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Ethical Problems with Infertility Treatments: Attitudes and Explanations*

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Abstract

Although media coverage of infertility treatments has increased markedly over the past decade, there is a dearth of empirical information about public perceptions of the ethics of infertility procedures (e.g. artificial insemination, in-vitro fertilization, donor eggs, surrogate mothering, gestational carriers) and about the factors that shape them. Two representative telephone survey samples (930 adults in a Midwestern state, and 580 adult women aged 25 to 50 in the North Central region) are analyzed to gauge public views on the ethics of infertility treatments and estimate the effects of social structure and exposure on these views. Ethical concerns were viewed as more serious for techniques that could result in a child who may not be biologically related to the woman or her partner than for those yielding a child biologically related to both parents. Social structural factors such as age and education were the strongest predictors of attitudes towards the ethics of infertility treatments. Neither parenthood nor experiencing infertility was related to ethical concerns, although women reporting the use of infertility services had fewer ethical concerns than their counterparts.

Advances in medical technology have had major impacts on human reproduction. The development of effective contraceptive methods has reduced unwanted fertility, and the development of a variety of drugs and procedures has, for the first time, permitted women with fertility problems to reasonably expect that they can fulfill their desires to have children (Bondolfi, 1998; CDCP, 2000; Wright, Schieve, Reynolds, & Jeng, 2003). Assisted Reproductive Technology (ART) is the phrase most commonly used to describe medical

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techniques which increase the likelihood that a woman will have a child. These techniques include artificial insemination, stimulation of ovulation and methods which involve manipulation of the egg or the sperm in the laboratory (Mitchell, 2002; Rebar & DeCherney, 2004) as well as those involving donor eggs or sperm and in vitro fertilization.

Progress in assisted reproductive technologies (ART), however, has raised a number of ethical concerns. Ethical issues include the risks of some infertility techniques, such as multiple pregnancies and the use of selective abortions (Mitchell, 2002; Parens & Knowles, 2003; Rebar & DeCherney, 2004). Others revolve around issues of what constitutes a family and relatedness and whether people find it problematic for children to come into a family in ways other than biological parents giving birth to biological children unaided by technology (Macklin, 1991). The popular press is replete with articles about people's experiences and attitudes regarding infertility treatments, so we expect that the general awareness of these techniques is high. Little is known, however, about how ethical and moral concerns have impacted acceptance of these techniques by the public, or about the factors that account for variation in these public concerns.

This paper has two research goals. The first is to assess the extent to which ethical concerns in representative samples of the public vary by reproductive technique. Some reproductive techniques are more likely to result in the birth of a child not biologically related to one or both parents. We examine whether differences in the ethical concerns about techniques are affected by the difference in biological relatedness. Fisher (2003) argues that if one examines actual adoption behavior and not simply attitudes, adoption may still be a "devalued status in the sense that Americans regard it as a last alternative to having biological children" (p. 353). The public overwhelmingly says it is in favor of adoption as a way of providing families for children without them, but actually adopting is a rare event undertaken only when all other options that can lead to a biologically related child are exhausted. We expect respondents will have greater ethical issues with donor insemination, surrogate mothering and gestational carriers than with other techniques such as in-vitro fertilization and insemination with the husband's sperm, because each of these three techniques is likely to result in the birth of a child who is not biologically related to his/her parents or is not carried to term by the biological mother.

The second goal of the paper is to examine the sources of variations between individuals in their ethical concerns with ART when we combine the rating of different techniques. We explore the influences of a person's social background and his/her exposure to infertility on his/her perceptions of the ethics of ART. Social structural sources of variation include characteristics of age, race, education, income and gender. Exposure to infertility issues can entail either direct experiences, or from exposure to value and belief systems. Having personally experienced infertility or sought treatment for it or knowing people with infertility problems would be examples of exposure effects, whereas the effects of religiosity and liberal versus conservative political and social orientation would be examples of exposure to value and belief systems.

We examine these goals in two samples; the first is a representative probability sample of male and female adults in a Midwestern state, and the second is a representative probability

sample of women ages 25 to 50 in eight states in the Midwest region. Perceptions of the ethics of ART were measured similarly in both studies. The use of two samples allows us to overcome some of the limitations in each. One sample allows the examination of gender effects but contains no direct measures of experience with infertility. The second sample has a smaller age range and is confined to women only but does have measures of exposure to infertility and attitudes towards more assisted reproductive techniques.

Theoretical Framework and Research Hypotheses

Dramatic economic and social changes over the past several decades in U.S. society have greatly affected the timing and patterns of childbearing. Opportunity costs for women who take time out of the paid labor force, combined with the high cost of raising and educating children, have encouraged women to postpone having children and to have fewer children (Gerson, 1985; Morgan & King, 2001). Though delaying childbearing can have positive benefits for women and families economically (Waldfogel, 1997), it can also increase the likelihood of experiencing infertility (Menken, Trussell, & Larsen, 1986). Reported infertility rates have increased in the U.S., with an estimated 51% of women in 2005-2006 reporting that they have experienced infertility at some point in their lives (Johnson & White, 2009).

Cultural lag theory

Advances in medical technologies and increasing demand have expanded women's options for infertility treatments. ART has changed reproduction such as it no longer means that children are necessarily born to heterosexual coupled parents; unpartnered women and gay couples can now have a biological child outside of a traditional heterosexual relationship, and techniques such as surrogate mothering, egg and sperm donation, and in vitro fertilization provide opportunities for infertile adults to become parents in non-traditional ways (Rifkin, 1998). It is unclear, however, how the public views these techniques, though religious affiliation, sensationalist media reports, and personal experience likely affect individual attitudes and perceptions. Cultural lag theory posits that technology often advances more rapidly than social guidelines or comfort for their use; the time between invention and diffusion of a new technology and cultural adjustments and acceptance is the lag period (Ogburn, 1922). Cultural lag considerations are relevant for understanding utilization of medical technologies, particularly for stigmatized, non-life-threatening conditions. For example, Marshall, Georgievskava, and Georgievsky (2009) utilized cultural lag theory to examine patterns of social acceptance and critique following the introduction of Valium and Prozac. They claim that demands for rapid introduction were followed by growing criticism and recommendations for more restrictive usage.

Cultural lag theory is particularly relevant for attitudes regarding the ethics of ART because of the rapid pace of technology development accompanied by critiques from religious institutions such as the Catholic Church (U.S Catholic Bishops, 2009) and increased discourse in the media. Infertility is not generally life-threatening, so people may perceive ART to be largely unnecessary. One the other hand, the U.S. is often described as a pronatalist society, and there is a stigma associated with remaining childless (Ridgeway & Correll, 2004; Ulrich & Weatherall, 2000). People may therefore be empathic towards those

who experiencing difficulties conceiving or bearing children, increasing the acceptability of ART.

We utilize insights from cultural lag to help explain variation in attitudes of the ethics of ART. Three primary considerations should help account for variations; 1) biological-relatedness of a child resulting from ART; 2) social structure position; and 3) exposure to beliefs or the experience of infertility. Each consideration suggests specific concepts that should be associated with attitudes regarding ART.

Biological-relatedness and attitudes toward Assisted Reproductive Technologies (ART)

We expect that ART that result in children not biologically related to one or both parents or not carried to term by the mother will be rated by respondents as having more serious ethical concerns than those techniques which result in children being biologically related to both parents and carried to term by the mother. Because insemination with the husband's sperm and in vitro fertilization result in children who are biologically related to both parents, we expect respondents to report the fewest ethical concerns about these techniques. Sperm and egg donation, gestational carriers and surrogate mothering are techniques that result in children who are not biologically related to one or both of their parents or may not be carried to term by the mother (Stacey, 1996).

Social structure and attitudes toward ART

There is ample evidence in the infertility literature to suggest that women respond to the experience of fertility differently than men (Greil, 1997). Because the experience of infertility more directly affects women, we expect that women will be more likely than men to find ART to be ethical. Younger respondents are more likely to have grown up with media presentations focusing on infertility and new techniques for its resolution than were older respondents, and their attitudes have been formed during a time where discussions about infertility were more open and information was plentiful, decreasing the cultural lag between the introduction of the new technology and its acceptance among younger persons. We expect that older compared to younger respondents are more likely to believe that infertility techniques pose ethical problems.

Previous studies have shown that increased years of schooling result in greater tolerance and acceptance of new ideas and technologies. For example, Singer, Corning et al. (1999) found that those respondents with higher levels of education tend to be more accepting of genetic testing than those with lower levels of education. We expect to find that ethical concerns about ART will decline with greater educational attainment because of the reduced effects of a cultural lag with increased education.

Respondent's level of income may impact ethical perceptions as those possessing higher incomes have increased access to opportunity and to greater amounts of information (Kingston, Hubbard, Lapp, Schroeder, & Wilson, 2003). Because many ART procedures are not covered by insurance and are often quite expensive, they present a more viable option to persons with greater economic resources. We expect that as household income increases, fewer ethical concerns will be expressed, and that the relationship will remain after controlling for educational attainment.

Exposure and attitudes toward ART

We treat religiosity as an indicator of exposure because it encompasses both the views and beliefs into which the respondent was socialized as well as the continued influence and exposure to religious beliefs and contact with persons holding similar views. Research evidence suggests that people with strong religious beliefs tend to be more traditional in lifestyle choices, gender ideology, and marriage and family patterns (Grasmick, Wilcox, & Bird, 1990; Jensen & Jensen, 1993; Morgan, 1987). The more religious also tend to hold more conservative views toward genetic testing and are less likely to want a prenatal test for themselves or their spouses (Singer, Corning, & Lamias, 1998). We expect that respondents with higher levels of church attendance and those who are more religious will be more likely to think that infertility techniques pose ethical issues than will respondents with lower levels of church attendance and religiosity.

General liberal political and social views held by respondents may also impact the perceptions of the ethics of ART. Hout (1999) found that respondents with more conservative political views are less likely to be pro-choice on the abortion issue than those with more liberal political views. Therefore, we expect a similar effect will be found for ART attitudes.

The presence of children in the household may also affect ART attitudes, although we are uncertain about the direction of the effect. It may be that respondents with no infertility-related problems in having their own family may view many infertility techniques as unnecessary and thus weigh their views towards the ethical concerns of the techniques rather than the outcomes. On the other hand, people with children may have greater empathy for couples who have difficulty conceiving and focus more on the positive outcomes for couples than on the potential ethical concerns that some of these techniques might pose.

We expect that knowing someone with infertility problems should decrease ethical concerns about ART. For similar reasons, we expect that persons themselves seeking infertility treatments should find ART to be more ethically acceptable than their counterparts. Because persons who know someone with infertility issues or have sought treatment themselves are likely to have greater degrees of understanding and interest in treatments, and perhaps more empathy for people experiencing infertility, we expect these experiences will, to some degree, mitigate ethical concerns.

Data and Methods

Samples

The survey data for the Midwestern State Study (Sample I) were gathered through a random digit dialing telephone survey conducted between November 2000 and April 2001. The respondents were 19 years of age and older at the time of the interviews. The sample was representative of adults in households with telephones in a Midwestern state. The respondent in the contacted households was selected at random from the adults living there. The cooperation rate was 76 percent. The response rate was 49 percent. The infertility items were included on a random half of an omnibus survey of 1,800 respondents with 930 cases

having the ART items. The data were weighted to adjust for differences from the population in the demographic characteristics of the respondents.

The Midwest Region Study (Sample II) data were gathered through telephone interviews with a random sample of women ages 25 to 50 residing in 12 Midwestern states. The research was conducted in the spring of 2002. Households were identified through random digit dialing and screened for the presence of a female ages 25-50. Census Tracts with 40% or more minority residents were over sampled. The cooperation rate was 75%, and the response rate was 60%. The sample was 15% African American compared to 11% in the region's population. Interviews were conducted in English only, so the sample slightly under-represents Latinas (3.8% compared to 4.5% in the 12-state area). The age distribution of the sample was virtually identical to that of women ages 25-50 in the 12-state region. As is usual in survey research, the sample over-represents well-educated women, with 36% reporting a college degree compared to 27% in the Census.

Dependent Variables

The primary outcome variables were the separate items rating ethical problems with each technique and a scale combining the items to assess the extent to which the respondent views assisted reproductive techniques (ART) as posing ethical problems. In Sample I, the perception of ethical problems with infertility techniques was measured as the respondent's mean score on three items asking whether specific infertility treatment techniques (1: sperm donation and artificial insemination, 2: surrogate mothering, and 3: in vitro fertilization) posed ethical problems. Respondents were asked to assign a rating of from 1 to 5 with 1 being no ethical problem and 5 a serious ethical problem. The alpha reliability for the scale was .77. Higher scale scores corresponded to greater seriousness of the ethical problems posed by the procedures. We used a z-scored version of the scale in the regression analyses. The three items were also analyzed separately when we examined differences in ethical concerns with the assisted reproductive procedures.

In Sample II, perceptions of ethical problems with infertility treatments was measured by the mean of six items measuring attitudes toward the ethics of artificial reproductive technology (1: insemination with husband's sperm, 2: insemination with donor sperm, 3: in vitro fertilization, 4: use of donor eggs, 5: surrogate mothering, and 6: using a gestational carrier). Each item was measured with three ordered categories; (1) no ethical problem, (2) some ethical problems, or (3) serious ethical problems. The items were examined separately and combined into a summated scale. The alpha for the six-item scale was .89. The higher the score, the more serious ethical problems the respondents had with ART. The Z-scored version of the scale was also used in the regression analyses for greater comparability with the scale in Sample I. For comparability, we also created a three-item version based on the same three ART procedures assessed in Sample I. The alpha for the three-item scale was .78. The two versions were highly correlated (.98), so we used the more reliable six-item scale in the analyses. We also repeated the analyses using the three-item scale and found little difference in the results.

Independent Variables

Five independent variables were measured in similar ways in both of the samples. Age of the respondent was measured in years of age. Total family income was measured in twelve income categories ranging from under \$5,000 to over \$100,000. Race was included in both surveys, but was treated differently in the analyses of the two samples. Because of the small numbers of non-white respondents in Sample I, race was represented in the analyses by a binary variable contrasting whites with all others race/ethnic categories. Sample II included an over-sample of minorities, so we had adequate cases to code race into three categories; Non-Hispanic white, black and other races. Marital status was coded into four categories (married, never married, divorced and separated, and widowed) in Sample I. Because Sample II was restricted to women between the ages of 25 and 50, there were very few (n=5) widowed women in the sample and they were included in the married category (excluding the 5 widowed women from the analysis had no substantive effect on the findings). In Sample I, religiosity was measured by church attendance with eight ordinal categories ranging from (1) never to (8) several times a week. In Sample II, religiosity was measured by a scale composed of three items: how much the respondent believed religion influenced her life, how frequently she prayed, and how close she felt to God. Higher scores indicate higher levels of religiosity. The scale was computed as the respondent's mean score of these three items, and the alpha reliability was .77. About 87 percent of respondents in both samples were Catholic or Protestant. Experience with children was measured differently in the two studies. In Sample I, the only available information on children was the number of children currently living in the household, which was used here. In Sample II, the question used was whether or not the women had ever given birth to a child.

Four independent variables were available only in Sample I. The gender of the respondent (0=male; 1=female) was defined as a dichotomous variable. Respondents were asked if they knew anyone who had been unable to have children or had problems getting pregnant (0=no; 1=yes). The political-social views of the respondent were assessed by a single item ("Liberal and conservative are terms often used to describe people's beliefs about politics and government. In general, do you see yourself politically as very liberal, liberal, middle-of-the-road, conservative, very conservative, or something else?"). Five ordered response categories were used (1 - 5) with the highest score assigned to very liberal.

Five independent variables were available only in Sample II. The respondent's perception of the importance of children and having a family was measured on a 4-point ordinal scale ("How important is each of the following in your life? Raising children and having a family?"). A higher score indicates that it was more important to the respondent to have a family. Another item measuring parenting attitudes ("I think I would find parenting as satisfying with adopted children as with my own biological children") was also measured on a four point ordinal scale (1 to 4) with the higher number indicating greater agreement with the item. The respondent's experience with infertility was measured by an item which asked if she thought of herself as someone who has or has had fertility problems (coded 0=no, 1=yes). Finally, the women were asked if they had ever sought medical treatment for infertility (0=no, 1=yes).

Methods of Analysis

We first examine how ethical concerns vary by the ratings of the ART items in the two samples and then explore in multiple regression models the determinants of the scales measuring ethical problems with ART. To retain the maximum number of cases in the analyses, we impute missing values with the EM procedure in SPSS (Allison, 2001). Most variables in both data sets had missing information on less than two percent of the cases. The highest missing rate was for family income (9% in Sample I and 14% in Sample II). Sample weights were available for Sample I and were used in the analysis. Robust standard errors, which yield more accurate standard errors with weighted data and are less biased in the presence of non-normal distributions of the error terms (StataCorp, 2005), were used in the regression analyses for both samples.

Results

We expect that assisted fertility techniques will differ in the extent to which they provoke ethical concerns because some may involve having children that are biologically unrelated to the couple or are carried by someone other than the mother. Table 1 presents the percentage of the samples finding the technique as posing somewhat or serious ethical problems. Because each sample used a different rating scale, comparable percentages identifying ethical problems for the techniques were obtained by presenting the percent giving the two most serious ratings (4,5) in Sample I and those identifying some or serious ethical problems in Sample II. The rankings of the means of these items (see Table 2) correspond closely to the percentage rankings. Surrogate motherhood was found by respondents in both studies to be the technique with most ethical problems, while in-vitro and insemination with husband's sperm posed the least problems. The rank ordering of these percentages was the same in both studies for the three techniques assessed in both. In Sample II, gestational carrier also raised ethical concerns in a majority of the respondents. The rank of the ethical concerns showed that respondents were more concerned about relationship issues rather than technical ones, as in-vitro is likely the most technically sophisticated but does not involve use of genetic material from unrelated individuals as is true in the procedures viewed as more ethically problematic. T-tests were used to test significant differences between each technique in each sample. Techniques which resulted in children biologically unrelated to their parents or involved mothers not carrying their children to term were significantly more likely ($p < .001$) to be rated as causing serious ethical problems as compared to those techniques that resulted in children who were biologically related to their parents.

We next assess in multiple regression models the effects of the social structural and exposure factors on ethical concerns. Table 3 presents the results of multiple regression analyses for Sample I of the effects of social structural and exposure factors on the ethics of ART. Model 1 in Table 4 includes only the structural variables in the equation. Five of the variables had statistically significant effects on ART ethics. There was a strong relationship between age and attitudes with ethical concerns increasing as age increased, and a curvilinear pattern of age for women was also found to be statistically significant. Plotting a Loess curve (not shown) revealed that women under 30 had higher ethical concerns than

women in their 30s, and ethics rose again as women aged beyond 40. As years of schooling increased, there was a decline in ethical concerns. Those with higher incomes also were less likely than those with lower incomes to report ethical concerns. As compared to married respondents, the widowed and divorced and separated respondents were also less likely to raise ethical concerns. There was no significant difference, however, between the married and the never married scale scores, or a significant effect of race. Overall, this set of structural variables accounted for 10.8% of the variance in the ART Ethics scale.

Variables measuring exposure to political and religious influences and perceptions were added to the equation in Model 2. Church attendance was strongly and significantly related to ART ethics. The more often respondents attended church, the more likely they were to perceive ethical problems with these ART procedures. As we hypothesized, respondents holding more liberal social-political views were less likely to perceive ethical problems than those holding more conservative views. Although church attendance and social-political liberal views were moderately correlated (-.27), each clearly exerted an independent effect on the ethics of ART. Including these two variables in the equation raised the overall explained variance to 18.2%.

In Model 3, we added the measures of exposure to infertility-related experiences that we expected to impact attitudes. Knowing someone with infertility problems was not significantly related to the respondent's views. When the presence of children in the household was added to the regression (not shown), the effect was not significant. We did, however, detect a significant interaction between the presence of children and gender, and this was included in Model 3. The pattern of coefficients, when converted into a separate effect of the presence of children for men and women, revealed a significant effect for men (.267) and no effect for women (.267 - .292 = -.025). Men with children in the household were significantly more likely than men without children present to view ART procedures as posing ethical problems. These exposure variables increased the overall explained variance to 18.8%.

We next replicated these analyses in Sample II. This sample contains only female respondents in a restricted age range (25 – 50), but it has the advantage of a larger proportion of minority respondents, a more complete ethics scale, and direct measures of the respondent's experiences with infertility and treatment. The results are reported in Table 4. In Model 1, we included the structural variables of age, race, marital status, and education, and income. Age was significantly related to the Ethics scale with greater age related to perceptions of greater ethical problems. We did not find the curvilinear relationship with age found for women in Sample I, although the restricted age range (no women under age 25) would have made it difficult to detect this effect in this sample because most of the curvilinear effect in Sample I occurred below this age. Otherwise, the age effect was consistent with the age effect found for women over age 30 in Sample I. We did find a significant effect of race/ethnicity on attitudes in this sample. Blacks and respondents reporting other race/ethnicity group memberships were significantly more likely to show concern about ethical issues related to ART than were white respondents. Although the effect of marital status was not significant, the results were consistent with the findings from Sample I, as the divorced/separated were less likely to express ethical problems than the

married, and there was no apparent difference between the views of the married and the never married. Finally, educational attainment had a significant inverse effect on ethical concerns—similar to the finding in Sample I. Income, however, was not a significant predictor in this sample. The structural variables explained 6.1% of the variance in ethical concerns about ART in Sample II.

In Model 2, we added the measure of religiosity. Religion was again a strong predictor, with more religious respondents expressing the most ethical concerns. Overall, this model explained 10.5% of the variance in the ART ethics scale. Although we had no direct measure of political-social orientation in this sample, one of the measures, - the extent to which respondents view parenting biological or adopted children as the same - is likely to reflect tolerance of alternative parenting options. In Model 3 we added this variable and a set of variables related to exposure experiences related to infertility. Contrary to our expectations, childbearing and having experienced infertility problems were not significantly related to ethical views. Women who reported seeking infertility treatments, however, did report significantly fewer ethical concerns. This may reflect either exposure or a selection effect. Women with infertility problems who have strong ethical objections to the available treatment options may be less likely to seek treatment. We found that women who agreed that parenting adopted children was the same as parenting biological children were less likely see ethical problems than those who disagreed. This might reflect exposure to more general liberal views, but because we do not have a measure of political orientation in this sample, we cannot test for this. The addition of the exposure variables to the equation increased the explained variance to 12.9%.

Discussion

One goal of the current research was to describe the attitudes of representative samples of the general public toward a number of artificial reproductive technologies. Comparing the ratings of the ethical problems with three different techniques in one sample and six in the other suggests that ethical ratings are influenced more by the complexity of biological relatedness than by technical complexity. Surrogate mothering, for example, may be a technically simple procedure, but it involves complex legal and relationship issues. In-vitro may be technically difficult, but it seems to raise few ethical concerns in our samples. This would suggest that methods that involve genetic material from both the husband and wife, even if technically complex and invasive, may be more acceptable than less technically-complicated techniques such as donor or surrogacy approaches. The current finding is consistent with research in the area of surrogacy and adoption, which highlights the importance of biological relatedness of parents and children (Ciccarelli & Beckman, 2005; Donaldson, 1997).

Our second goal was to test the predictors of attitudes toward ART in representative samples of the general public. Most previous studies of attitudes used convenience samples of respondents or those selected because of their experiences with infertility. Explanations based on social structural position and exposure on attitudes toward artificial reproductive technology were tested and some support was found for these explanations. Age, education, and race were found to be significantly related to ethical positions toward ART. This is

consistent with social structural explanations for attitudes and behaviors. The relationship with age may be due to the differences in exposure to infertility information between younger and older respondents.. The finding of a curvilinear relationship in one of the samples with women under 30 more likely to report ethical concerns cannot be explained in this way. Perhaps younger women are anticipating their own fertility and find these invasive techniques more troubling than they would later in age when having the children they want is more urgent. This finding, as it was not anticipated here, would need to be replicated in other studies.

We expected that gender of the respondent would have an overall effect on attitudes toward ART since it has been a variable consistently identified in the infertility literature as having an effect upon behaviors and attitudes (Greil, 1997). Surprisingly, the only gender effects observed were conditional on other situations. Presence of children has a significant effect on men's ethical perceptions but had no such effect for women. Among adults under 30, women were likely to have more concerns than did men. Much of the previous research finding gender effects has focused on experiencing infertility and knowing people dealing with infertility among select samples of respondents (Abbey, Andrews, & Halman, 1991; Brkovich & Fisher, 1998). Thus, it may be that gender effects are limited to the responses of men and women in the actual experience of infertility and not with ethical perceptions of the reproductive techniques.

Exposure to value systems was found to strongly influence respondents' attitudes toward ART. Religiosity was found to be a consistent and strong predictor of attitudes toward infertility. People are socialized into religiosity at an early age, and religion has been found to be associated with holding more conservative attitudes toward social issues such as gender roles and abortion (Grasmick et al., 1990; Jensen & Jensen, 1993; Morgan, 1987; Peterman, 1996). People with strong religious beliefs are more likely than their counterparts to find ethical problems with ART because these techniques do not follow the traditional norms and behaviors associated with conception and childbearing. The exposure to value systems explanation for attitudes was also supported with the findings from political and social attitudes. People who are politically conservative are more likely to have ethical problems with ART than their counterparts. This is consistent with the findings for religiosity that exposure to value systems influences attitudes. The finding that women who agree that parenting adopted and biological children is the same reported fewer ethical problems than women who disagreed is also consistent with an effect of exposure to values. A woman's endorsement of this statement may signal her greater tolerance of alternative family forms.

An unexpected finding is that no empirical support was found for variables that focused on direct experience with infertility and attitudes toward ART. Neither having experienced infertility nor knowing someone who has experienced infertility has a significant effect on attitudes toward ART. Although other researchers have identified a significant relationship between experience with infertility and attitudes toward infertility interventions (Halman et al., 1992), this may be due to differences in samples. Ours were probability samples of the general public, while Halman et al. (1992) analyzed a sample of individuals recruited at infertility and gynecological clinics. Although in one of our samples we found that women

who had sought help with infertility were less likely to see ethical problems with the techniques than were women who had not sought help, we are cautious to interpret this as an outcome of exposure to the infertility experience as it may primarily reflect self-selection.

In this study, we find both social structure and exposure to value systems to affect ART ethics, with the social structural variables contributing more in explaining attitudes toward ART than variables assessing value systems. This is a consistent finding in the literature examining factors influencing social attitudes (Ciabattari, 2001; Kulik, 2002; Luker, 1984). The findings also provide some support for a cultural lag explanation. The decline in ethical concerns with increased educational attainment and the greater acceptance of these techniques among those with more liberal compared to more conservative political and social views is consistent with an expectation of a lower cultural lag in these groups.

These findings have important implications for policy and practice. In the United States, there is an increasing use of ART to assist people to achieve the families they desire. As the use of these techniques becomes more common due to, among other factors, women waiting longer to have children (Frank, Bianchi, & Campana, 1994), an increasingly large number of children will be conceived with ART (Petrozza, 2004). The public's attitudes toward these techniques will influence both their willingness to use them and how they feel about couples who have chosen this road to parenthood. The findings from this research demonstrate that overall, people have greater ethical problems with techniques that are further from the historical and normative notions of how children are conceived (such as surrogate mothering), and they have fewer ethical problems with less invasive techniques (such as insemination with a husband's sperm). The results also show that these attitudes are affected by social structural, socialization, and to a lesser extent, exposure and experience with infertility and childrearing.

This study has practical implications for women and couples who are experiencing infertility and for the medical and psychological practitioners who work with them. As women wait longer to have children and an increasing number of them require some fertility intervention, dealing with the ethics of infertility will become an increasingly important issue for those in the medical community, counselors/therapists, and within families. The issue of biological relatedness versus social parenting needs to be clearly addressed by those who help individuals deal with infertility. It may not be enough for a person to have a child if he or she or family members find donor insemination, surrogate mothering and gestational carriers to be unethical means of having a baby.

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TABLE 1

Relative Ratings of Ethical Problems Posed by Assisted Reproductive Technologies

	%
<hr/> Sample I (N= 930)	
<i>Percent in top two seriousness ratings (4,5)</i>	
In-Vitro	22
Sperm Donor	31
Surrogate Mother	47
Sample II (N = 580)	
<i>Percent some or serious ethical problems</i>	
Inseminate husband's sperm	10
In-vitro	24
Donor sperm	42
Donor eggs	45
Gestational Carrier	55
Surrogate Mother	61

TABLE 2

Descriptive Information for Variables used in the Two Surveys

Variable	Mean	S.D.	Min	Max
<i>Sample I (N = 930)</i>				
Insemination with husband's sperm	2.70	1.55	1	5
Insemination with donor sperm	3.28	1.52	1	5
In-vitro fertilization	2.20	1.49	1	5
ART Ethics Scale (3 items)	2.73	1.25	1	5
Gender of respondent	0.53	0.50	0	1
Age of respondent	48.07	16.80	19	92
Years of education completed	14.09	2.74	2	23
Married	0.62	0.49	0	1
Never married	0.14	0.35	0	1
Divorced/Separated	0.15	0.35	0	1
Widowed	0.09	0.29	0	1
White	0.94	0.23	0	1
Other Race	0.06	0.23	0	1
How often attend church	5.35	2.09	1	8
Political-Social Liberal	2.82	0.88	1	5
Number of Children	0.66	1.07	0	6
Know someone with infertility problems	0.68	0.47	0	1
Total family income	7.33	2.64	1	12
<i>Sample II (N=580)</i>				
Insemination with husband's sperm	1.13	0.39	1	3
Insemination with donor sperm	1.52	0.66	1	3
In-vitro fertilization	1.31	0.59	1	3
Use of donor eggs	1.57	0.70	1	3
Use of surrogate mother	1.82	0.76	1	3
Use of gestational carrier	1.72	0.74	1	3
ART Ethics Scale (6 Items)	1.51	0.52	1	3
Age of respondent	38.33	6.90	25	50
White	0.77	0.42	0	1
Black	0.14	0.35	0	1
Other Race	0.09	0.28	0	1
Married	0.68	0.47	0	1
Divorce/separated	0.16	0.37	0	1
Never Married	0.16	0.36	0	1
Years of education completed	14.46	2.42	9	25
Religiosity Scale	3.94	1.02	1	5
Number of Children	2.23	1.63	0	10
Parenting adopted same as biological	3.19	0.63	1	4
Importance of raising children	3.57	0.83	1	4

Variable	Mean	S.D.	Min	Max
Have infertility problems	0.13	0.34	0	1
Received infertility treatments	0.06	0.24	0	1
Total Family Income	8.59	2.61	1	12

TABLE 3Ethics of ART Regression models for Sample I. ^a

	Model 1		Model 2		Model 3	
	<i>b</i>	<i>Beta</i>	<i>b</i>	<i>Beta</i>	<i>b</i>	<i>Beta</i>
Gender of respondent	−0.0635	−0.03	−0.0780	−0.04	0.0423	0.02
Age of respondent (centered)	0.0147 **	0.25	0.0125 **	0.21	0.0156 **	0.27
Age-squared	−0.0002	−0.05	−0.0001	−0.03	0.0000	−0.01
Age × Gender	−0.0014	−0.02	−0.0007	−0.01	−0.0034	−0.04
Age-squared × Gender	0.0006 **	0.02	0.0005 **	0.13	0.0004 †	0.11
Years of education completed	−0.0284 *	−0.08	−0.0355 **	−0.01	−0.0365 **	−0.10
Married (Reference category)						
Never married	−0.0694	−0.02	0.0502	0.02	0.1298	0.05
Divorced/Separated	−0.2613 *	−0.08	−0.0944	−0.03	−0.0574	−0.02
Widowed	−0.5277 **	−0.12	−0.4490 **	−0.10	−0.4444 **	−0.10
White (Reference category)						
Other Race	0.1019	0.02	0.0683	0.02	0.0916	0.02
Total family income	−0.0472 **	−0.12	−0.0490 **	−0.13	−0.0498 **	−0.13
How often attend church			0.1021 **	0.22	0.1002 **	0.21
Political-Social Liberal Views			−0.1540 **	−0.14	−0.1455 **	−0.13
Children in Household (1 = yes)					0.2672 **	0.13
Children in Household × Gender					−0.2917 *	−0.12
Know someone with infertility problems					−0.0076	0.01
Constant	0.8305		0.7981		0.7007	
R-square	0.108		0.182		0.188	

^a N = 930^b Data are weighted and robust standard errors and significance tests are used.† $p < .10$.* $p < .05$.** $p < .01$ (two-tailed test).

TABLE 4Ethics of ART Regression models for Sample II.^a

	Model 1		Model 2		Model 3	
	<i>b</i>	<i>Beta</i>	<i>b</i>	<i>Beta</i>	<i>b</i>	<i>Beta</i>
Age of respondent	0.023 ^{**}	0.156	0.015 ^{**}	0.109	0.016 ^{**}	0.108
Race						
White (reference category)						
Black	0.443 ^{**}	0.155	0.259 [†]	0.091	0.194	0.068
Other Race	0.351 [†]	0.099	0.282 [†]	0.079	0.250	0.070
Marital Status						
Married (reference category)						
Divorce/separated	-0.169	-0.062	-0.141	-0.052	-0.101	-0.037
Never Married	0.005	0.001	0.046	0.017	0.068	0.025
Years of education completed	-0.038 [*]	-0.092	-0.039 [*]	-0.094	-0.031 [†]	-0.076
Total Family Income	-0.016	-0.042	-0.076	-0.046	-0.014	-0.036
Religiosity Scale			0.220 ^{**}	0.224	0.231 ^{**}	0.235
Number of Children					0.008	0.013
Parenting adopted same as biological					-0.192 ^{**}	-0.122
Importance of raising children					0.011	0.009
Have infertility problems					0.092	0.031
Received infertility treatments					-0.450 [*]	-0.106
Constant	-0.246		-0.807		-0.412	
R-squared	0.061 ^{**}		0.106 ^{**}		0.129 ^{**}	

^aN = 580^bRobust standard errors and significance tests are used.[†]*p* < .10.^{*}*p* < .05.^{**}*p* < .01 (two-tailed test).