁴ Two hundred fifteen (77.1%) were between eighteen and fifty-

CONFLICT: PUBLIC ATTITUDES ON EMBRYONIC STEM CELL RESEARCH 6-7 (2005). These groups are associated with the southern area of the country that runs from Florida in the east to Texas in the west. See E-mail from Candice Hinds, *supra* note 61 (describing the region often referred to as the “Bible Belt”). In general (though not exclusively), states supporting hESC research politically and financially are in the Northeast and West. They include California, Illinois, Maryland, Massachusetts, New Jersey, New York, and Wisconsin. Christine Vestal, *States Take Sides on Stem-Cell Research*, STATELINE.ORG, Jan. 31, 2008, <http://www.stateline.org/live/details/story?contentId=276784>. Despite New Jersey’s early support for hESC research, in November 2007, New Jersey voters rejected a bond issue that would have funded that research. Terri Somers, *Defeat in N.J. of Stem Cell Initiative Raises Alarm*, SAN DIEGO UNION-TRIB., Nov. 11, 2007, at F1. Arkansas, Indiana, Louisiana, Michigan, North Dakota, and South Dakota have restricted the research. Vestal, *supra*.

68. See *supra* note 63 and accompanying text.

69. At least initially, we hoped to learn whether people in the United States who oppose ESC research imagine the early embryo as being more like a fetus or even a person than do people who favor the research.

70. HUDSON ET AL., *supra* note 67, at 1. The GPPC identified respondents through a research panel, described as representative of the United States population as a whole. *Id.* The panel was identified by Knowledge Networks. *Id.* Additional information about the research methodology is available through their website. *Id.*; see also Press Release, Knowledge Networks, New Johns Hopkins/KN Study Defines Gray Areas in Public Views on Stem Cell Research (Oct. 14, 2005) (on file with Hofstra Law Review).

71. See *infra* app. I.A.

72. An additional respondent did not report his or her gender. See *infra* app. I.A.

73. See *infra* app. I.A.

74. One respondent was under eighteen. See *infra* app. I.A.

nine, and sixty-three (22.6%) were sixty years of age or older.⁷⁵ About half of the respondents were married (145, or 51.9%).⁷⁶

The majority of respondents were Protestant (50.5%, or 141).⁷⁷ Sixty-four (22.9%) were Catholic, ten (3.6%) were Jewish, and nine (3.2%) were Eastern Orthodox, Muslim, Buddhist, or Hindu (grouped together for statistical purposes).⁷⁸ Forty-seven respondents (16.8%) reported no religious affiliation.⁷⁹

The distribution of respondents' income ranged from less than \$25,000 to more than \$100,000 in yearly household income, and was fairly evenly distributed across those values.⁸⁰ The majority of respondents (142, or 50.9%) reported having had some college education.⁸¹ Fifty-seven respondents (20.4%) reported having graduated from college, and all but four (1.4%) had at least a high school education.⁸²

2. Comparative Data: Study Reported by the GPPC

A brief summary of results reported in the study of attitudes toward hESC research, done by the GPPC, provides a comparative frame.⁸³ The GPPC survey was designed to reflect a representative sample of the United States' population.⁸⁴ GPPC researchers found that a significant majority (67%) of respondents reported that they approve or strongly approve of ESC research.⁸⁵ In contrast, 32% of the GPPC respondents reported that they disapprove or strongly disapprove of ESC research.⁸⁶ The GPPC researchers further noted that Democrats were more likely than Republicans to approve of ESC research; and that people with college degrees were more likely than people without college degrees to "strongly approve" of ESC research; and that those affiliated with almost all religious groups "approve" of ESC research.⁸⁷ However, those reporting affiliation with Fundamentalist and Evangelical Christians were "10 times more likely than people with no religious affiliation to

75. *See infra* app. I.A.

76. *See infra* app. I.A.

77. *See infra* app. I.A.

78. *See infra* app. I.A.

79. *See infra* app. I.A. Eight respondents did not report their religious affiliation. *See infra* app. I.A.

80. *See infra* app. I.A.

81. *See infra* app. I.A.

82. *See infra* app. I.A.

83. *See HUDSON ET AL.*, *supra* note 67, at 1.

84. *Id.*

85. *See id.* at 5.

86. *See id.*

87. *Id.* at 6.

strongly disapprove of” ESC research.⁸⁸ Even within Fundamentalist and Evangelical groups, however, half of the respondents reported approving or strongly approving of ESC research while slightly less than half (48%) reported disapproving or strongly disapproving of the research.⁸⁹

Extrapolating from survey results, GPPC researchers suggested that about half of those who responded to the study had “moral concerns” about destroying embryos but, at the same time, favored the development of the research because it promises to lead to cures for serious illness and disability.⁹⁰ Moreover, somewhat “more than one-third (36%) of respondents” who reported that an embryo enjoys the highest level of “moral status” also reported approving of ESC research.⁹¹ And “[a]mong respondents who accorded the embryo no or low moral status, 17 percent disapproved of ESC research.”⁹²

3. Differences Among Respondent Groups and General Population

Our sample is significantly smaller than that studied by GPPC.⁹³ In addition, it is weighted to include people from particular geographic areas within the United States. Respondents in Groups 1 and 3 resided in the South and southern part of the Midwest.⁹⁴ Respondents in Group 2 were selected from within the broader United States population studied by GPPC.

Some of the differences we expected to find between our sample and that studied by GPPC, as well as differences we expected among people in the three groups included in the survey (and especially between those in Groups 1 and 3 as compared with Group 2), are reflected in the data. However, the differences were not as broad or as consistent as we had presumed they would be.

No significant differences emerged among the three respondent groups (distinguished by respondents’ geographic location) regarding “[a]ttitudes toward embryonic stem cell research.”⁹⁵ Just over half of all

88. *Id.*

89. *Id.*

90. *Id.* at 9. This suggestion followed from the finding that a bit more than half (52%) of respondents agreed with at least one statement apparently favoring the preservation of embryonic life and agreed with at least one statement apparently favoring ESC research. *Id.*

91. *Id.* at 15.

92. *Id.*

93. GPPC’s survey was completed by 2254 respondents. *Id.* at 1. Of these, 2212 were deemed “qualified” completes. *Id.* The respondents were sampled randomly, and GPPC reports that the respondent group is representative of the United States population. *Id.*

94. See *supra* notes 61-63 and accompanying text.

95. See *infra* Appendix II.A.

279 respondents reported that they support ESC research.⁹⁶ In contrast, 67% of GPPC's respondents reported approving or strongly approving of ESC research.⁹⁷

*B. Views of Embryos and Attitudes Toward ESC Research*⁹⁸

Most interestingly, we did not find significant distinctions in understandings of embryos by respondents in the three groups we studied. Moreover, over 60% of the full respondent group reported the size of the early embryo with fair accuracy.⁹⁹ And only about 7% of the respondents reported the early embryo to be four inches or larger.¹⁰⁰ Further, a majority of the respondents reported thinking of the early embryo as “a thing,” “a clump of cells,” a “ball of cells,” or a “human organ” rather than as a “person” (16.8%) or a “potential person” (22.4%).¹⁰¹

In sum, our respondents, whose selection based on geographic factors suggested they would be more likely than the general population to oppose ESC research, are more like the general population in this regard than we had expected. Some differences do appear, however, and they are important. These differences are described in this Part.

96. Among the 271 survey respondents included for analytical purposes, 53.5% reported that they favored (30.6%) or strongly favored (22.9%) stem cell research. *See infra* app. II.A.

97. HUDSON ET AL., *supra* note 67, at 5.

98. Frequencies, cross tabulations, and chi-square statistics were run to examine the relationships between variables of interest. The symbol χ^2 is the statistical symbol for the chi-square statistic, which is a nonparametric statistic used to determine if there is a relationship between two variables, measured on a nominal scale; that is, when there is frequency data. The *p* value is the obtained probability value of the calculated *chi*-square. By common convention, *p* values of less than 0.05 (less than 5% of the time) are considered statistically significant, hence not just due to chance. The variable *df* is the degrees of freedom associated with that *chi*-square test, which is essentially the number of values in the calculation of the statistic that are free to vary. For *chi*-square, *df* is calculated as (number of rows-1)*(number of columns-1). Sample sizes in the contingency tables (Appendix II) will generally be less than the 279 total respondents, as respondents are dropped from the *chi*-square analysis if there is missing data on either variable in the analysis. Again, our sample size was relatively small, and our analysis was exploratory. Therefore, conclusions should be considered tentative in nature. Future studies need to be conducted and the results replicated.

99. *See infra* app. II.D. The early embryo at the blastocyst stage of development is a “hollow sphere of cells smaller than the period at the end of this sentence.” NAT'L ACADS., UNDERSTANDING STEM CELLS: AN OVERVIEW OF THE SCIENCE AND ISSUES FROM THE NATIONAL ACADEMIES 4 (2007), available at http://dels.nas.edu/dels/rpt_briefs/Understanding_Stem_Cells.pdf.

100. *See infra* app. II.D.

101. *See infra* app. II.E.

Again, interpretations of the data must be understood as exploratory given the comparatively small size of our respondent groups.¹⁰²

1. Embryo Drawings

Before answering survey questions, respondents were asked to draw an embryo as they imagine it to look on day five of development.¹⁰³ We assessed respondents' drawings on a scale of 1 to 5, with those ranked as "1" having no fetal or human features and those ranked as "5" having features associated with late-term fetuses or babies.¹⁰⁴ Those categorized as 1 consist of a dot, a circle, or a set of intersecting or adjoining circles.¹⁰⁵ Those ranked as 2 assume the shape of an early fetus; most of the drawings classed as 2's exhibit a crescent shape.¹⁰⁶ Those classed as 3's exhibit more clear-cut fetal features and generally assume a shape with clear body parts.¹⁰⁷ Few respondents drew embryos ranked as 4's or 5's. Of the total group of respondents, 6.1% (17 people) drew embryos ranked as 4, and 2.2% (6 people) drew embryos ranked as 5.¹⁰⁸ Drawings ranked as 4's include more features associated with developed fetuses than those ranked as 3's.¹⁰⁹ They include, for instance, facial features or, perhaps, eyes plus hands with distinct fingers. Those ranked as 5's show features of a baby (or even, in a couple of cases, an older person), such as a distinct head with a face,

102. We hope that we will be able to conduct a second study with a significantly larger group of respondents.

103. Respondents were provided the following information before they drew the five-day embryo:

We don't expect you to make the drawing the same size that you envision the embryo to be at five days. Please don't refer to any outside source, either printed or online. Also, please don't talk with anyone about your drawing either before or while making it. After you complete the survey, you should of course feel free to discuss your drawing with anyone.

Your drawing will not be assessed for artistic talent. So, don't try to make it perfect.

See *infra* app. IV. Additional instructions were provided to those completing the survey online:

In order to make the drawing, move the cursor over the drawing tablet below. The cursor will change into a pencil. Click on the right side of the mouse to start drawing. Hold the right side of the mouse down and move the mouse around in order to draw the picture.

Click on the "clear" button if you want to redo the drawing.

Picturing the Early Embryo, Online Survey (on file with the Hofstra Law Review).

104. See *infra* app. III.A. This appendix includes drawings representative of each category.

105. See *infra* app. III.A.

106. See *infra* app. III.A.

107. See *infra* app. III.A.

108. See *infra* app. II.B.

109. See *infra* app. III.A.

arms, a body, and legs.¹¹⁰ Examples of each category of embryo drawing can be found in Appendix III.A.¹¹¹

At least a few of the respondents who drew embryos assessed as 4's and 5's may not have intended their pictures accurately to reflect an early embryo's physical appearance but to reflect its presumed ontological state. Moreover, a few of the drawings assessed as 4's or 5's included outrageous or humorous elements and may, thus, have been intended as caricatures or even cartoon figures by those who drew them. One drawing, ranked as a 5, pictured an ape-like creature with large human breasts (we decided to exclude that drawing from the survey data).

Of the 279 total survey respondents, 50.5% (141 people) drew embryos categorized as 1's; 30.1% of the respondents (84 people) drew embryos categorized as 2's.¹¹² Of the remaining respondents, 9.0% (25 people) drew 3's, and as noted, only 8.3% of the total group (23 people) drew embryos ranked as 4's or 5's. Six respondents failed to produce a drawing.¹¹³

2. Drawings and Attitudes Toward hESC Research and Other Matters¹¹⁴

Our expectation that people who drew early embryos with fetal and human, rather than embryonic, features would more likely oppose ESC research is not reflected in the data.¹¹⁵ In fact, we found no significant relationship between the accuracy of respondents' drawings of five-day embryos and respondents' attitudes toward ESC research.¹¹⁶ Slightly more than half (50.5%) of the respondents drew embryos without any

110. *See infra* app. III.A.

111. *See infra* app. III.A.

112. *See infra* app. II.B.

113. *See infra* app. II.B. The online program did not allow a respondent to continue to Question 2 until he or she drew an image of the early embryo. However, respondents who answered the survey online could have begun the drawing, cleared any markings, and then moved on to the remainder of the survey questionnaire. Thus, the program allowed such respondents to continue with the survey even though the tablet in which their drawings were to appear remains blank. We did not give assessment scores to surveys on which no embryo drawing was visible. These were assessed arbitrarily as 99's and were not included in analyses of the data.

114. To examine the relationship between respondents' attitudes toward ESC research and other variables, we collapsed the "strongly favor" and "favor" categories and the "strongly oppose" and "oppose" categories into simple favor and oppose groups, respectively. "Neither favor nor oppose" remained as is. Grouping "top two" and "bottom two" categories is a common practice in business and market research.

115. *See infra* app. II.C.

116. *See infra* app. II.C.

fetal or human features.¹¹⁷ Further, in stark contrast with our expectations, 58.1% of those who reported strongly opposing ESC research drew embryos categorized as 1's. And 56.5% of those strongly favoring ESC research drew embryos categorized as 1's.¹¹⁸

We did find a significant relationship between respondents' drawings and their estimate of the five-day embryo's size,¹¹⁹ as well as a significant relationship between respondents' drawings and their descriptions of the five-day embryo's ontological status.¹²⁰ Seventy-five percent of respondents who drew an embryo assessed as a 1 described the early embryo as no larger than the size of a pin's head.¹²¹ Among those who drew an embryo assessed as a 3, 52.0% described the embryo as no larger than the size of a pin's head.¹²²

Similarly, 57.7% of respondents who drew an embryo assessed as a 1 and 45.8% of those who drew an embryo assessed as a 2 viewed the early embryo as either a "clump of cells" or a "ball of cells," while 35.0% and 42.2% who drew the embryo as a 1 or 2, respectively, viewed the five-day embryo as either a "potential person" or a "person."¹²³ In contrast, of respondents who drew the embryo as a 3, only 28.0% reported viewing it as either a "clump of cells" or a "ball of cells," while 48.0% reported viewing it as either a "potential person" or a "person."¹²⁴

These relationships between drawings and both estimates of the early embryo's size and understandings of the early embryo's ontological status are not surprising and suggest the credibility of survey responses. In light of that suggestion, it is incumbent on us to attempt an explanation of the absence of a significant relationship between respondents' drawings of the five-day embryo and their attitudes toward ESC research.¹²⁵

117. See *supra* note 114 and accompanying text. It would seem that respondents' differing images of the early embryo cannot be explained with reference to their having or not having had a post-high school biology course. Indeed, there was no correlation between respondents' drawings and their having taken such a course. Of those who drew embryos assessed as 1's, 48.2% had no biology after high school and 51.8% did have a post-high school biology course. See Terri Shapiro, Frequency Dataset (on file with the Hofstra Law Review). Similarly, those who drew embryos classed as 4's and 5's were as likely as other respondents to have had a post-high school biology course. *Id.*

118. See *infra* app. II.C.

119. See *infra* app. II.D.

120. See *infra* app. II.E.

121. See *infra* app. II.D.

122. See *infra* app. II.D.

123. See *infra* app. II.E.

124. See *infra* app. II.E.

125. See *supra* note 114.

The explanation may, in fact, be simple. By now public media have been attempting to describe ESC research and its implications to the public for several years.¹²⁶ It thus seems likely that most people have been exposed to media portraits of the early embryo and have, in consequence, developed a fairly accurate view of what the early embryo looks like.¹²⁷ As recently as five years ago, when drawings done for Irv Weissman included human features, many fewer people had been exposed to depictions of embryos.¹²⁸

It is also possible that the lack of a significant relationship between respondents' views about ESC research and their depictions of early embryos represent the beginning of a broader shift in public attitudes toward ESC research. If that is the case, and if, furthermore, that shift reflects the public's hope that the medical promise associated with ESC research will be actualized, then public attitudes toward the research during the next several years may be more open to reformulation than, for instance, public attitudes toward abortion.

3. Attitudes Toward ESC Research and Attitudes Toward Abortion¹²⁹

Respondents' attitudes toward ESC research were significantly related to opinions about abortion, but were not totally redundant with those opinions. Not surprisingly, those who opposed ESC research reported believing that abortion should never be permitted (31.8%) or should only rarely be permitted (62.1%), while only 6.0% thought that abortion should almost always be permitted (1.5%) or that abortion should be generally (though not always) be permitted (4.5%).¹³⁰ None thought there should be no restrictions on abortion.¹³¹ Interestingly, respondents who reported neither favoring nor opposing ESC research were more likely to favor restricting than to favor permitting abortion.¹³² Only 11.7% reported thinking that there should be no restrictions on abortion; 20.0% reported thinking that abortion should generally be

126. See Gibbs, *supra* note 57, at 40-41, 45-46.

127. The widespread portrait of early embryos in the popular press is reflected in an issue of *Time* featuring a cover spread with the caption, "The Truth About Stem Cells," which appeared on newsstands August 7, 2006. *TIME*, Aug. 7, 2006 (cover page). The cover pictures a large, pink photo of an adult stem cell. *Id.* The table of contents page includes a large picture of an early embryo (a blastocyst). *Id.* at 2. The accompanying story includes a series of photographs of the early embryo from fertilization to the stage at which stem cells are extracted and then showing the development of stem cells into various sorts of tissue. Gibbs, *supra* note 57, at 42-45.

128. See *supra* notes 57-58 and accompanying text.

129. See *infra* app. II.F.

130. See *infra* app. II.F.

131. See *infra* app. II.F.

132. See *infra* app. II.F.

permitted but that there are a variety of circumstances in which it should be prohibited, and 46.7% reported thinking that abortion should not be permitted except in rare circumstances.¹³³

For those who favored ESC research, however, results were distributed across all the attitudes toward abortion. Among this group, 35.2% thought there should be no restrictions on abortion—a much higher proportion than in other groups—while 15.9% thought that abortion should be permitted except in rare circumstances, 25.5% thought abortion should generally be permitted but that there are a variety of circumstances in which it should be prohibited, 20.0% thought abortion should not be permitted except in rare circumstances, and only 3.4% thought abortion should never be permitted.¹³⁴ Thus, respondents with contrasting attitudes toward ESC research also opposed abortion. Almost all of those who oppose ESC research would restrict abortion. However, not all who favor ESC research reported thinking that abortion should be permitted.

4. Attitudes Toward ESC Research and Religion¹³⁵

The survey data reflect a significant relationship between respondents' attitudes toward ESC research and respondents' religious affiliations. Among people reporting "no religious affiliation," 76.6% reported favoring ESC research, and only 4.3% reported opposing it.¹³⁶ That is, almost eighteen times as many respondents with no religious affiliation favored the research than opposed it.¹³⁷ Only respondents identifying themselves as Jewish included a comparably large percentage (90.0%) of people who favor or strongly favor ESC research.¹³⁸

133. See *infra* app. II.F.

134. See *infra* app. II.F.

135. See *infra* app. II.G. Percentages we report in this section may differ minimally from those reported elsewhere. For purposes of this analysis, we omitted respondents who report having "no opinion" about ESC research.

136. See *infra* app. II.G. The total number is very small. Only two people reported both "no religious affiliation" and opposition to ESC research. Both "strongly oppose" the research. See *infra* app. II.G. As noted above, we have conflated the "favor" and "strongly favor" responses and the "oppose" and "strongly oppose" responses.

137. To say this differently, if one excludes from the group of those who reported having "no religious affiliation" respondents who reported having no opinion about ESC research or neither favoring nor opposing the research, 95.0% of those reporting no religious affiliation favored (or strongly favored) the research. See *infra* app. II.G.

138. See *infra* app. II.G. Again, the total numbers are small. There were ten self-identified Jews among the respondents. One of these strongly opposes ESC research. All of the others favor or strongly favor it. See *infra* app. II.G.

Among respondents who reported being Catholic or Protestant, almost half (48.4% of Catholics and 46.0% of Protestants) reported favoring ESC research.¹³⁹ About one quarter of each of these groups (slightly less in the case of Catholic respondents, and slightly more in the case of Protestants) reported that they “neither favor nor oppose” the research.¹⁴⁰ Finally, over one quarter of both Catholic and Protestant respondents reported that they oppose ESC research.¹⁴¹

Among respondents who reported a religious affiliation (that is, the Catholic, Protestant, Jewish, and Other categories only), respondents’ own attitudes toward ESC research are correlated with their understanding of their religion’s attitude. So, for instance, among those reporting that their religion “would always permit” ESC research, no one reported opposing the research, and 94.7% reported favoring it.¹⁴² And among those who reported that their religion “would never permit” ESC research, 54.1% reported opposing the research and 27.9% reported favoring it.¹⁴³ Among those reporting that their religion “would sometimes permit” the research, 3.0% reported opposing it, and 63.6% reported favoring it.¹⁴⁴ It is likely relevant to future shifts in attitudes toward ESC research, that among respondents who claimed a religious affiliation and responded to the question about their understanding of their religion’s view on ESC research (206 respondents), close to half (44.2%) reported not being familiar with what attitude, if any, their religion took toward the research.¹⁴⁵

Finally, there is a correlation (though less definite than that between respondents’ attitudes toward ESC research and their understandings of

139. See *infra* app. II.G. Among Catholics, 17.2% report strongly favoring the research, and 31.2% report favoring it. Among Protestants, 17.5% report strongly favoring the research, and 28.5% report favoring it. See *infra* app. II.G.

140. Among Catholics, 21.9% are in this category, and among Protestants, 27.0% are. See *infra* app. II.G.

141. Among Catholics, 29.7% of respondents reported opposing or strongly opposing the research. See *infra* app. II.G. Among Protestants, 27.0% of respondents reported opposing or strongly opposing the research. See *infra* app. II.G. A significant majority (56.5%) of Catholic respondents reported that their religion would never permit the research. See *infra* app. II.H. Among Protestants, 20.3% reported that their religion would never permit the research. See *infra* app. II.H. And among Jewish respondents and among respondents reporting some other religion (for example, Hindu, Muslim, and Buddhist), none reported that their religion would never permit ESC research. See *infra* app. II.H.

142. See *infra* app. II.I.

143. See *infra* app. II.I.

144. See *infra* app. II.I. In reporting these correlations, we have combined those who favor the research with those who “strongly favor” it, and we have combined those who oppose it with those who “strongly oppose it.”

145. See *infra* app. II.H. Among those who agreed to be interviewed, several reported not knowing the attitude of their religious group toward ESC research, but none who did know took a personal stance in opposition to that of their religion. See *infra* Part IV.

their religions' attitudes toward ESC research) between religiously affiliated respondents' attitudes toward ESC research and their understandings of their religions' attitude toward abortion. For instance, among those who reported that their religion "would always permit" abortion, 77.8% favored ESC research and none opposed it.¹⁴⁶ Among those who report that their religion "would never permit" abortion, 44.4% opposed ESC research, and 33.3% favored it.¹⁴⁷ This suggests some independence in respondents' attitudes toward ESC research and their attitudes toward abortion. However, more respondents (88 people) simply did not know their religion's attitude toward ESC research as did not know their religion's attitude toward abortion (47 people).¹⁴⁸

These data reflect correlations. They may suggest, but do not prove, lines of causation. Yet, the strong correlation, in particular, between respondents' attitudes toward ESC research and that which they attribute to their religion demands further study. It may be that respondents looked to their religious leaders as they formed their own views of ESC research. Alternatively, it may be that people affiliated with particular religions share a wide set of beliefs and values with others in the group and that those beliefs and values shape attitudes toward ESC research. Or it may be that, in choosing to affiliate with (or to remain affiliated with) a particular religious group, respondents were influenced by the group's position on a set of important matters (including ESC research).

IV. INTERVIEWS¹⁴⁹

The last question on the survey offered respondents the opportunity to provide their e-mail addresses and/or telephone numbers so that the researchers could contact them for more in-depth consideration of issues raised by the survey questions. Slightly less than one-fifth of those who completed surveys volunteered such information. We sent e-mails to

146. See *infra* app. II.J.

147. See *infra* app. II.J.

148. See *infra* app. II.I; II.J. The GPPC study of over 2000 respondents, assumed to be representative of the larger United States' population, also found that respondents who reported no religious affiliation or affiliation with a non-Christian religion were much more likely than Catholics or Protestants to approve of ESC research. See HUDSON ET AL., *supra* note 67, at 1, 6-7. In addition, the study found disapproval of ESC research to be significantly greater among Fundamentalist and Evangelical Christians than among those in any other religious groups. *Id.* at 6-7.

149. A summary of interviewees' demographics may be found *infra* app. I.B. We refer to all interviewees by pseudonyms in order to safeguard their privacy. In some cases, we are not even aware of an interviewee's last name. The people whom we contacted about interviews all provided e-mails or telephone numbers, but some did not provide their names. We are committed to protecting the identity of all respondents. Respondents who did not provide contact information can only be identified by survey number.

each of these respondents, asking each if he or she would, in fact, be willing to talk with us by telephone about ESC research and related issues.¹⁵⁰ Only a small number (nine) of the respondents who supplied contact information on the questionnaire actually replied to our follow-up e-mails. Of these, all agreed to be interviewed.¹⁵¹

We spoke with (and in one case communicated by e-mail with) each person¹⁵² who agreed to be interviewed.¹⁵³ One researcher and a research assistant called each prospective interviewee at a time designated by the interviewee in an e-mail.¹⁵⁴ The researcher asked most of the questions. Conversations were transcribed by the research assistant. Interviewees knew that they were speaking to two people, and from time to time, the research assistant asked a follow-up question or set of questions. Each interview was prepared in light of the prospective interviewees' responses to survey questions. We began each interview by referring to the interviewee's reported position about ESC research on the questionnaire and by asking the interviewee for a fuller explanation of that position. All of the telephone interviews were open-ended and, on average, lasted for thirty minutes.¹⁵⁵ One interview, as noted above, was (at the request of the interviewee) conducted through

150. One of those whom we contacted asked what incentive would be provided. We did not offer compensation to the people we interviewed. We did offer to send them a copy of the study's conclusions once they were available. The respondent in question did agree to be interviewed without an incentive. At least one other responded with a peculiar e-mail suggesting that we were inadequately "friendly" to interview him. We did not respond. Most of those who provided contact information simply did not reply to our e-mails requesting an interview.

151. One interviewee responded at first by asking what we would pay him were he to agree to a follow-up interview. When we explained that interviews were voluntary and would involve no money exchange, he agreed to be interviewed on those terms.

152. One respondent who answered our e-mail offered to speak with us by telephone, but did not respond to our telephone messages. We left several messages. None were answered. We were thus not able to interview this respondent.

153. Respondents opposing or strongly opposing ESC research were somewhat more likely to provide contact information than those favoring or strongly favoring the research. Those reporting "no opinion" and those reporting that they neither favor nor oppose the research were much less likely to provide contact information than were respondents with clearly expressed opinions, either in favor of or against the research. None of those with "no opinion" provided contact information, eight people of those reporting that they neither favor nor oppose the research provided contact information.

154. Interviews were carried out by Janet L. Dolgin and Shoshana Streiter.

155. After the interview, we sent an e-mail to each interviewee, thanking him or her and inviting additional responses if any seemed important. Only one interviewee contacted us after the interview. This interviewee suggested that we might productively contact his ex-wife who, in his view, had a very different stance toward ESC research and related matters than he did. We did not contact this interviewee's ex-wife. Summary of Telephone Interview with Survey Respondent 1939894 ("Rick") (Jan. 21, 2008) [hereinafter Telephone Interview with Rick] (on file with the Hofstra Law Review).

e-mail exchanges.¹⁵⁶ We sent a set of questions to the interviewee, who answered almost immediately. We responded with follow-up questions. The interviewee answered those questions, again by e-mail.

Respondents who agreed to be interviewed differed from the complete respondent group on a number of dimensions. Most important, none of those who agreed to speak with us was indifferent to the subject of the study, and in particular, none was indifferent to ESC research.¹⁵⁷ Of those respondents with whom we spoke, some favored (or strongly favored) ESC research, and some opposed (or strongly opposed) it. Only one reported neither favoring nor opposing hESC research, and none reported having no opinion.¹⁵⁸ In fact, the interviewee who reported neither favoring nor opposing hESC research was not neutral about the issues.¹⁵⁹ This respondent answered our initial e-mail by requesting that we “interview” her through e-mail exchanges. She explained that she preferred not to speak with us on the telephone.¹⁶⁰ In fact, this respondent felt very intensely about the subject. Her apparently noncommittal response on the questionnaire (indicating that she neither favored nor opposed ESC research) reflected, in fact, a sincere ambivalence and confusion.¹⁶¹ Rather than not caring whether the research goes forward, this interviewee felt strongly on some counts that it should be supported and felt strongly on other counts that it should be stopped.¹⁶²

Although the total number of interviews conducted was small, the data obtained through them provide a richer picture of respondents’ positions about ESC research. Unsurprisingly, the interviews suggest, as responses to survey questions cannot, some of the intricacies of how the issues at stake relate to people’s lives.¹⁶³ In short, completed questionnaires provided us with useful information about interviewees’ attitudes toward ESC research and related matters. Interviews allowed us to explore issues at a level that is, in the nature of large-scale survey

156. E-mail from Survey Respondent g1880546 (“Theresa”), to Janet L. Dolgin, Professor of Law, Hofstra Law School (Feb. 4, 2008, 14:32 EST) [hereinafter First E-mail from Theresa] (on file with the Hofstra Law Review).

157. See *supra* Part IV (describing and analyzing respondent interviews).

158. See *supra* Part IV (describing and analyzing respondent interviews).

159. See *infra* notes 237-47 (describing the interview with Theresa).

160. First E-mail from Theresa, *supra* note 156.

161. The e-mail exchange between Theresa and the researchers is described later in Part IV. See *infra* notes 234-44 and accompanying text.

162. See *infra* notes 234-44 and accompanying text.

163. The interview with Theresa provides a fine example. Theresa had strong and complicated responses to ESC research. That could not have been discerned from her survey response indicating that she neither favored nor opposed the research. See *infra* notes 234-44 and accompanying text.

research, not possible. Each methodology (survey research and interviewing respondents) complemented the other.

In fact, interviewees' responses sometimes seemed clearly to confirm the methodology of the survey research. For instance, one interviewee explained early on in the interview that he checked the box indicating opposition to ESC research but that, actually, he is "not totally [opposed]."¹⁶⁴ "I answered," he noted, "as closely as I could."¹⁶⁵ This interviewee explained that he would allow research on embryos slated to be discarded in any event, implying that he would not support research on embryos that might be implanted and survive implantation and gestation.¹⁶⁶ This reason likely explains why he checked the questionnaire box indicating that he opposed ESC research rather than the box indicating that he "strongly" opposed the research.¹⁶⁷ His explanation indicates that his response to the survey question was, indeed, appropriate.

We began each interview by asking the interviewee to explain his or her attitude toward ESC research.¹⁶⁸ Fairly quickly, each of the interviewees embedded the answer in an encompassing personal narrative.¹⁶⁹ For each interviewee, regardless of that person's particular attitude toward ESC research, the subject seemed to suggest and to reflect views about a wider array of important social issues, including especially: abortion, gender, religion, national politics, and family relationships. We had expected ESC research might carry this sort of weight for those opposing it. We were surprised that, at least among respondents whom we interviewed, those reporting that they favored ESC research explained, much as did those reporting that they opposed this research, that the subject carried great weight for them.

For these interviewees, the very notion of hESCs served as a powerful, yet open-ended, symbol. Almost all of the interviewees felt strongly about hESC research and discussed the issues involved with

164. Telephone Interview with Survey Respondent 2720519 ("Don") (Jan. 28, 2008) [hereinafter Telephone Interview with Don] (on file with the Hofstra Law Review).

165. *Id.*

166. *See id.*

167. *See id.*

168. *See, e.g., id.*; Telephone Interview with Survey Respondent 2589358 ("Carolyn") (Feb. 1, 2008) [hereinafter Telephone Interview with Carolyn] (on file with the Hofstra Law Review); Telephone Interview with Survey Respondent H008 ("Ariadne") (Jan. 19, 2008) [hereinafter Telephone Interview with Ariadne] (on file with the Hofstra Law Review); Telephone Interview with Survey Respondent g2219815 ("Angela") (Jan. 21, 2008) [hereinafter Telephone Interview with Angela] (on file with the Hofstra Law Review).

169. *See, e.g.,* Telephone Interview with Don, *supra* note 164; Telephone Interview with Angela, *supra* note 168.

intensity.¹⁷⁰ Asking people to respond to questions about ESC research seems to constitute a sort of social Rorschach test that indicates attitudes toward a host of other matters. However, for a variety of reasons, including both confusion about the science underlying ESC research and the power of promised medical cures (even for those who did not favor ESC research), a few interviewees with very strong opinions noted that they could imagine that their opinions about the research, though strongly felt, could shift as new information about the research and its medical promise becomes available.¹⁷¹

For instance, one interviewee, whom we call “Mitchell,” has, over time, held a variety of positions about ESC research.¹⁷² Mitchell felt strongly about the subject and apparently had for almost a decade. Yet, remarkably, his position about the research had shifted from being strongly in favor to being strongly opposed, and even at the time of the interview, he admitted the possibility that he could once again revise his position about the research and about ESCs.¹⁷³ For Mitchell, it seemed important to develop a strong view about ESC research. Indeed, the fact of having a strong view seemed at least as important to Mitchell as the shape and meaning of any specific view. In short, for Mitchell the topic was essential to public debate in society, and he wanted to have an opinion about, and a voice in, that debate.¹⁷⁴

Mitchell was self-consciously influenced in his attitude toward ESCs by both his church and by the views of people whom he saw as more informed about the underlying science than he, himself, was.¹⁷⁵ Thus, Mitchell seemed to assume that his responses to ESC research did reflect or should have reflected some set of underlying truths about reality (viewed through both a spiritual and a scientific lens). But Mitchell acknowledged that he was still uncertain about the shape of the specific truths in question.¹⁷⁶

170. All but one of the interviewees who agreed to be interviewed had definite views about ESC research. *See infra* notes 234-44 and accompanying text (describing interviewee Theresa’s mixed views on ESC research). This may suggest that only people with strong views on the subject were interested in further discussion. Of the total group of respondents, 2.2% had no opinion about ESC research, and 21.5% neither favored nor opposed the research. *See* Shapiro, *supra* note 117.

171. This supports our sense that it is important to do a follow-up study that will explore shifts in attitudes toward ESC research in light of shifts in developments in science and, possibly, in broader social debates, such as the debate about abortion.

172. Telephone Interview with Survey Respondent 2975772 (“Mitchell”) (Jan. 22, 2008) [hereinafter Telephone Interview with Mitchell] (on file with the Hofstra Law Review).

173. *Id.*

174. *See id.*

175. *Id.*

176. *See id.*

Several of the interviewees were more clearly committed to a specific position about ESC research. These interviewees found it difficult to imagine shifting positions on the topic. This makes sense in light of another finding: For most of the interviewees, the meaning of ESCs and of ESC research were not matters independent of other important social issues.¹⁷⁷ Rather, interviewees' positions about embryos and about ESC research followed from (or at least reflected) a set of other intensely held beliefs. Thus, it is not surprising that each of the interviewees made sense of ESC research by situating that topic within a larger personal narrative.

Rick's responses, for instance, made sense of ESC research in the context of his intensely negative attitude toward his ex-wife.¹⁷⁸ Rick, an intelligent, college graduate in his forties, reported on the survey questionnaire that he "strongly favors" ESC research. Rick lived in the South.¹⁷⁹ His embryo drawing depicted the early embryo in the shape of a human body, with a discrete head, arms, and legs.¹⁸⁰ He reported the early embryo to be about the "size of a quarter" and to be akin to a human organ.¹⁸¹

Rick had been divorced for about a decade at the time of the interview, but he was still intensely bitter about his ex-wife ("Glenna"). Glenna is the mother of Rick's twelve-year-old daughter.¹⁸² Rick described Glenna as active in a fundamentalist Christian church.¹⁸³ Although Rick respected religion and what he called "morals," and described himself as a Protestant who attended church about once a month, he characterized Glenna's involvement with religion as motivated by fear.¹⁸⁴ Rick believed that Glenna "views her life through a lens of fear, fear of God and fear of failure. [She's] trying to avoid Satan's fiery darts."¹⁸⁵ In Rick's view, Glenna was only posing as a

177. See Telephone Interview with Angela, *supra* note 168; Telephone Interview with Carolyn, *supra* note 168; Telephone Interview with Don, *supra* note 164.

178. Telephone Interview with Rick, *supra* note 155. As mentioned earlier, we took significant caution to protect the privacy of our interviewees. See *supra* note 159.

179. We are using the past tense to describe interviewees and their positions. That does not mean that the continuing present would not, in many instances, have been more accurate. But since we did not contact interviewees subsequent to the initial interview, we do not know whether interviewees have changed their positions about ESC research or have experienced changes with regard to relevant demographic facts or life patterns.

180. Telephone Interview with Rick, *supra* note 155. His drawing was assessed as a 3. *Id.*

181. *Id.*

182. Rick described himself as "married" on the questionnaire. Yet he did not mention having a wife (other than Glenna, from whom he was divorced), even in the context of describing in some detail his relationship with his daughter. *Id.*

183. *Id.*

184. *Id.*

185. *Id.*

“good Christian.”¹⁸⁶ In fact, he believed that “behind closed doors,” she was not a good person.¹⁸⁷ Among other things, Rick claimed that Glenna taught their daughter that Rick’s “relationship with her as her father, [didn’t] exist.”¹⁸⁸

Although it might not be fair to the letter of Rick’s words to conclude that he supported ESC research *because* Glenna opposed it, Glenna’s opposition to the research seemed to increase its appeal for Rick. Moreover, descriptions of Glenna’s opposition as well as that of her church were threaded through Rick’s discussion of his own favorable conclusions about ESC research. Rick, in the context of discussing Glenna’s practice of religion and those who he viewed as her ilk, referred to them as “hypocrite[s],” who went to church but “oppose[] embryonic stem cell research and [in doing that] hurt[] other people.”¹⁸⁹ For Rick, his strong approval of ESC research contrasted with what he described as Glenna’s fearful, hurtful opposition to the research.

In contrast, Angela,¹⁹⁰ a married woman in her thirties, and the mother of three children, reported strongly opposing ESC research.¹⁹¹ Yet, as for Rick, Angela described her attitude toward the research as part of her larger life story. For Angela, who saw an embryo as a “person” and who would not have provided for the legalization of abortion under any circumstances, the value of the embryo was absolute.¹⁹² Her view of embryos informed and was informed by her view of marriage, gender, and maternity.¹⁹³ Angela believed that the family in the United States is collapsing because “too many moms . . . aren’t in the home and . . . [they thus] sacrifice their families for their careers.”¹⁹⁴ Angela home-schooled her children and explained that her decision to forfeit the income she might have earned were she to have remained in the working world altered the lifestyle that she and her husband could afford.¹⁹⁵ Angela’s priorities about her own everyday life were clear. She believed those priorities were reflected in her attitude toward embryonic life and in her deep, unbending objection to both abortion and ESC research. Most interesting, perhaps, Angela, while noting that her church opposes both abortion and ESC research, reported

186. *Id.*

187. *Id.*

188. *Id.*

189. *Id.*

190. Telephone Interview with Angela, *supra* note 168.

191. *Id.*

192. *See id.*

193. *Id.*

194. *Id.*

195. *Id.*

that she would not change her views were her church to revise its positions.¹⁹⁶ Were the church to begin advocating for abortion rights or encouraging ESC research, Angela would seek a new church.¹⁹⁷

Angela explained that her church is committed to what she called “biblical truths.”¹⁹⁸ She clarified that claim by noting that although she was brought up by parents who took her to church, she was not exposed to “biblical truths” as a girl.¹⁹⁹ She differentiated her girlhood church from her current church by reporting that the church to which her parents took her “wasn’t a church that taught Biblical truth.”²⁰⁰ At the time of the interview, she was deeply committed to a church that she saw as teaching biblical truths. Her interview suggested that her faith in those truths was heavily related to her commitment to the inviolability of embryonic life.²⁰¹

In short, for Angela, the value of embryonic life was a holy truth. And as such, it transcended the worldly teachings of any particular church. Angela saw her commitment to the notion of the embryo-as-person as an essential component of a universe in which children were raised morally by at-home moms who, as Angela told it, would happily surrender personal ambition and discretionary cash (by not working outside of the home) in order to do what was “right.”

Similarly, Ariadne²⁰² made sense of ESC research by viewing the issue within the context of her own life story. Ariadne was a young, unmarried Catholic mother of a three-year-old boy.²⁰³ She lived in the Southwest.²⁰⁴ Ariadne opposed ESC research.²⁰⁵ Her drawing and questionnaire responses showed an accurate view of the shape and size of an early embryo.²⁰⁶

Ariadne’s attitude toward ESC research was intricately linked with her understanding of her relation to her son and to her son’s conception and birth. Ariadne explained that several years earlier she had been involved in an abusive relationship, had become pregnant, and then miscarried.²⁰⁷ After the miscarriage, she feared that she might not be

196. *Id.*

197. *Id.*

198. *See id.*

199. *Id.*

200. *Id.*

201. *See id.*

202. Telephone Interview with Ariadne, *supra* note 170.

203. *Id.*

204. *Id.*

205. *Id.*

206. *See infra* app. III.B (classifying Ariadne’s drawing as a 1).

207. Telephone Interview with Ariadne, *supra* note 168.

able to conceive again.²⁰⁸ A few years later, involved with a different man and still unmarried, she did conceive.²⁰⁹ Ariadne resisted pressure to abort the pregnancy. She remained very proud of living up to her belief that abortion is unethical.²¹⁰ The birth of her son brought great meaning to Ariadne's own life. For her, allowing the destruction of embryos in research was tantamount to gainsaying her young son's very life.²¹¹ Thus opposition to ESC research seemed a necessary complement, for Ariadne, of that which had become more important to her than anything else—her son.

Ariadne explained that she had a friend who was pro-choice. At the time of the interview, that friend was pregnant.²¹² Ariadne wondered if the friend would revise her own views about abortion after the birth of her child.²¹³ Thus, Ariadne's attitude toward ESC research made sense in light of, and provided a commentary on, her own life story. Even more, for Ariadne, her attitude toward ESC research reconfirmed the value of her own life choices (especially the choice not to have agreed to an abortion).

The responses of two interviewees, each of whom strongly favored ESC research, similarly suggest the centrality of the issue for people.²¹⁴ For these interviewees, much as for those described above, one's attitude about ESC research reflected something important about one's life choices generally.

Sue, a divorced woman in her sixties who lived in northern Florida, had “no patience” for people whose religion or politics encouraged them to oppose ESC research.²¹⁵ Although born into a Protestant family, Sue “never” attended religious services.²¹⁶ She saw herself as an enlightened rationalist. Sue reported that she had several ailments that might have been treated as a result of developments in ESC

208. *Id.*

209. *Id.*

210. *Id.*

211. *See id.*

212. *Id.*

213. *Id.*

214. Telephone Interview with Survey Respondent g2582458 (“Sue”) (Jan. 22, 2008) [hereinafter Telephone Interview with Sue] (on file with the Hofstra Law Review). Telephone Interview with Survey Respondent 2767992 (“Rob”) (Jan. 31, 2008) [hereinafter Telephone Interview with Rob] (on file with the Hofstra Law Review). A third interviewee who “strongly favors” ESC research seemed to care less about the research itself than about holding a view on the topic that harmonized with her view of herself as “rational” and modern. Telephone Interview with Carolyn, *supra* note 168.

215. Telephone Interview with Sue, *supra* note 214.

216. *Id.*

research.²¹⁷ She believed it was irrational not to support the research. Sue described herself as “pro-choice,” and explained that those who opposed ESC research were “pro-life.”²¹⁸ Sue explained that the people she viewed as “pro-life” have turned the issue into a public dispute which hurts people like her—people with illnesses that the research might cure. “I won’t even discuss it with pro-lifers.”²¹⁹

Sue noted with pride that she favored the research even though she saw herself as “old.”²²⁰ She thought it much less remarkable that her children, who were “young,” favored ESC research.²²¹ Thus, Sue suggested, again, though indirectly, that she was rational, despite demographic factors (such as age) that might incline her toward a less rational position.²²² Interestingly, Sue reported concern about “cloned meat.”²²³ In her view, that was a rational concern because the “safety” of the food supply was at issue.²²⁴ When asked if, in a similar vein, it was responsible to be concerned about the safety of cures developed through ESC research, Sue responded by describing the question as “off topic.”²²⁵ Sue thus contended that opposing the production of cloned meat was rational, but that opposing ESC research was irrational. Yet she refused further to harmonize the two contentions because, in her view, each was as self-evident as the other.

Rob also strongly favored ESC research.²²⁶ Rob was also in his sixties. He was married, had four grown children, and, at the time of the interview, lived in northern Florida.²²⁷ Rob explained that he was a Republican but that he was “very angry at Bush for taking a personal stand on [ESC research].”²²⁸ Rob thus described President Bush’s refusal to provide for broad federal funding of ESC research as grounded in “personal” issues.²²⁹

Yet, Rob’s strong support for the research would also seem to be “personal.” Rob reported that each of his four children had a medical condition that could be helped or cured as a result of developments in

217. *Id.*

218. *Id.*

219. *Id.*

220. *Id.*

221. *Id.*

222. *See id.*

223. *Id.*

224. *Id.*

225. *Id.*

226. Telephone Interview with Rob, *supra* note 214.

227. *Id.* On the questionnaire instrument, Rob reported that he was in his forties. He erroneously checked the wrong age category. *See id.*

228. *Id.*

229. *See id.*

ESC research.²³⁰ He was especially concerned about one son who had Type I diabetes. When asked if his position on ESC research might have been different had he not had children, Rob explained that it would not be different because he, himself, had “more ailments than you can write about in a book.”²³¹ Interestingly at the start of the interview, Rob had explained that he was not thinking about his own ailments in favoring ESC research because he was over sixty: “[I]t doesn’t matter for me.”²³² But for his children, Rob believed that the research may “matter.”²³³ For Rob, ESC research brought hope for a future in which his children, at least, would be protected from certain types of physical pain and suffering.

One respondent who provided contact information asked if we might communicate further by e-mail rather than by telephone. We agreed.²³⁴ This interviewee (whom we call “Theresa”) was a married mother of two, in her thirties. Theresa reported on the questionnaire that she neither favored nor opposed ESC research.²³⁵ We were surprised, before speaking with her, because all of the other respondents who had agreed further to communicate with us had clear positions about ESC research.²³⁶

In fact, it emerged that Theresa also had intense feelings about the subject. It became clear that she reported that she neither favored nor

230. *Id.* In particular, Rob spoke about a child with diabetes and a child with Crohn’s Disease. *Id.*

231. *Id.*

232. *Id.*

233. *Id.*

234. First E-mail from Theresa, *supra* note 156. We sent this respondent a set of questions by e-mail. She responded to most of the questions. E-mail from Janet L. Dolgin, Professor of Law, Hofstra Law School, to Survey Respondent g1880546 (“Theresa”) (Feb. 5, 2008, 10:28 EST) [hereinafter E-mail from Janet L. Dolgin] (on file with the Hofstra Law Review); E-mail from Survey Respondent g1880546 (“Theresa”), to Janet L. Dolgin, Professor of Law, Hofstra Law School (Feb. 5, 2008, 13:33 EST) [hereinafter Second E-mail from Theresa] (on file with the Hofstra Law Review). We then asked a set up follow-up questions. She responded to each of these questions. *See* E-mail from Survey Respondent g1880546 (“Theresa”), to Janet L. Dolgin, Professor of Law, Hofstra Law School (Feb. 5, 2008, 19:14 EST) [hereinafter Third E-mail from Theresa] (on file with the Hofstra Law Review).

235. E-mail from Janet L. Dolgin, *supra* note 234.

236. Six of the interviewees either strongly favored (Carolyn, Rick, Rob, and Sue) or strongly opposed (Angela and Mitchell) ESC research. *See* Telephone Interview with Carolyn, *supra* note 168; Telephone Interview with Rick, *supra* note 155; Telephone Interview with Rob, *supra* note 214; Telephone Interview with Sue, *supra* note 214; Telephone Interview with Angela, *supra* note 168; Telephone Interview with Mitchell, *supra* note 172. Two others opposed it (Don and Theresa). *See* Telephone Interview with Don, *supra* note 164; Second E-mail from Theresa, *supra* note 234; Third E-mail from Theresa, *supra* note 234. One interviewee indicated he was not really in favor of ESC research but could not explain it (Ariadne). *See* Telephone Interview with Ariadne, *supra* note 168.

opposed ESC research because she was conflicted about the subject, rather than because she was neutral about it.

Theresa had an abortion when she was seventeen.²³⁷ Yet, she continued to regret having had an abortion.²³⁸ She had the pregnancy terminated at nine weeks gestation for what she described as “purely selfish” reasons.²³⁹ Contemplating ESC research over a decade and a half later, Theresa was torn between the “very good things [that] are coming from this kind of research” and her difficulty “get[ing] past the idea that these embryo’s [sic] could someday be a child that someone is destroying.”²⁴⁰ At the time of the e-mail interview, Theresa attended a Baptist church.²⁴¹ She was not sure whether the church had a position about ESC research, but if she found that it did, that would “affect [her] opinion” about the research.²⁴²

Theresa believed that abortion should generally be permitted, but asserted that it should be prohibited after the “20th week of pregnancy unless the life of the mother is threatened.”²⁴³ Theresa thus distinguished between her own regret at having aborted an adolescent pregnancy at nine-weeks gestation and her general position that abortion should be permitted until about the middle of the second trimester.²⁴⁴ Theresa asserted that her church shared her position on abortion.

Thus, almost all of those whom we interviewed had a clear view about ESC research and most of the interviewees had internalized that view and integrated it with understandings of their own life stories. For these interviewees, questions about ESC research constituted a social Rorschach test. Thus, responses to questions about ESC research indicated interviewees’ attitudes toward a far-ranging collection of matters, including family, parentage, abortion, illness, suffering, religion, and personhood.

V. CONCLUSION

Two hundred seventy-nine respondents completed the survey questionnaire.²⁴⁵ Of these, nine agreed to be interviewed in greater depth

237. Second E-mail from Theresa, *supra* note 234.

238. *Id.*

239. *Id.*

240. Third E-mail from Theresa, *supra* note 234

241. *Id.*

242. Second E-mail from Theresa, *supra* note 236

243. *Id.*

244. *Id.*

245. *See infra* app. I.A.

about the subject.²⁴⁶ Given the size of the study population, the survey findings must be viewed as exploratory. In that light, the quantitative and qualitative data, read together, suggest a number of conclusions.

First, we expected to find a significant relationship between respondents' drawings of the five-day embryo and their attitudes toward ESC research. Similarly, we expected that respondents' attitudes about ESC research would correlate with their estimates of the size of the embryo at five days of development. These expectations were not borne out by the data. Most of the respondents (both those favoring and those opposing ESC research) had a fairly accurate understanding of the early embryo. That may be a product of the widespread media attention given to ESC research in the last decade, and especially in the last five years. This suggestion is supported, though indirectly, by the absence of a relationship between respondents' understanding of the early embryo and their having had or not having had a post-high school biology course.²⁴⁷ This suggests that, although some respondents may have learned about embryonic development in science courses, others, who view early embryos accurately, learned about embryos outside the context of formal courses in biology.

Second, attitudes toward embryos and ESC research may be open to reevaluation. The survey instrument was distributed in the fall 2007, and interviews were conducted in early 2008.²⁴⁸ Developments relevant to ESC research appear and are reported frequently in public media.²⁴⁹ Several occurred during the period in question.²⁵⁰ With each development, and consequent media reports and other commentary about the development and about ESCs more generally, there may be shifts in public attitudes about embryos and ESC research. Several interviewees acknowledged that their attitudes about hESC research, though important to them, were open to reevaluation as new research findings provide more information about the potential benefits (or potential risks) of the research. Moreover, although attitudes toward ESC research have been embedded in the more encompassing debate

246. See *infra* app. I.B.

247. See *supra* note 117.

248. E-mail from Candice Hinds, *supra* note 59; see *supra* Part IV.

249. For instance, in late 2007, two groups of scientists, one in Japan and one in the United States, created human embryonic-like stem cells by "reprogram[ing]" somatic cells. See Gautam Naik, *Advance in Stem-Cell Work Avoids Destroying Embryos*, WALL ST. J., Nov. 21, 2007, at A1. This was done by inserting a few genes into a somatic cell. *Id.* These cells reprogrammed the cells into "embryonic-like" cells. *Id.* At about the same time, a group of researchers in California reported that they cloned a human embryo using somatic cell nuclear transfer. French et al., *supra* note 4, at 1, 6-8.

250. See *supra* note 249.

about abortion,²⁵¹ interview responses, in particular, suggest some readiness to disassociate attitudes about each matter from those about the other.

Third, Catholics and members of various Protestant churches²⁵² proved more likely than others to oppose ESC research.²⁵³ It is not, however, clear whether that is a consequence of their conflating their churches' views about abortion with views about ESC research; their expressly adopting their churches' views about ESC research *because* it is the church's view; or perhaps their having chosen the church with which they affiliate because its spokespeople or parishioners are perceived as having similar views as those of the respondent on a wide variety of social issues (including abortion, hESC research and other, related matters). Each of these possibilities deserves further study.

Fourth, discussion with interviewees suggests that attitudes about hESC research are intensely personal. Even interviewees who acknowledged uncertainty about the scientific facts relevant to hESC research or about the theological implications of the research understood their responses to hESC research as indicating something significant about their own identity as people, their social commitments more generally, and even their deepest hopes and fears. In short, each interviewee wove his or her opinion about hESC research into a larger autobiographical narrative.

Many of our findings (both those from the survey instrument and those from interviews) suggest the need for further study. Confirmation of our findings requires a larger group of survey respondents as well as more in-depth interviewing.

Widespread interest in embryos and ESC research is apparent. Even more, the intensity and complexity of responses among those whom we interviewed echo the intensity and complexity of public responses among theologians, lawmakers, scientists, politicians, and others. As is the case regarding public debate about abortion, debate about embryos and about ESC research provides a context for examining society's deepest values, its assumptions about personhood, and its vision of the future.

251. See *infra* app. II.C.

252. The GPPC's 2005 study found that "Fundamentalist and Evangelical Christians were 10 times more likely than those with no religious affiliation to strongly disapprove of embryonic stem cell research (25 percent vs. 2.5 percent respectively)." HUDSON ET AL., *supra* note 67, at 6.

253. See *infra* app. II.G.

APPENDIX I.A
DEMOGRAPHICS OF FULL RESPONDENT GROUP

| Gender | n | Percent |
|---------------------------------|------------|--------------|
| Male | 113 | 40.5 |
| Female | 165 | 59.1 |
| Did not report | 1 | 0.4 |
| Total | 279 | 100.0 |
| Race | n | Percent |
| Caucasian | 234 | 83.9 |
| African-American | 11 | 3.9 |
| Asian | 10 | 3.6 |
| Hispanic | 16 | 5.7 |
| Other | 8 | 2.9 |
| Total | 279 | 100.0 |
| Age | n | Percent |
| Under 18 | 1 | 0.4 |
| 18 - 29 | 92 | 33.0 |
| 30 - 39 | 38 | 13.6 |
| 40 - 49 | 45 | 16.1 |
| 50 - 59 | 40 | 14.3 |
| 60 - 64 | 11 | 3.9 |
| 65 - 69 | 31 | 11.1 |
| Over 69 | 21 | 7.5 |
| Total | 279 | 100.0 |
| Marital Status | n | Percent |
| Married | 145 | 52.0 |
| Single | 68 | 24.4 |
| Divorced | 25 | 9.0 |
| Widow or Widower | 14 | 5.0 |
| Involved with Significant Other | 27 | 9.7 |
| Total | 279 | 100.0 |

| Religion | n | Percent |
|---|------------|--------------|
| Protestant | 141 | 50.5 |
| Catholic | 64 | 22.9 |
| Jewish | 10 | 3.6 |
| Other | 9 | 3.2 |
| No religious affiliation | 47 | 16.8 |
| Did not report | 8 | 2.9 |
| Total | 279 | 100.0 |
| Yearly household income | n | Percent |
| Less than \$25,000 | 46 | 16.5 |
| \$25,000 to \$30,000 | 29 | 10.4 |
| \$30,001 to \$50,000 | 55 | 19.7 |
| \$50,001 to \$70,000 | 53 | 19.0 |
| \$70,001 to \$100,000 | 40 | 14.3 |
| More than \$100,000 | 26 | 9.3 |
| Did not report | 30 | 10.8 |
| Total | 279 | 100.0 |
| Education | n | Percent |
| Did not complete high school | 4 | 1.4 |
| High school | 33 | 11.8 |
| Trade school after high school | 10 | 3.6 |
| Some college | 142 | 50.9 |
| Graduated college | 57 | 20.4 |
| Some graduate or professional school | 9 | 3.2 |
| Completed graduate or professional school | 23 | 8.2 |
| Did not report | 1 | 0.4 |
| Total | 279 | 100.0 |

APPENDIX I.B
DEMOGRAPHICS OF THOSE INTERVIEWED

| Gender | n | Percent |
|------------------------------------|---|---------|
| Male | 4 | 44.4 |
| Female | 5 | 55.6 |
| Total | 9 | 100.0 |
| Race | n | Percent |
| Caucasian | 8 | 88.9 |
| African-American | 1 | 11.1 |
| Total | 9 | 100.0 |
| Age | n | Percent |
| 18 - 29 | 1 | 11.1 |
| 30 - 39 | 2 | 22.2 |
| 40 - 49 | 2 | 22.2 |
| 50 - 59 | 2 | 22.2 |
| Over 69 | 2 | 22.2 |
| Total | 9 | 100.0 |
| Marital Status | n | Percent |
| Married | 6 | 66.7 |
| Single | 1 | 11.1 |
| Divorced | 1 | 11.1 |
| Involved with Significant Other | 1 | 11.1 |
| Total | 9 | 100.0 |

| Religion | n | Percent |
|--------------------------------|---|---------|
| Protestant | 5 | 55.6 |
| Catholic | 1 | 11.1 |
| Jewish | 2 | 22.2 |
| Did not report | 1 | 11.1 |
| Total | 9 | 100.0 |
| Yearly household income | n | Percent |
| Less than \$25,000 | 1 | 11.1 |
| \$30,001 to 50,000 | 2 | 22.2 |
| \$50,001 to \$70,000 | 3 | 33.3 |
| \$70,001 to \$100,000 | 1 | 11.1 |
| More than \$100,000 | 1 | 11.1 |
| Did not report | 1 | 11.1 |
| Total | 9 | 100.0 |
| Education | n | Percent |
| Trade school after high school | 1 | 11.1 |
| Some college | 4 | 44.4 |
| Graduated college | 4 | 44.4 |
| Total | 9 | 100.0 |

APPENDIX II.A
ATTITUDES TOWARD ESC RESEARCH AND RESPONDENT GROUP

| Location | Attitude Towards Embryonic Stem Cell Research | | | | | | Total |
|----------|---|--------|-------------------------|--------|-----------------|--------|--------|
| | Strongly Favor | Favor | Neither Favor or Oppose | Oppose | Strongly Oppose | | |
| Group 1 | n | 28 | 29 | 22 | 13 | 10 | 102 |
| | % within Location | 27.5% | 28.4% | 21.6% | 12.7% | 9.8% | 100.0% |
| | % within Attitude | 45.2% | 34.9% | 36.7% | 37.1% | 32.3% | 37.6% |
| | % of Total | 10.3% | 10.7% | 8.1% | 4.8% | 3.7% | 37.6% |
| Group 2 | n | 22 | 36 | 17 | 7 | 14 | 96 |
| | % within Location | 22.9% | 37.5% | 17.7% | 7.3% | 14.6% | 100.0% |
| | % within Attitude | 35.5% | 43.4% | 28.3% | 20.0% | 45.2% | 35.4% |
| | % of Total | 8.1% | 13.3% | 6.3% | 2.6% | 5.2% | 35.4% |
| Group 3 | n | 12 | 18 | 21 | 15 | 7 | 73 |
| | % within Location | 16.4% | 24.7% | 28.8% | 20.5% | 9.6% | 100.0% |
| | % within Attitude | 19.4% | 21.7% | 35.0% | 42.9% | 22.6% | 26.9% |
| | % of Total | 4.4% | 6.6% | 7.7% | 5.5% | 2.6% | 26.9% |
| Total | n | 62 | 83 | 60 | 35 | 31 | 271 |
| | % within Location | 22.9% | 30.6% | 22.1% | 12.9% | 11.4% | 100.0% |
| | % within Attitude | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | % of Total | 22.9% | 30.6% | 22.1% | 12.9% | 11.4% | 100.0% |

$\chi^2 = 14.0$, $df = 8$, $p > .05$

APPENDIX II.B
FREQUENCY OF EMBRYO DRAWINGS

| Drawing Type | n | Percent |
|---------------------|------------|----------------|
| Drawing 1 | 141 | 50.5 |
| Drawing 2 | 84 | 30.1 |
| Drawing 3 | 25 | 9.0 |
| Drawing 4 | 17 | 6.1 |
| Drawing 5 | 6 | 2.2 |
| Missing | 6 | 2.2 |
| Total | 279 | 100.0 |

APPENDIX II.C
ATTITUDES TOWARD ESC RESEARCH AND
UNDERSTANDINGS OF 5-DAY EMBRYO

| Embryo Drawing | Attitude Towards Embryonic Stem Cell Research | | | | | Total | |
|----------------|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------------|
| | Strongly Favor | Favor | Neither Favor nor Oppose | Oppose | Strongly Oppose | | |
| Drawing 1 | n % within Embryo Drawing % within Attitude % of Total | 35 25.2% 56.5% 12.9% | 39 28.1% 47.0% 14.4% | 33 23.7% 55.0% 12.2% | 14 10.1% 40.0% 5.2% | 18 12.9% 58.1% 6.6% | 139 100.0% 51.3% 51.3% |
| Drawing 2 | n % within Embryo Drawing % within Attitude % of Total | 13 16.0% 21.0% 4.8% | 28 34.6% 33.7% 10.3% | 16 19.8% 26.7% 5.9% | 16 19.8% 45.7% 5.9% | 8 9.9% 27.6% 3.3% | 81 100.0% 33.1% 33.1% |
| Drawing 3 | n % within Embryo Drawing % within Attitude % of Total | 6 24.0% 11.1% 2.4% | 8 32.0% 10.7% 3.3% | 6 24.0% 10.9% 2.4% | 2 8.0% 6.3% 0.8% | 3 12.0% 10.3% 1.2% | 25 100.0% 10.2% 10.2% |
| Drawing 4 | n % within Embryo Drawing % within Attitude % of Total | 4 23.5% 6.5% 1.5% | 5 29.4% 6.0% 1.8% | 4 23.5% 6.7% 1.5% | 2 11.8% 5.7% 0.7% | 2 11.8% 6.5% 0.7% | 17 100.0% 6.3% 6.3% |
| Drawing 5 | n % within Embryo Drawing % within Attitude % of Total | 2 33.3% 3.2% 0.7% | 3 50.0% 3.6% 1.1% | 0 0.0% 0.0% 0.0% | 1 16.7% 2.9% 0.4% | 0 0.0% 0.0% 0.0% | 6 100.0% 2.2% 2.2% |
| Total | n % within Embryo Drawing % within Attitude % of Total | 60 22.4% 100.0% 22.4% | 83 31.0% 100.0% 31.0% | 59 22.0% 100.0% 22.0% | 35 13.1% 100.0% 13.1% | 31 11.6% 100.0% 11.6% | 268 100.0% 100.0% 100.0% |

$\chi^2 = 10.9$, $df = 16$, $p = .814$

APPENDIX II.D
EMBRYO DRAWINGS AND UNDERSTANDINGS OF SIZE OF 5-DAY EMBRYO

| Embryo Drawing | How big is an embryo at 5 days of development | | | | | | Total |
|----------------|---|---------------------------------|---------------------------------|--------------------------------|--------------------------------|------------------------------|-----------------------------------|
| | Less than the width of a piece of paper | About the width of a pin's head | About the width of a penny | About the width of a quarter | 4 to 8 inches | | |
| Drawing 1 | n % within Embryo Drawing % within 5 Day Embryo % of Total | 21 15.0% 63.6% 7.7% | 84 60.0% 61.8% 30.9% | 19 13.6% 36.5% 7.0% | 11 7.9% 34.4% 4.0% | 5 3.6% 26.3% 1.8% | 140 100.0% 51.5% 51.5% |
| Drawing 2 | n % within Embryo Drawing % within 5 Day Embryo % of Total | 9 10.7% 27.3% 3.3% | 32 38.1% 23.5% 11.8% | 23 27.4% 44.2% 8.5% | 12 14.3% 37.5% 4.4% | 8 9.5% 42.1% 2.9% | 84 100.0% 30.9% 30.9% |
| Drawing 3 | n % within Embryo Drawing % within 5 Day Embryo % of Total | 1 4.0% 3.0% 0.4% | 12 48.0% 8.8% 4.4% | 6 24.0% 11.5% 2.2% | 3 12.0% 9.4% 1.1% | 3 12.0% 15.8% 1.1% | 25 100.0% 9.2% 9.2% |
| Drawing 4 | n % within Embryo Drawing % within 5 Day Embryo % of Total | 1 5.9% 3.0% 0.4% | 7 41.2% 5.1% 2.6% | 3 17.6% 5.8% 1.1% | 4 23.5% 12.5% 1.5% | 2 11.8% 10.5% 0.7% | 17 100.0% 6.3% 6.3% |
| Drawing 5 | n % within Embryo Drawing % within 5 Day Embryo % of Total | 1 16.7% 3.0% 0.4% | 1 16.7% 0.7% 0.4% | 1 16.7% 1.9% 0.4% | 2 33.3% 6.3% 0.7% | 1 16.7% 5.3% 0.4% | 6 100.0% 2.2% 2.2% |
| Total | n % within Embryo Drawing % within 5 Day Embryo % of Total | 33 12.1% 100.0% 12.1% | 136 50.0% 100.0% 50.0% | 52 19.1% 100.0% 19.1% | 32 11.8% 100.0% 11.8% | 19 7.0% 100.0% 7.0% | 272 100.0% 100.0% 100.0% |

$\chi^2 = 27.5$, $df = 16$, $p = .036$

APPENDIX II.F
ATTITUDES TOWARD ESC RESEARCH AND OPINIONS REGARDING ABORTION

| | Opinion Regarding Abortion | | | | Total |
|--|--|---|---|---|---|
| | Abortion should be permitted but there are rare specific circumstances in which it should not be allowed | Abortion should generally be permitted but there are a variety of circumstances in which it should not be allowed | Abortion should generally not be permitted but there are rare specific circumstances in which it should be allowed | Abortion should never be permitted | |
| For or Against Embryonic Stem Cell Research | Abortion should not be restricted | Abortion should be permitted but there are rare specific circumstances in which it should not be allowed | Abortion should generally be permitted but there are rare specific circumstances in which it should be allowed | Abortion should never be permitted | |
| | n | n | n | n | n |
| | % within For or Against % within Opinion % of Total | % within For or Against % within Opinion % of Total | % within For or Against % within Opinion % of Total | % within For or Against % within Opinion % of Total | % within For or Against % within Opinion % of Total |
| Favor | 51 35.2% | 23 15.9% | 37 25.5% | 29 20.0% | 5 3.4% |
| Neither | 7 11.7% | 10 16.7% | 12 20.0% | 28 46.7% | 3 5.0% |
| Oppose | 0 0.0% | 1 1.5% | 3 4.5% | 41 62.1% | 21 31.8% |
| Oppose | 0 0.0% | 2 2.9% | 5 8.8% | 41 62.1% | 21 31.8% |
| Total | 58 21.4% | 34 12.5% | 52 19.2% | 98 36.2% | 29 10.7% |
| | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | 21.4% | 12.5% | 19.2% | 36.2% | 10.7% |

$\chi^2 = 109.6$, $df = 8$, $p < .001$

APPENDIX II.G
ATTITUDES TOWARD ESC RESEARCH AND RESPONDENT'S RELIGION

| | Participant's Religion | | | | | | Total |
|--|------------------------|----------|--------|--------|--------------------------|--------|-------|
| | Protestant | Catholic | Jewish | Other | No religious Affiliation | | |
| For or Against Embryonic Stem Cell Research | | | | | | | |
| Favor | n 63 | 31 | 9 | 5 | 36 | 144 | |
| % within For or Against | 43.8% | 21.5% | 6.3% | 3.5% | 25.0% | 100.0% | |
| % within Religion | 46.0% | 48.4% | 90.0% | 71.4% | 76.6% | 54.3% | |
| % of Total | 23.8% | 11.7% | 3.4% | 1.9% | 13.6% | 54.3% | |
| Neither | n | | | | | | |
| Favor nor | 37.0% | 14.0% | 0.0% | 0.0% | 9.0% | 60.0% | |
| Oppose | 61.7% | 23.3% | 0.0% | 0.0% | 15.0% | 100.0% | |
| % within Religion | 27.0% | 21.9% | 0.0% | 0.0% | 19.1% | 22.6% | |
| % of Total | 14.0% | 5.3% | 0.0% | 0.0% | 3.4% | 22.6% | |
| Oppose | n | | | | | | |
| Favor | 37 | 19 | 1 | 2 | 2 | 61 | |
| % within For or Against | 60.7% | 31.1% | 1.6% | 3.3% | 3.3% | 100.0% | |
| % within Religion | 27.0% | 29.7% | 10.0% | 28.6% | 4.3% | 23.0% | |
| % of Total | 14.0% | 7.2% | 0.4% | 0.8% | 0.8% | 23.0% | |
| Total | n | | | | | | |
| Favor | 137 | 64 | 10 | 7 | 47 | 265 | |
| % within For or Against | 51.7% | 24.2% | 3.8% | 2.6% | 17.7% | 100.0% | |
| % within Religion | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | |
| % of Total | 51.7% | 24.2% | 3.8% | 2.6% | 17.7% | 100.0% | |

$\chi^2 = 24.6$, $df = 8$, $p = .002$

APPENDIX II.H
RESPONDENTS' UNDERSTANDING OF THEIR RELIGION'S OPINION ON ESC

| Religion | Understanding of Your Religion's Opinions on Embryonic Stem Cell Research | | | | | Total |
|------------|---|------------------------|--------------------|--------------|--------|--------|
| | Would Always Permit | Would Sometimes Permit | Would Never Permit | I Don't Know | | |
| Protestant | n | 13 | 19 | 26 | 70 | 128 |
| | % within Religion | 10.2% | 14.8% | 20.3% | 54.7% | 100.0% |
| | % within Understanding of Total | 46.4% | 54.3% | 40.6% | 69.3% | 56.1% |
| Catholic | n | 2 | 9 | 35 | 16 | 62 |
| | % within Religion | 3.2% | 14.5% | 56.5% | 25.8% | 100.0% |
| | % within Understanding of Total | 7.1% | 25.7% | 54.7% | 15.8% | 27.2% |
| Jewish | n | 4 | 3 | 0 | 2 | 9 |
| | % within Religion | 44.4% | 33.3% | 0.0% | 22.2% | 100.0% |
| | % within Understanding of Total | 14.3% | 8.6% | 0.0% | 2.0% | 3.9% |
| Other | n | 2 | 2 | 0 | 3 | 7 |
| | % within Religion | 28.6% | 28.6% | 0.0% | 42.9% | 100.0% |
| | % within Understanding of Total | 7.1% | 5.7% | 0.0% | 3.0% | 3.1% |
| Total | n | 21 | 33 | 61 | 91 | 206 |
| | % within Religion | 10.2% | 16.0% | 29.6% | 44.2% | 100.0% |
| | % within Understanding of Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

$\chi^2= 50.7, df = 9, p < .001$

APPENDIX II.I
 ATTITUDES TOWARD ESC RESEARCH AND RESPONDENTS' UNDERSTANDINGS OF
 THEIR OWN RELIGION'S OPINION ON ESC RESEARCH

| | Understanding of Your Religion's Opinions on Embryonic Stem Cell Research | | | | | |
|---|---|------------------------|--------------------|--------------|--------|--|
| For or Against Embryonic Stem Cell Research | Would Always Permit | Would Sometimes Permit | Would Never Permit | I Don't Know | Total | |
| Favor | 18 | 21 | 17 | 42 | 98 | |
| n | | | | | | |
| % within For or Against | 18.4% | 21.4% | 17.3% | 42.9% | 100.0% | |
| % within Understanding | 94.7% | 63.6% | 27.9% | 47.7% | 48.8% | |
| % of Total | 9.0% | 10.4% | 8.5% | 20.9% | 48.8% | |
| Neither | 1 | 11 | 11 | 24 | 47 | |
| n | | | | | | |
| % within For or Against | 2.1% | 23.4% | 23.4% | 51.1% | 100.0% | |
| % within Understanding | 5.3% | 33.3% | 18.0% | 27.3% | 23.4% | |
| % of Total | 0.5% | 5.5% | 5.5% | 11.9% | 23.4% | |
| Oppose | 0 | 1 | 33 | 22 | 56 | |
| n | | | | | | |
| % within For or Against | 0.0% | 1.8% | 58.9% | 39.3% | 100.0% | |
| % within Understanding | 0.0% | 3.0% | 54.1% | 25.0% | 27.9% | |
| % of Total | 0.0% | 0.5% | 16.4% | 10.9% | 27.9% | |
| Total | 19 | 33 | 61 | 88 | 201 | |
| n | | | | | | |
| % within For or Against | 9.5% | 16.4% | 30.3% | 43.8% | 100.0% | |
| % within Understanding | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | |
| % of Total | 9.5% | 16.4% | 30.3% | 43.8% | 100.0% | |




$\chi^2 = 48.5$ df = 6, p < .001

APPENDIX II.J
 ATTITUDES TOWARD ESC RESEARCH AND RESPONDENTS' UNDERSTANDINGS OF
 THEIR OWN RELIGION'S OPINION ON ABORTION




| For or Against Embryonic Stem Cell Research | Understanding of Your Religion's Opinions on Abortion | | | | | Total |
|---|---|------------------------|--------------------|--------------|--------|--------|
| | Would Always Permit | Would Sometimes Permit | Would Never Permit | I Don't Know | | |
| Favor | n | 7 | 24 | 36 | 31 | 98 |
| | % within For or Against | 7.1% | 24.5% | 36.7% | 31.6% | 100.0% |
| | % within Understanding % of Total | 77.8% | 61.5% | 33.3% | 66.0% | 48.3% |
| Neither Favor nor Oppose | n | 2 | 11 | 24 | 11 | 48 |
| | % within For or Against | 4.2% | 22.9% | 50.0% | 22.9% | 100.0% |
| | % within Understanding % of Total | 22.2% | 28.2% | 22.2% | 23.4% | 23.6% |
| Oppose | n | 0 | 4 | 48 | 5 | 57 |
| | % within For or Against | 0.0% | 7.0% | 84.2% | 8.8% | 100.0% |
| | % within Understanding % of Total | 0.0% | 10.3% | 44.4% | 10.6% | 28.1% |
| Total | n | 9 | 39 | 108 | 47 | 203 |
| | % within For or Against | 4.4% | 19.2% | 53.2% | 23.2% | 100.0% |
| | % within Understanding % of Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| | | 4.4% | 19.2% | 53.2% | 23.2% | 100.0% |

$\chi^2 = 33.9$, $df = 6$, $p < .001$


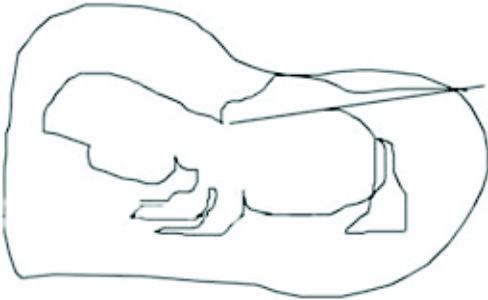

APPENDIX III.A
SAMPLE DRAWINGS

| Category | Drawing |
|----------|---|
| 1 |  |
| 1 |  |
| 2 |  |



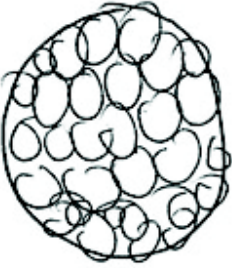
APPENDIX III.A (CONT.)
SAMPLE DRAWINGS

| Category | Drawing |
|----------|---|
| 3 |  |
| 4 |  |
| 5 |  |


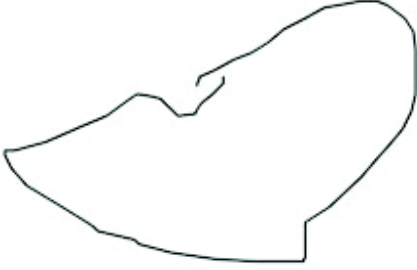

APPENDIX III.B
INTERVIEWEES' DRAWINGS

| Interviewee | Category | Drawing |
|-------------|----------|--|
| G1880546 | 3 |  |
| 2720519 | 4 |  |
| 2975772 | 4 |  |

APPENDIX III.B (CONT.)
INTERVIEWEES' DRAWINGS

| Interviewee | Category | Drawing |
|-------------|----------|--|
| 1939894 | 3 |  |
| G2219815 | 2 |  |
| H008 | 1 |  |

APPENDIX III.B (CONT.)
INTERVIEWEES' DRAWINGS

| Interviewee | Category | Drawing |
|-------------|----------|---|
| 2589358 | 1 |  |
| G2582458 | 2 |  |
| 2767992 | 1 |  |

APPENDIX IV
ONLINE SURVEY QUESTIONS

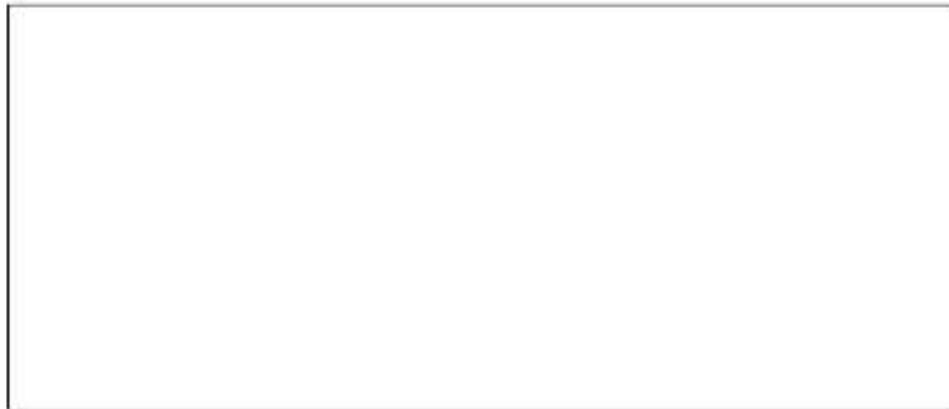
Picturing the Early Embryo

Part I

In the box below please draw an embryo as you imagine it looks on the fifth day of development.

We don't expect you to make the drawing the same size that you envision the embryo to be at five days. Please don't refer to any outside source, either printed or online. Also, please don't talk with anyone about your drawing either before or while making it. After you complete the survey, you should of course feel free to discuss your drawing with anyone.

Q1 Your drawing will not be assessed for artistic talent. So, don't try to make it perfect.

A large empty rectangular box with a thin black border, intended for the respondent to draw an embryo as they imagine it looks on the fifth day of development.

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Q2 **How big do you think an embryo is at day 5 of development?**

- Less than the width of a piece of paper*
- About the width of a pin's head*
- About the width of penny*
- About the width of a quarter*
- 4 to 8 inches*
- More than 8 inches*

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Part II

You may already be well-informed on the subject, but please read the following brief description of embryonic stem cells and embryonic stem cell research, and then indicate your attitude about it:

Embryonic stem cells are undifferentiated cells. They can be extracted for use in biomedical research from the inner cell mass of an embryo 5 days after conception, but an embryo cannot survive that process. Human embryonic stem cells are important because they have the potential to develop into specialized cells in the human body.

Q3 **What is your attitude toward embryonic stem cell research?**

- Strongly Favor
- Favor
- Neither favor or oppose
- Oppose
- Strongly oppose
- No opinion

Q4 **Do you think a 5 day old embryo is most like:**

- A thing
- A clump of cells
- A ball of cells
- A human organ
- A potential person
- A person
- Other

Other - Please Specify:

Q5 **Have you or your partner ever had fertility treatments?**

- Yes
- No

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

- Q6** If you had fertility treatments was it *in vitro* fertilization (IVF)?
- Yes
 - No
 - Not applicable
- Q7** If you had IVF was it successful?
- Yes
 - No
 - Not applicable
- Q8** Were you or was anyone close to you conceived through IVF?
- Yes
 - No
- Q9** Have you or your partner ever had a medically-induced abortion (whether by medication or a procedure in the doctor's office)?
- Yes
 - No
- Q10** Have you or your partner ever had a miscarriage?
- Yes
 - No
- Q11** Did you take a biology course after high school?
- Yes
 - No

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Part III

Q12

Below are a number of statements regarding abortion. Please indicate which best describes your opinion.

- Abortion should not be restricted.
- Abortion should be permitted, but there are rare specific circumstances in which abortion should not be allowed.
- Abortion should generally be permitted, but there are a variety of circumstances in which abortion should not be allowed.
- Abortion should generally **not** be permitted, but there are rare specific circumstances in which abortion should be allowed.
- Abortion should **never** be permitted.

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Part IV

Q13

Religious affiliation:

Protestant

Catholic

Jewish

Eastern Orthodox

Other - Please Specify

Muslim

Buddhist

Hindu

No religious affiliation

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Q14 Please specify religious branch, if relevant:

Q15 How often do you attend religious services?

- Daily
- Weekly
- Monthly
- Every few months
- Once or twice a year
- Never

Q16 If authorities in your religion have stated opinions on any of the following, what is your understanding of those opinions?

| | Would always permit | Would sometimes permit | Would never permit | I do not know | Not applicable |
|------------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| Embryonic stem cell research | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| In vitro fertilization (IVF) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Abortion | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Contraception | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q17 Do you or does someone close to you have a medical condition that you have heard might be treated or even cured as a result of research using human embryonic stem cells?

- Yes
- No

Q18 Are you adopted?

- Yes
- No

Q19 Do you have a child who is adopted?

- Yes
- No

The following question is optional:

Q20 Sexual orientation

- Heterosexual
- Homosexual
- Bisexual
- Unsure

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Part V

This is the last part of the survey.

Q21 What is your age?

- Under 18
- 18-29
- 30-39
- 40-49
- 50-59
- 60-64
- 65-69
- Over 69

Q22 What formal education have you had?

- Did not complete high school
- High school
- Trade school after high school
- Some college
- Graduated college
- Some graduate or professional school
- Completed graduate or professional school

Q23 Please enter your 5 digit zip code

Q24 Sex:

- Male
- Female

Q25 Marital Status:

- Married
- Single
- Divorced
- Widow or Widower
- Involved with a significant other
- Would rather not say

Q26 Were you born in the United States?

- Yes
- No

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Q27

Race:

- White
- Black
- Asian
- Hispanic
- Other - Please specify

Q28

How many children do you have?

The following question is optional:

Q29

Yearly household income

- Less than \$25,000
- From \$25,000 to \$30,000
- From \$30,001 to \$50,000
- From \$50,001 to \$70,000
- From \$70,001 to \$100,000
- More than \$100,000

APPENDIX IV (CONT.)
ONLINE SURVEY QUESTIONS

Q30 If you would like to be interviewed about some of the issues raised in this questionnaire, please supply your name and contact information (email and telephone number) in the box below.

Please be assured that only the person who interviews you will know your name.
If you would like to be interviewed, but would like your answers on the survey to remain anonymous even from the researchers, send us an email at ResearchSurvey@Hofstra.edu later today or in the next few days.