

**PARENTHOOD MOTIVATION
AND ATTITUDES TOWARD
ASSISTED REPRODUCTIVE TECHNOLOGIES**

BY

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in Partial Fulfillment of the Requirements

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**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University
of Manitoba in partial fulfillment of the requirements of the degree
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MASTER OF SCIENCE**

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Abstract

This study was mainly exploratory in nature and had multiple purposes. First, it explored the possible relationship between parenthood motivation and attitudes toward assisted reproductive technologies (ART). Second, it explored the possible relationship between the perceived knowledge of ART and attitudes toward ART. Third, it examined the differences in the attitudes toward ART and perceived knowledge of ART which corresponded to differences in the following demographic characteristics: age, racial heritage, education, religious preference, personal income level, and combined income level. In addition, it investigated the relationship between parenthood motivation and the perceived knowledge of ART.

The sample consisted of 124 recently married women who were within childbearing ages (18 to 35). All subjects were selected from a marital registry in Minneapolis, Minnesota. They each completed the Parenthood Motivation Questionnaire (Kirchner, Seaver, Straw & Vegega, 1977), items regarding ART, and demographics items.

Analyses included Pearson product correlations, Analyses of Variance (ANOVA), and t-tests. Pearson product correlation analyses were used to determine if there were relationships between several different parenthood motivation measures and attitudes toward ART. Results of the analyses revealed that none of the parenthood motivation measures were significantly related to attitudes toward ART, except for the motivation for gender role fulfillment of having children. The hypothesized relationship between the perceived knowledge of ART and attitudes toward ART was also analyzed using a Pearson product correlation. The results showed that

there was no significant relationship between the two variables. ANOVAs and t-tests were used to determine if there were differences in the attitudes toward ART for the following demographic characteristics of the subjects: age, racial heritage, education, religious preference, personal income level, and combined income level. Results of the analyses found that there were no significant differences in the attitudes toward ART for the demographic characteristics of the women. ANOVAs and t-tests were also used to determine if there were differences in the perceived knowledge of ART for the demographic characteristics of the subjects. Analyses showed that there were significant differences in the knowledge of ART for the demographic characteristic age. That is, younger recently married women (26 and under) had greater knowledge of ART than older recently married women (over 26). There were no other significant differences in the knowledge of ART for the other demographic variables. The hypothesized relationship between parenthood motivation and perceived knowledge of ART was analyzed using a Pearson product correlation. The results showed that there was no significant relationship between the two variables.

**Dedicated to my loving and supportive husband
and
our precious daughter**

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CHAPTER I: INTRODUCTION

Many women assume that they will one day get married and have children. Upon marriage, women are faced with decisions about whether and when to have children. Only four percent of all married adults choose to remain childfree (Gallup & Newport, 1990). Having biological children is often viewed by many women as a basic human right (Daniluk, 1988). Unfortunately many women will unexpectedly have difficulty conceiving a child. Infertility has increased in the last 20 years, affecting one out of five couples of childbearing age (Burns, 1987). For the majority of these women, infertility is unanticipated and will come as a shock. Some will experience a crisis because of the unanticipated experience of infertility.

In the past, infertile couples had only a few alternatives to infertility, including adoption, becoming foster parents, or remaining childfree. The development of assisted reproductive technologies (ART) within recent years has offered infertile couples increased alternatives to overcome the infertility barrier (Gernsheim, 1990; Holbrook, 1990; Miall, 1989). Half of all infertile couples who use medical treatments will eventually achieve the goal of biological parenthood (Menning, 1980). These new alternatives, however, present numerous complex decisions that couples must address (Halman, Abbey & Andrews, 1993; Miall, 1989). Many of these ART procedures are also ethically and morally controversial.

Lauritzen (1990) stated that ART can be placed on a continuum ranging from simple to complex procedures. Each one of these treatments involves costs (emotional, psychological, financial, physical, and time costs). As one proceeds along to the complex end of the continuum, the costs intensify and the decisions have more serious consequences. The costs of these treatments must be weighed against the benefit of a chance for a biological child (Zoeten, Tymstra & Alberda, 1987).

The increased use of ART has given rise to the question, What makes some women more willing to use ART than others? The literature on infertility has briefly addressed this issue and found that many factors influence an infertile woman's decision to use ART. Although not directly studied, research in this area has suggested that parenthood motivation may likely be a factor involved in an infertile woman's decision to use ART. Most of the infertility research has shown that women using ART highly value children. Many of the women in these studies have experienced infertility for several years and have over-emphasized the benefits of children to such a degree that they are willing to try any medical procedure (Burns, 1990). For many of these women, having a child has become the main focus in their lives. According to Miall (1989), it is very hard to know whether the value they place on children reflects the actual value they placed on children before their realization of infertility. It would be reasonable to assume that people give much greater value to something they have been denied.

Empirical research on public attitudes toward ART is extremely limited. One of the few research studies found that examined the public attitudes to ART was a nationwide Gallup poll in the United States conducted in 1978 (Gallup, 1978). This study, however, only examined the attitudes toward and knowledge of in vitro fertilization (IVF), one of the many ART procedures. Gallup presented his respondents with a hypothetical situation, asking them whether, if they were unable to have children, would they be willing to use IVF in order to have a child? He found that many of the women (52%) said they would. He also found that respondents had a good understanding of the IVF procedure, and that knowledge of IVF was a key determinant of attitudes toward it. Since this time, the utilization of IVF and other ART procedures has significantly increased.

In response to the rapidly evolving field of assisted reproductive technologies, a Canadian Royal Commission was formed to investigate and report on current and potential assisted reproductive technologies. The Commission conducted a nationwide inquiry into assisted reproductive technologies within the context of Canada's values and attitudes, geography, institutions, social and health system. Based on its findings, the Royal Commission laid out in its Final Report recommendations for how Canada can deal with ART, regulate the use of ART, and ensure that the use of it or future developments are in the public's best interest (Royal Commission on New Reproductive Technologies, 1993).

A limited number of studies have addressed the possible association between demographic characteristics and attitudes toward ART or knowledge of ART (Alder, Baird, Lees, Lincoln, Loudon, & Templeton, 1986; Dunn, Ryan & O'Brien, 1988; Gallup, 1978; Turtle, Harrajchi, Perry & Tully, 1988). Findings from these studies, however, are inconsistent. Therefore, there is the need to further examine demographic variables and knowledge of ART in relation to attitudes toward ART.

The limited research on the public's attitudes toward ART gives rise to certain questions: What are the public attitudes of recently married women of childbearing age to ART? Specifically, how open are recently married women of childbearing age to using ART if they are faced with a hypothetical infertility problem? Like infertile women, does their parenthood motivation affect their attitudes toward ART? No studies to date have specifically addressed the possible association between parenthood motivation and attitudes toward ART. These questions need to be addressed as this specific population of women are the most likely candidates for the use of ART. They are at a stage in their life cycle in which childbearing is likely an important concern and they may unexpectedly be confronted with infertility. As

mentioned earlier, approximately one out of five couples eventually experiences infertility and may be confronted with the possibility of the use of ART. Certainly more should be known about the attitudes of this segment of population toward the various ARTs and factors that may be associated with these attitudes.

Research findings from this study could provide many valuable contributions. Most importantly, several policy implications could be derived from this study. Research on the attitudes of women of childbearing age toward ART and the factors possibly related to these attitudes would give policymakers a better understanding of women's willingness to use ART and the importance that is placed on children by this subgroup of women. These findings could aid policymakers in establishing legislation and regulation regarding the use and development of ART. Presently no enforced legislation exists in this rapidly evolving area. Any information about the attitudes to ART, especially of this subgroup of women, would likely be of assistance to policymakers in this currently ambiguous area. Updated research on the attitudes toward ART is always needed as the field of assisted reproductive technologies is rapidly advancing.

Findings from this study could also assist lobbyists and researchers in obtaining public funding for ART research. Currently research on assisted reproductive technologies has been primarily funded by private institutions. Research showing that women have favorable attitudes to ART and a high motivation to have children could lead to more public funding of ART research. Further research on more successful ARTs is needed. Contrary to popular belief, many ART methods still have very low success rates. For example, in vitro fertilization has a success rate of only 15 to 20 percent.

Another policy implication that could stem from this research is the issue of public subsidization of the use of ART. Research indicating that women have favorable attitudes to ART and high parenthood motivation may help support the need for subsidization of certain ARTs. Currently, many ARTs are very expensive and only available to those women who can financially afford them.

Findings from this study also could have research implications. Very little is known about the public attitudes of women toward ART and the factors related to these attitudes. Research in this area would, therefore, contribute to this virtually unexplored area and assist scholars in better understanding these attitudes. Investigation in this area could also lead to further studies, such as longitudinal studies on the relationship between the attitudes toward ART and parenthood motivation in a sample of recently married women who eventually experience infertility. This longitudinal data would help to determine if the relationship between parenthood motivation and attitudes toward ART changes upon experiencing infertility.

Results from this study also have theory implications. Currently, most research studies on attitudes toward ART are not guided by theories. More theoretical research needs to be explored in this area. This study was guided by the general problem solving theory (Tallman, 1988). Further ART research using Tallman's problem solving theory could possibly be useful for the exploration of the relationship between parenthood motivation or other factors related to the attitudes of infertile women toward ART.

The above implications and the lack of empirical research suggests a need for further exploration of this area. In the following section, the objectives of this study are presented.

Purpose of the Study

The purpose of this study was to examine the possible relationship between the attitudes toward parenthood motivation, as measured by the costs and benefits of having children, and the attitudes toward assisted reproductive technologies, as measured by the openness to using assisted reproductive technologies, in a sample of recently married women who were within childbearing ages. Another goal of this study was to examine the possible relationship between the perceived knowledge of assisted reproductive technologies and attitudes toward assisted reproductive technologies in a sample of recently married women. The third objective of this study was to explore differences in the attitudes toward ART and perceived knowledge of ART which corresponded to differences in the following demographic characteristics of recently married women: age, racial heritage, education, religious preference, personal income level and combined income level. In addition, the relationship between parenthood motivation and the perceived knowledge of assisted reproductive technologies was explored.

Exploration of the above possible relationships and differences would help researchers gain a better understanding of some of the factors involved in recently married women's attitudes toward assisted reproductive technologies.

It is important to point out that many factors probably are related to a woman's attitude towards ART. These factors also merit investigation, but this study focused on such factors as parenthood motivation, knowledge of ART, and demographic characteristics. It is also important to note that because this study examined women who have not experienced infertility, their attitudes toward ART do not reflect their actual future use of ART. Following are key concepts used in this study.

Definitions of Key Concepts

Parenthood Motivation - a psychological construct which mediates fertility decision-making and which is operationalized by statements about perceived benefits and costs of having a child (Seaver, Kirchner, Straw, & Vegega, 1977).

Assisted Reproductive Technologies (ART) - Reproductive technologies that provide infertile couples a chance of participating in the production of a child (Dunn, Ryan & O'Brien, 1988). Some examples of these techniques are artificial insemination by donor, in vitro fertilization, and surrogate parenting.

Attitudes Toward Assisted Reproductive Technologies - One's opinion regarding one's level of approval of assisted reproductive technologies. In the present study, a respondent's attitude toward ART was measured by asking each respondent whether if she were unable to become pregnant, she would be willing to use ART to become a parent.

Perceived Knowledge of Assisted Reproductive Technologies - One's subjective opinion of one's obtained knowledge of assisted reproductive technologies.

Demographic Characteristics - Personal characteristics of individuals such as age, education, religious preference, racial heritage, personal income level, and combined income level.

CHAPTER II: CONCEPTUAL FRAMEWORK

The conceptual framework that guided this study was a general theory of problem solving (Tallman, 1988). The theory's main focus is how actors (individuals, groups or families) interpret and seek solutions to their problems. Tallman described a problem as a barrier to the achievement of some valued goal. Infertility can be viewed as a barrier that obstructs a woman's goal of having a child. Although this study did not examine women with infertility problems, it presented recently married women with a hypothetical infertility problem, asking them whether, if they were unable to have children, they would be willing to use various types of assisted reproductive technologies (ART). Therefore, Tallman's problem solving theory was viewed as applicable to the present study.

According to Tallman, some kind of activity (mental or physical) is needed to overcome a barrier so that the individual can attain his/her desired goal. Activities to overcome infertility include adoption, foster-parenting, or attempting ART. As stated previously, this study focused on ART. According to Tallman's theory, activities involve a certain degree of risks and uncertainties which may produce additional problems themselves. Therefore, individuals usually choose those activities that have the least amount of risks. Uncertainties and risks are inherent in the various ART procedures, with some methods involving more risks and uncertainties than others. These procedures may also involve several costs (financial, emotional, physical, and time costs) and are ethically controversial.

The main focus of the general problem solving theory is on the decision making process. Tallman described a decision as "a conscious and non-routine process of comparing alternative objects or courses of action, selecting one of the alternatives

and making a commitment to that alternative until a subsequent evaluation is made" (p. 113).

Like the social exchange theory, this theory assumes that human beings are satisfaction seekers and that we view decisions in terms of a cost/benefit analysis. A proposition of this theory is that decisions involve comparing alternatives in terms of one's subjective estimates of the probable costs and benefits of each alternative and choosing the alternative that provides the greatest assurance of getting the highest expected satisfaction. From a problem solving perspective, women compare the various ART procedures in terms of all of the various costs involved with the procedures against the benefit of having a child. Women also take into consideration the success rate of each procedure. This proposition may help to explain why a complex procedure such as in vitro fertilization (involving high costs and low success rates) is chosen less often than hormonal medication involving fewer costs.

Another basic proposition of this theory is that the higher the value placed on a specific benefit, the more costs and risks an individual is willing to undergo in order to obtain that benefit. According to this theory we would expect that the greater the parenthood motivation of a woman, the more likely she would be willing to try ART procedures, even high risk and costly ART methods.

Another proposition of this theory is that people who are confronted with a problem will gather and process information about the risks, costs, and benefits associated with each alternative available for solving the problem. This proposition did not directly apply to the proposed study since the subjects did not experience an actual infertility problem, but were given a hypothetical question which asked whether if they were unable to become pregnant, they could see themselves using assisted reproductive technologies. Therefore the subjects in this study had no need

to do an information search about infertility alternatives. This study, however, takes into consideration the importance that acquired information knowledge has on the decision-making process. That is, the current level of a woman's knowledge of ART should be related to her openness to using ART. According to Rettig (1993), most decisions are based on information and intuition. Gallup (1978) suggested that knowledge of ART is a main determinant of attitudes toward it.

CHAPTER III: LITERATURE REVIEW

Parenthood Motivation

Researchers have typically ignored factors that influence a person's decision to have children (Gormly, Gormly & Weiss, 1987). The few researchers who have examined parenthood motivation have focused their research efforts on distinguishing the factors that influence a person's decision to have children. These factors included the perceived costs and rewards of parenthood, value of children, sex role expectations, personality variables, and family structure (Gormly, Gormly, & Weiss, 1987). Parenthood motivation is a cohesive construct that represents the conceptual meaning of nearly all of the psychological fertility variables used in studies that examine determinants of fertility. In many studies, the term is used very loosely and is often referred to as the value of children, satisfactions and costs of children, attitudes toward children, and family planning (Kirchner, Seaver, Straw & Vegega, 1977). Other terms for parenthood motivation have also been used: desire for children, positive and negative psychological determinants of childbearing, and perceived costs and benefits of having children. Many of the studies have interchangeably used these various terms and have not differentiated between them. The possible confusion of the terms may be because motivation for parenthood is closely intertwined with the value of children. Mueller (1986) described values as enduring beliefs that can be determinants of attitudes that influence behavior. According to Rettig (1993), values serve as guidelines for decisions. Whatever the label used, motivation for parenthood is generally defined as a psychological construct which mediates fertility decision-making and which is operationalized by statements about perceived benefits and costs of having a child (Seaver, Kirchner, Straw, & Vegega, 1977).

Most of the researchers who first studied parenthood motivation became interested in this area because of concerns about overpopulation. One of the first research teams that attempted the study of parenthood motivation was Rabin and Green (1968). From analyzing responses from sentence-completion tests, these researchers found the following four major categories of parenthood motivation: a) altruistic - unselfish motivation for children indicated by affection and concern for children; b) fatalistic - the notion that people were naturally meant to procreate and continue the human species; c) narcissistic - the notion that the child will prove the parent's psychological, physical, and biological adequacy; d) instrumental - the notion that the child has utility and is a vehicle for the achievement of certain parental goals.

Pohlman (1969) devised an exhaustive list of motivations for childbearing from an extensive review of the empirical and theoretical literature. Pohlman found that the pressure of social conformity was a primary factor that influenced motivation for parenthood. Pohlman also described other motivating factors. Children can be enjoyable and challenging; provide change and stimulation; can be loved and needed; offer enjoyment of company; are part of religious beliefs; are a means of expressing happiness and love felt towards one's partner; provide a way of identifying with one's parents; and provide many women with a role. He suggested that some women are uncertain of their identity and role and that having a first baby provides them with a clearer identity and role. Pohlman's extensive list of motives for having children was a good starting point for a virtually unexplored area. A limitation of his research, however, was that he did not provide these various motives within a cohesive model.

Kirchner, Seaver, Straw, and Vegega (1977) criticized Pohlman's work by stating that it provided little guidance regarding children's importance, did not state under

which conditions these motives exist, and did not provide sound operations for the measurement of motives for parenthood.

Hoffman and Hoffman (1973) devised one of the first theoretical models for understanding the value of children. It consisted of the five interacting variables related to child-bearing: (a) the value of children; (b) alternative sources of the value; (c) costs; (d) barriers; (e) and facilitators. These five components are balanced against one another and help to predict a person's desire for children. According to Hoffman and Hoffman (1973), the "value of children" is a motivational construct which consists of basic values related to having children. The "value of children" refers to the psychological needs children fulfill or the functions they serve.

"Alternatives" refer to other ways, besides having one's own children, that fulfill a value. For example, female employment, foster parenting, and remaining childfree are examples of alternatives to motherhood. "Costs" are the disadvantages of having children. "Barriers" refer to factors that make it more troublesome to obtain the particular value of having children, such as infertility. "Facilitators" are factors that make it easier to obtain the value. The "value of children" variable consisted of nine categories of the following basic values of children: (a) adult status and social identity; (b) expansion of the self; (c) morality; (d) primary group ties, affiliation; (e) stimulation, novelty, fun; (f) creativity, accomplishment, competence; (g) power, influence, effectance; (h) social comparison, competition; (i) economic utility. This model was the first cohesive model which contained interactive elements to help predict a person's motivation for children. Unfortunately, the first variable set of the model, "value of children," is the only element that is developed in great detail (Fawcett & Arnold, 1973), while the other four elements are too underdeveloped.

Research by Hoffman and Hoffman (1973) influenced the Value of Children

Project (VOC), supervised by James Fawcett (Arnold, Bulatao, Buripakdi, Chung, Fawcett, Iritani, Lee, Tsong-Shien, 1975). This cross-national study examined 400 married couples from six different countries, including five Asian countries and Hawaii. The main goal was to investigate different types of motivations for having children by examining parents' perceptions of the satisfactions and costs of having children. From the analysis of the data a conceptual model of the value of children was developed. This model consisted of five positive values of children (satisfactions) and five negative values (costs) of children. The positive values were emotional benefits, economic benefits and security, self-enrichment and development, identification with children, and family cohesiveness. The negative values of children were emotional costs, economic costs, restrictions or opportunity costs, physical demands, and family costs.

Arnold et al. (1975) found that different benefits and costs of children were emphasized by different cultures and by levels of development of the countries. The American women emphasized the importance of "primary group ties" and "fun and stimulation." Urban and educated parents emphasized the psychological and emotional benefits of children, while the rural parents emphasized the importance of economic benefits of children. While Arnold et al.'s cross-cultural study yielded a theoretical contribution to the understanding of overall fertility motivation and the diversity of fertility motivation of different ethnic and cultural backgrounds, it was limited by validity issues due to the translation of instrumentation.

Using a sample of recently married couples in the United States, Kirchner, Seaver, Straw, and Vegega (1977) developed a multiple parenthood motivation model. Twenty-two specific positive and negative parenthood motivations were identified. Factor analysis identified 12 perceived benefits of having children, including:

immortality, experiencing the birth process, experiencing love and life's fuller meaning, remembering and re-experiencing own childhood, old age insurance, partnership benefits, sculptor, opportunity for personal growth, deeper love, fulfillment through nurturance, sex role fulfillment, stimulation and feelings of pride. The ten costs of having children were social and personal restrictions, concern about ability to parent, possibility of defective child, pessimistic world view, financial considerations, worries and responsibilities of rearing a child, discomforts of childbearing, population concerns, emotional immaturity, education and career interference.

A strength of Kirchner, Seaver, Straw, and Vegega's model is that it covers a wide variety of motivations for and against parenthood. As in real life, many motives likely are involved in the complex decision of having children. In the last 25 years, a person's decision to have children has become increasingly complex due to the development of more effective contraceptives, increased education, and career involvement of women. Another strength of this model is that it consists of less traditional motivations for and against parenthood than the previous motivation models. In addition, it also contains more emotional motives for having children, and the motive for experiencing the birth process, which are both important to women today.

Based upon the findings of Kirchner, Seaver, Straw, and Vegega (1977), a team of researchers (Gerson, Berman, and Morris, 1991) examined differences between parenthood motivation of older subjects (over 30 years of age) and younger subjects (under 30 years). This study included both childfree women and childfree men. According to Gerson et al., the younger subjects viewed parenthood more positively, had higher motivation to have children, and valued children more than the older

subjects. Noticeable differences were found between the older and younger subjects' perceived motivations for having children. A discriminant analysis of the specific motives for children revealed that younger women placed more importance on the traditional motive of experiencing love and life's fuller meaning, partnership benefits, and a communal value, while older women valued stimulation and feelings of pride, and were more aware of the worries and responsibilities of having children. Gerson et al. suggested that the differences between the two age groups may be the result of differences in the stages of the life cycle. From an Eriksonian perspective, the younger group were trying to achieve intimacy versus isolation. Therefore, to resolve difficulties regarding intimacy, they may have fantasized in the sharing of the creation of a child to facilitate their transition to the next stage of development. Gerson et al. also suggested that the more androgynous gender role attitudes of the older female subjects toward children were likely due to the influence of the feminist movement in the 1970s. Although this study yielded interesting findings, it was limited by its sampling technique.

In an attempt to investigate the changing child-bearing attitudes of young adults, Gormly, Gormly, and Weiss (1987) examined the specific motives for parenthood of childfree female and male undergraduate students. They found that the most frequently mentioned response for wanting children was to be able to expand one's self by carrying on one's physical traits and name. The researchers compared their results to the findings of Hoffman's study (1972). They found noticeable differences between their subjects' perceived benefits of children and Hoffman's sample. Forty-five percent of Gormly et al.'s sample mentioned that having children was a way to promote love and family ties, while 64 percent of the women and 52 percent of the men in Hoffman's study mentioned this as a benefit of having children. Other

differences were that almost half of the subjects indicated that having children was a way to achieve adult status or social identity, while only nine percent of the men and 14 percent of the women in Hoffman's study mentioned this as a motive for having children. Gormly et al. stated that these changes in orientation reflected an emphasis on the valuing of children as a means of self-fulfillment and adulthood identity.

Gormly, Gormly, and Weiss (1987) further found in their study that financial stability, marital stability and emotional stability were important factors in the timing of parenthood. Women, more than men, stated they would delay parenthood until they have achieved a specific goal or established their career and gotten to know their spouse.

This study presented many interesting findings by comparing its results to a study 15 years prior. One is able, therefore, to see the attitude changes that have occurred over time. The study by Gormly et al., however, was limited by its selected sample (university students), so therefore cannot be generalized to all young adults.

Bell, Bancroft, and Philip (1985) conducted a factor-analytic study of attitudes for and against having children. They suggested that the perceived benefits of children are fairly stable, affective, and interpersonal in nature, while the perceived costs of children are more sensitive to the environment. The respondents in the study perceived the benefits of children as providing continuity and a notion of "naturalness." Childlessness was seen as problematic. The perceived costs of children were that they interfered with personal development and the marital relationship, were a source of stress, and competed with other pursuits.

Veevers (1973) examined parenthood from a sociological perspective by developing a systematic model that delineated the social meanings of parenthood and nonparenthood. According to Veevers, the desire for parenthood and

nonparenthood (not having children) revolve around the central themes of morality, responsibility, naturalness, sex, marriage, and mental health. According to Veever, individuals who have children are seen more positively than those who are childless. Veever's model was one of the first attempts at examining nonparenthood in terms of a sociological perspective. Although the themes today for parenthood and nonparenthood may have somewhat changed since the development of this model, parenthood is still viewed more positively than nonparenthood by the general population.

In summary, several empirical studies illustrated that parenthood motivation involves many different benefits and costs of having children and likely influences a woman's decision to have children. Parenthood motivation is also related to many factors. Lacking in the literature is the examination of parenthood motivation in relation to the attitudes toward assisted reproductive technologies (ART). Currently, more couples than ever are experiencing infertility and must make their fertility decisions based on the use of ART. Since the literature suggested that parenthood motivation influences a person's decision to have children, one would also expect that parenthood motivation would be related to one's attitudes toward ART. There exists, therefore, the need to explore the construct of parenthood motivation in relation to women's attitudes toward assisted reproductive technologies. We will now turn to the effects of gender role on parenthood motivation.

Parenthood Motivation and the Female Gender Role

Most societies have pronatalistic attitudes in which women are assigned the role of childbearer and rearer (Heltsley, Warren, and Hong-Min Lu, 1981). Of all the aspects of becoming an adult for a woman, becoming a mother is the most integral to gender role development (Hoffman, 1974). Willen (1988) stated that many

background factors determine a woman's motivation for children. Such background factors include a woman's personality, her history, the culture she lives in, age, social norms, gender roles, etc. He further stated that a woman can educate herself, have a career, devote herself to creative activity, but she must perform her primary duty of becoming a mother. This role is taught to a woman probably earlier than any other role she will ever perform. At a very young age she is given dolls and taught to be nurturant, in preparation for one of the most important life roles.

Hoffman and Manis (1978) found that women who had a traditional view of the gender roles perceived the adult status associated with parenthood to be a more important source of satisfaction than those who had a less traditional view. Hoffman and Manis also found that nonemployed women also identified adult status and social identity as very important aspects of having children.

A national study on the value of children (Hoffman, Thorton & Manis, 1978) found that traditional women placed an overall greater importance on children than nontraditional women. Women were considered traditional if they defined the female role as being that of a housewife and homemaker. Hoffman et al. found that the more traditional women also gave the greatest importance to adult status and identity and the notion that children complete the family. These researchers suggested that traditional women usually have access to fewer alternative sources, besides children, for fulfilling a value and therefore they place the great importance on having children. According to Hoffman et al. (1978), children are considered less important for the fulfillment of a need when there are more acceptable alternative sources for fulfilling these needs. Education and employment are examples of alternative ways of fulfilling certain values provided by children. Hoffman et al.(1978) found that less educated women valued children more than highly educated women. They also reported that

nonemployed women were more likely to regard children as a source of fun and stimulation than employed women. This is likely because employed women have certain needs that are fulfilled from their jobs outside the home.

Regardless of gender roles, statistics show that virtually almost every woman wants children. According to Gallup and Frank (1990), only four percent of women do not want any children. Even the majority of women who are educated and have lifetime careers plan one day to have children (Hendricks, 1985). Although present day society has supposedly decreased its strong sanction of parenthood, the role of parent is still viewed by most women as the most important role in life (Link & Darling, 1986). As previously mentioned, most women expect to become parents one day, however, some couples will experience infertility and as a result will be unable to become biological parents. The next section of the review discusses the definition, prevalence, and causes of infertility.

Definition, Prevalence, and Causes of Infertility

Infertility is defined as the "inability of a couple to conceive or carry a pregnancy to live birth after one year of normal sexual intercourse without contraceptives" (Burns, 1987, p. 1). Infertility has increased 10 percent in the last twenty years, affecting approximately one in five couples (Burns, 1987). Of these one in five couples, half will achieve a baby with the help of medical interventions (Menning, 1980). The term "involuntarily childless" has often been used to refer to those couples who are infertile and wish to procreate (Miall, 1985). Salzer (1991) reported that female and male factors each account for approximately 35 percent of the infertility cases. Problems in both partners account for approximately 20 percent, while in the remaining 10 percent of couples the cause of infertility cannot be determined.

Many societal, lifestyle, and environmental factors have contributed to the rise of infertility. One of the primary causes is that many women today delay childbirth past their peak fertility (Thibeault-Mulley, 1995). Another significant factor is that sexual freedom has resulted in epidemic rates of sexually transmitted diseases which can scar the woman's fallopian tubes, making her infertile (Berger, Goldstein & Fuerst, 1989). Third, numerous birth control methods have also contributed to the rise of infertility. The ingestion of alcohol, marijuana, cigarettes, cocaine, and other psychotropic drugs have also been linked to infertility (Aral & Cates, 1983). Another factor contributing to the increase of infertility is the exposure to toxic agents from the environmental workplace or hazards (Berger, Goldstein, & Fuerst, 1989).

In summary, infertility has increased greatly in North American society and is a problem for many couples. Infertility can be attributed to many causes by both male and female factors. We now turn to models of infertility that have been developed to better understand the psychosocial aspect of infertility.

Theories For Understanding Infertility

Infertility as a Crisis

Series of mini crises. Infertility begins for most couples as a stressor, but for some it may precipitate a crisis (Burns, 1987). A stressor can be defined as a life event impacting on the family system that produces or has the potential to produce change within the family system (McCubbin & Patterson, 1982). A crisis has been defined as "a disruption in the steady state, or a period of disequilibrium" (Menning, 1980, p. 314).

Mahlstedt, Macduff, and Bernstein (1987) compared the stresses of infertility with other major life crises and found that 80 percent of their infertile sample described

infertility as stressful or extremely stressful, while 63 percent rated infertility as stressful or more stressful than divorce and 58 percent thought infertility was as stressful as or more stressful than death of a loved one.

Infertility is characterized as an emotional roller coaster because it is a series of mini-crises for those who desire children (Salzer, 1991). Each month when a woman menstruates she is reminded of her infertility and her "failure" to become pregnant (Salzer, 1991; Hendricks, 1985). Additional stressors are seemingly never-ending medical tests and treatments (Salzer, 1991). Due to the repeated nature of the crisis, the couple may work through the anger and depression stages of grief many times (Hendricks).

Biopsychosocial crisis. The crisis of infertility has also been conceptualized as a complex biopsychosocial crisis (Cook, 1987). Cook's crisis framework has been labelled as biopsychosocial "because it involves an interaction among physical conditions predisposing infertility, medical interventions addressing the infertility, social assumptions about parenthood, reactions of others, and individual psychological characteristics" (p. 465). According to Cook, the strong expectations of parenthood that are held by the individual and others cause the infertility crisis. The stress of infertility treatments further contributes to this crisis.

Infertility as Grief and Loss Processes

Menning's grief theory. Based upon grief theory, Menning (1980, 1982) developed a stage-like framework that described the various feelings individuals experience as they attempt to work through the crisis of infertility. According to Menning (1980, 1982), the feelings (stages) of infertility are surprise, denial, anger, isolation, guilt, grief, depression, and resolution. These feelings may vary in order and intensity.

Losses of infertility. During the crisis of infertility, couples grieve over many losses such as the loss of the pregnancy experience, the loss of children, the loss of fertility, and the loss of genetic continuity (Menning, 1980). Mahlstedt (1985) devised a framework for describing the many losses of infertility. Based upon recent research on the greatest losses in life, Mahlstedt devised eight categories of important losses that are all involved in infertility. They are as follows: loss of a relationship with an important person, loss of health and body image, loss of status in the eyes of others, loss of self-esteem, loss of self-confidence or control, loss of security, loss of an important fantasy, and loss of something of tremendous symbolic value. Each of these losses may precipitate a depressive episode in an individual. According to Mahlstedt, the loss of fertility is intangible, which intensifies the pain and makes it more difficult to understand.

Infertility as Failure in Completion of Developmental Tasks

Draye, Woods, and Mitchell (1988) conceptualized infertility as a developmental crisis, citing Duvall's (1977) work in family development theory. They cited that couples think of themselves as parents long before they have children. The developmental tasks originate from cultural pressures, physical maturation, aspirations, and values. Infertility challenges the cultural norm of parenthood and hinders an individual's life goals.

Callan and Hennessey (1988) compared the well-being of infertile women who had never experienced a pregnancy (primary infertility) or mothers who were unable to have more children due to infertility. They found that women with primary infertility were less satisfied with their life as a whole, perceived their lives as less interesting, more lonely, and were less contented than mothers experiencing infertility. The researchers speculated that the lower levels of happiness by women with primary

infertility were linked to their perceptions of life as more lonely and less interesting. They suggested that social norms dictate that having children is an essential part of the adult role and that life is perceived as less satisfying without children.

Many women define themselves in uterine terms, that is, they view their ultimate purpose in life as conceiving and rearing children (Hendricks, 1985). For those women whose only means of adult role fulfillment is having children, the experience of infertility may be extremely devastating (Draye, Woods, & Mitchell, 1988). Hendricks suggested this uterine socialization may occur years before a woman actually has children. The combined mandates of female anatomy, physiology, society, and religion have prepared women to choose "when" and not "whether" (p. 152) to have children (Hendricks, 1985).

The transition to nonparenthood. Most people assume they will one day make the transition to parenthood (Matthews & Matthews, 1986). Matthews and Matthews developed a theoretical framework for understanding the "transition to nonparenthood" (p.641) made by the involuntarily childless. Their conceptual framework examined how involuntarily childless couples must reconstruct their realities, identities, and roles in the transition to nonparenthood.

Infertility Treatment Theory

Blenner (1990) devised a stage-like theory on the psychosocial responses of couples as they go through the various phases of infertility treatment. The theory contains the following three constructs: engagement, immersion, and disengagement. The first concept, engagement, contains three stages: dawning of awareness; facing a new reality; and having hope and determination. The second concept of Blenner's model is immersion. It includes the stages of intensifying treatment and spiralling

down. The last concept in this framework is disengagement. It includes the stages of letting go, quitting and moving out, and shifting the focus.

Infertility as Boundary Ambiguity

Burns (1987) applied Boss's construct of boundary ambiguity to infertility. Boundary ambiguity is described as the uncertainty of who is in or who is out of the family system (Boss, 1990). According to Burns, infertility can cause boundary ambiguity on three levels: (a) The "fantasy child" who is psychologically present and physically absent, (b) One or both partners may be torn in their loyalties between their spouse and their family of origin, (c) Familial boundaries may be blurred as a result of adoption and the utilization of reproductive technologies.

In summary, several theories have been developed to better understand the experience of infertility. Empirical research on the psychosocial aspect of infertility will be addressed next.

Psychological Reactions to Infertility

Depression

One of the major psychological responses to infertility is depression (Domar, Broome, Zuttermeister, Seibel & Friedman, 1992). Domar et al. utilized the CES-D (Radloff, 1977), and the Beck Depression Inventory (BDI) (Beck, 1988) to measure the depression of infertile patients at an infertility clinic. They found that 25 percent of the infertile women scored in the depression range on the CES-D as compared with only 13 percent of the control subjects. The control group consisted of married, gynecological patients of reproductive age with no history of infertility. Results from the BDI showed that 37 percent of the infertile women were depressed while only 18 percent of the control subjects were found to be depressed. Most of

these scores fell within the mild to moderate depression range, while 8.4 percent scored within the moderate to extremely severe range.

Anxiety

Another common reaction to infertility is anxiety (Cook, 1987). Wright, Dutchesne, Sabourin, Bissonnette, Benoit, and Girard (1991) investigated the anxiety levels of approximately 450 women who were first time patients at an infertility clinic. They used a subscale of the Psychiatric Symptom Inventory (Ilfeld, 1976) as a measure of anxiety. Wright et al. found that the anxiety scores of the infertile women were significantly higher than the scores of the control group.

Self-esteem and Identity

A woman's self-esteem and identity are affected by the inability to accomplish such a basic task as pregnancy (Mahlstedt, 1985). Those women who place a great importance on biological parenthood and have defined themselves in terms of their ability to have their own biological children especially feel stripped of their self-esteem and identity (Hendricks, 1985; Matthews & Matthews, 1986). However, infertile women with successful careers and other accomplishments also feel infertility is an insult to their self-esteem (Nachtigall, Becker & Wozney, 1992).

Behavioral Disturbances

Destructive behaviors such as eating disorders, obsessiveness, alcohol or chemical abuse, and sexual promiscuity are common reactions to infertility (Burns, 1987; Butler & Koraleski, 1990; Valentine, 1986). These behaviors are an attempt to gain a sense of control back in their lives as the infertility experience makes individuals feel very out of control (Burns; Butler & Koraleski).

Effects of Infertility on Family Relationships

Effects on the Couple's Relationship

Infertility not only affects individuals but has a great impact on the couple's relationship (Higgins, 1990). Infertility involves many stresses and strains, often affecting the stability of the couple's marriage (Burns, 1987; 1993). Some couples are able to cope well with infertility, while others have more difficulty dealing with the crisis of infertility (Higgins, 1990). Infertility questions and challenges the biological and social functions of marriage (Matthews & Matthews, 1986). Depending on the diagnoses and success of the infertility treatments, couples must make the psychological transition from potential parents to infertile couples (Matthews & Matthews, 1986). Women usually have more difficulty making this transition than their husbands as they are more unwilling to forego having biological children. Therefore, women are more committed than men to seeking a solution to a couple's infertility problems (Ulbrich, Coyle & LLabre, 1990). Greil, Leitko, and Porter (1988) found that infertile wives were more likely than their husbands to view infertility as devastating and as extreme role failure while their husbands were more likely to view infertility as a problem they could get over and not as a role failure. To date, no study has specifically examined the differences between infertile men and women in the desire for parenthood or value of children.

Effects on the Extended Family

Burns (1987) stated that infertility not only impacts the individual and the couple, but also affects the couple's parents and siblings. This has been described as an "intergenerational familial crisis" (Burns, p. 149). Providing parents with grandchildren has been perceived by most people as a normal part of the life cycle (Matthews & Matthews, 1986). The couple's parents may become frustrated if they

are unable to become grandparents and may wonder if they somehow contributed to their children's infertility (Burns, 1987).

In summary, infertility can have a great effect on the individual, couple, and extended family. It is important to note, however, that many empirical studies on the psychosocial aspect of infertility should not be overgeneralized to all women experiencing infertility, for a few reasons. First, almost all of the subjects in these studies were attending infertility clinics or receiving counselling. Therefore, these studies did not include those women who chose not to seek infertility treatments or counselling. Therefore the findings cannot be generalized to all women with infertility. Second, the psychological distress varies amongst individuals experiencing infertility, often depending upon the stage of infertility treatment they are undergoing. Many of these studies examined women who were in the midst of using an ART procedure, therefore, they are at the peak of their psychological distress. The next section of the review will focus on assisted reproductive technologies and the costs associated with each of them.

Assisted Reproductive Technologies

Historically, adoption was the primary option available to infertile couples (Holbrook, 1990). However, the declining number of babies available for adoption and the societal emphasis on "genetic continuity" have influenced many of the involuntarily childless to pursue other alternatives to their infertility problems (Miall, 1989). Within recent years, the development of assisted reproductive technologies (ART) has provided infertile couples with increased alternatives to overcome the infertility barrier (Gernsheim, 1990; Holbrook, 1990; Miall, 1989). These recently developed alternatives, however, present many new decisions that infertile couples must address (Halman, Abbey & Andrews, 1993; Miall, 1989). Women who are

recently married and are faced with decisions about "whether" and "when" to have children have probably given little thought to the various ART methods, unless they have personally known someone who experienced infertility.

Lauritzen (1990) suggested that ART can be placed on a continuum according to complexity. He stated that at the "simple" end of the continuum lies drug therapy, surgery falls somewhere in the middle, while at the "complex" end lies the high-tech in-vitro fertilization (IVF). Each one of these treatments involves costs, and as one proceeds along toward the complex end of the continuum, the costs intensify and the decisions have more serious ramifications. Women deciding to use these procedures must weigh the costs against the benefits (having a child). Five types of assisted reproductive technologies will now be addressed.

Hormonal Treatment

Infertility drugs (hormonal treatments) are generally given to women who do not ovulate or menstruate, or have irregular ovulation or menstruation (Schwan, 1988). Hormonal testing of the women is done early in the infertility investigation (Berger, Goldstein & Fuerst, 1989). According to Schwan, Clomid is one of the safest hormonal drugs and contains relatively few side effects when taken in moderation. A stronger hormonal treatment involving more side effects is Pergonal. This drug is injected and involves many costs such as a large investment of energy, money and time; increased chances of multiple births; intensified emotions; and abdominal pain and swelling (Schwan).

Surgical Procedures

The development of microsurgical techniques over the past twenty years have allowed physicians to perform delicate surgery on those women who have problems with their reproductive tracts. Several methods of surgical repairs are available that

increase a woman's chance of pregnancy. The success of the surgeries varies depending on the previous damage to the woman's reproductive tract. Risk factors of these surgeries are often bleeding, infection, discomfort, and complications resulting from anesthesia (Berger, Goldstein & Fuerst, 1989).

Artificial Insemination

Artificial insemination by donor (AID) is used when the male partner has infertility. This is a relatively simple procedure that is done by collecting sperm from an anonymous donor and then inserting the sperm into the woman's reproductive tract (Holbrook, 1990; Miall, 1989). This procedure is fairly inexpensive and has a good success rate if the female does not have any infertility problems (The American Fertility Society, 1992). The costs of this procedure include the loss of genetic continuity; genetic ambiguity; ethical, social, and legal issues; identity issues for the children; procedures that are emotionally exhausting and time-consuming; and that it is an invasive procedure (Cooper & Glazer, 1994).

In Vitro Fertilization

In vitro fertilization (IVF) is a highly complex reproductive technology that was first developed in 1978 (Fagan, Schmidt, Rock, Damewood, Halle & Wise, 1986). This assisted reproductive technology has received a lot of media publicity. Candidates for IVF are usually women who have damaged fallopian tubes (Salzer, 1991). This procedure involves the stages of stimulating a woman's ovaries, collecting several of her eggs, fertilizing the eggs with a man's sperm outside of the woman's body in a petri dish, and placing the embryo(s) in the woman's womb (Asch & Marrs, 1992; Holbrook, 1990).

Newman and Zouves (1991) described in vitro fertilization as the "end of the line" treatment (p. 322) for infertile couples. Contrary to popular belief, in vitro

fertilization has a moderately low success rate (15-20%). A study on couples who were awaiting IVF treatment found that most of the respondents estimated the IVF success rates to be between 10 percent to 80 percent (Daniels, 1989).

There are many costs involved with the IVF procedure. First, it is a very expensive procedure, ranging between \$8,000 to \$10,000 per attempt. Often several IVF attempts are needed for a successful pregnancy. Second, IVF can be very stressful as it is often considered a couple's last hope for a biological pregnancy. Third, many couples using IVF may feel that they are on an emotional roller coaster (Newman & Zouves, 1991). According to Dennerstein and Morse (1985), other costs of the IVF procedure are blood tests, pressure to perform (to ovulate and produce semen when required) and invasion of the couple's sexual relationship. IVF also raises ethical, legal, and moral issues.

Surrogate Parenting

Surrogate parenting is used when the woman has infertility problems (Miall, 1989; Salzer, 1991). It helps an involuntarily childless couple to have a child that is biologically related to one of them (Zimmerman, 1982). This procedure involves artificially inseminating the surrogate female with the husband's sperm. The surrogate female then carries the baby to full-term and after giving birth gives it to the couple (Miall).

Surrogate parenting can be very expensive, often costing as much as \$30,000. The process involves many complicated emotional issues (Salzer, 1991). Other costs involved are the legal, social, and moral issues surrounding this procedure (Miall, 1989). There is also a risk that the surrogate mother may not want to relinquish the child to the prospective social parents (Zimmerman, 1982).

In summary, all of the ARTs involve a certain degree of costs and risks, especially the complex procedures such as IVF or surrogate parenting which have been highly publicized and controversial. Very little is known about the public's attitudes toward these different procedures. We now turn to the few studies that have examined the attitudes toward ART.

Attitudes Toward Assisted Reproductive Technologies

Empirical research on women's attitudes toward assisted reproductive technologies is extremely limited. Therefore, very little is known about the attitudes of women toward ART and the factors that influence or are related to these attitudes. Undoubtedly, many factors influence or are related to attitudes toward ART. Investigation of this area is needed as the infertility rates and the use of ART have increased.

Gallup (1978) was one of the few researchers who examined public attitudes toward ART. A nationwide Gallup poll in the United States conducted in 1978 on 1,500 adults found that a great majority of the sample (93%) had heard about the first baby born from IVF in 1978 (Gallup, 1978). Respondents in this study were asked whether they favored or opposed this procedure. Of the women, 61 percent favored, 29 percent opposed, while the remaining 10 percent had no opinion of IVF. Of the men, 59 percent favored, 26 percent opposed, while 15 percent had no opinion. College graduates and younger adults were more in favor of this procedure than less educated and older adults. Gallup also reported that 61 percent of Protestants and slightly over half of the Catholics were in favor of IVF.

Gallup then asked the respondents whether, if they were unable to have children, they would be willing to use IVF in order to have a child? Gallup found that slightly over half the women said they would (52%), while 38 percent would not, and 10

percent had no opinion. Of the men, 54 percent would, 33 percent would not, and 13 percent did not know. Once again, college graduates and younger adults were more in favor of this procedure. Protestants were also more favorably disposed to IVF (53%) than Catholics (50%).

Gallup (1978) also found that many people in his poll had a very good understanding of the IVF procedure. When asked about their current understanding of this procedure, 42 percent were able to describe exactly the procedure, 19 percent had a general idea of it, and 39 percent had poor or no knowledge of the IVF procedure. According to Gallup, one's knowledge of this procedure is a key determinant of attitudes toward it. That is, people with a clear understanding of IVF were more likely to be in favor of it than those with a low understanding. Gallup also reported that those respondents with higher education and incomes had a better understanding of this procedure.

Gallup's poll was groundbreaking. It was the only poll that presented a hypothetical infertility problem to the general public and then examined their willingness to use ART. The results of his poll suggested that certain factors were possibly related to attitudes toward ART. First, knowledge of the IVF procedure appeared to be a key determinant of attitudes toward it. Demographics also appeared to affect attitudes toward IVF and the willingness to using it. For example, the younger adults had more favorable attitudes toward IVF and were more willing to use it than the older adults. For the demographic characteristic of education, the more highly educated people had more favorable attitudes to IVF and were more willing to use it than less educated adults. Religion also appeared to affect attitudes, with Protestants having more favorable attitudes toward IVF and being more open to

using it than Catholics. Thus, knowledge, age, education, and religion appeared to be factors influencing the public's attitudes to IVF.

Gallup's research was exploratory and was a good starting point in examining the public's opinion to ART. Gallup conducted this poll almost twenty years ago and it demonstrated that the general public favorably viewed IVF. Since that time, the utilization of IVF and other ART procedures have significantly increased. Research on the public attitudes of women toward ART, however, has not kept pace. Gallup's study was limited by the statistical analyses that were used. Unfortunately, only descriptive statistics analysis was used for the methodology, while no significance testing or bivariate analysis was employed. Therefore, there is the need to explore the significance of the possible relationships between knowledge of ART and demographics with attitudes toward ART.

In response to the rapidly evolving field, a Canadian Royal Commission was formed to investigate and report on current and potential assisted reproductive technologies. The Commission conducted a nationwide inquiry into assisted reproductive technologies within the context of Canada's values and attitudes, geography, institutions, social and health system. They found that having children is an important goal to most Canadians, and if effective, safe ART methods should be included in the health care system. The Royal Commission laid out in its Final Report recommendations for how Canada can deal with ART, regulate the use of ART, and ensure that the use of it or future developments are in the public's best interest (Royal Commission on New Reproductive Technologies, 1993).

Turtle, Harrajchi, Perry, & Tully (1988) investigated the attitudes of Australian undergraduate students toward in vitro fertilization. Ten interviewers approached students to fill out questionnaires and stood by the respondents as they completed the

questionnaire. This fixed-response questionnaire was aimed at examining the respondents' level of information regarding the IVF procedure, how they had acquired information about IVF, attitudes toward the legal and moral aspects of IVF, and factors that influenced their opinions of IVF.

With regard to the level of information about IVF, 99 percent of the students had heard about IVF. An overwhelming majority of the students (92%) had acquired information about IVF from the media (print and television). Other sources of acquired information about IVF, in descending order, were friends, university journals, academic journals, and religious sources.

The majority of the subjects (73%) in this study approved of the IVF procedure. The rate of approval increased when married couples were specified as the recipients, while the rate of approval significantly decreased when homosexual couples and single unattached women were specified as the recipients. Data regarding legal and moral aspects of infertility treatments showed that the students had fairly liberal attitudes toward IVF, while they held conservative attitudes to futuristic extensions of IVF which included research on embryos, cloning, and ectogenesis.

Several items revealed that certain factors influenced students' opinions toward IVF. Factors that influenced their opinions to IVF, in descending order, were the stressful experience of infertility and IVF as a solution (72%), the fundamental right to have a child (63%), IVF as psychologically damaging to the person (49%), IVF as a threat to the institution of marriage (23%), religious beliefs (20%), and costliness of the procedure (6%).

It is important to point out that caution should be taken when interpreting this study's results as it was limited by the procedure used to collect the data which may have biased the subjects' responses. This study, however, presented many interesting

findings. For example, the findings indicated that an overwhelming majority of subjects had obtained information about IVF through the media. This demonstrates that the media is likely very influential in people's attitudes toward ART. Almost a decade has passed since this study and during this time certain ART procedures, such as artificial insemination and surrogate parenting, have received negative media attention. Therefore, there is the need to explore what the current attitudes of the public are toward ART in the mid-90's. The examination of people's knowledge of ART also deserves merit.

Dunn, Ryan, and O'Brian (1988) also investigated the attitudes of undergraduate college students toward ART. They specifically examined students' attitudes toward the acceptance of adoption and five infertility treatment alternatives. Subjects were chosen from personal health courses at two universities, one with a predominantly African-American population while the other consisted of a predominantly Caucasian population. A self-administered questionnaire was used that contained demographic questions and six items enquiring about the respondents' level of acceptance regarding adoption and six treatment alternatives to infertility. Dunn et al. found that adoption was the most acceptable method for dealing with infertility. The other infertility alternatives, in descending order of preference for both Caucasians and African-Americans, were artificial insemination by husband, in vitro fertilization, embryo transplant, artificial insemination by donor, and surrogate motherhood. Overall, African-Americans were less accepting than Caucasians of the different alternatives for dealing with infertility. The analysis by race indicated that Caucasians were significantly more accepting than African-Americans of adoption, artificial insemination by husband and donor, and in vitro fertilization. The analysis by religious preference found only one significant difference in acceptance of the ARTs:

artificial insemination by donor. That is, those respondents who gave their religious preference as "other" or "none" appeared to be more accepting of artificial insemination by donor than Catholics or Protestants.

Dunn, Ryan and O'Brien (1988) concluded from the findings of their study that college age students were highly accepting of adoption and less accepting of new infertility medical technologies, especially those methods involving a third party.

Baluch, Fallone, and Khan (1994) also examined the attitudes of university students toward certain ART procedures in England. Male and female students were compared in their attitudes toward the controversial issues of egg donation, sperm donation, and choosing a baby's sex. In addition to examining their attitudes toward these procedures, the subjects were also given the Eysenck's Personality Questionnaire (EPQ-R). The results showed that female subjects were more supportive of the issues of egg donation and sperm donation than their male counterparts. There were no significant differences between genders in their attitudes toward choosing a baby's sex. Both male and female subjects strongly disagreed with this particular issue. The respondents' attitudes toward the controversial ART methods were then correlated with their personality traits as measured by the Eysenck's Personality Questionnaire. Significant and positive correlations were found between the attitudes toward sperm donation with the personality traits of extraversion and psychoticism for the female group. The researchers concluded from these findings that females most likely to have favorable attitudes toward the issue of sperm donation were not likely to have a stable or introvert personality.

Baluch, Fallone, and Khan's (1994) study is very important because it is one of the few studies that correlated data on attitudes toward ART with an additional measure

such as Eysenck's Personality Questionnaire. This helped to obtain more information about attitudes toward ART. Generally, the few studies that have examined the attitudes toward ART have explored the significance of demographic variables with attitudes toward ART. This is likely because research on the attitudes toward ART is still very limited.

Alder, Baird, Lees, Lincoln, Loudon, and Templeton (1986) also explored people's attitudes toward controversial ART methods. These researchers investigated the attitudes of 1,920 women of childbearing age toward IVF and human embryo research. The women in this study were chosen from three clinics: family planning clinic, antenatal clinic, and infertility clinic. All three groups of women had similar attitudes to IVF and human embryo research. The vast majority of women (94%) were in favor of IVF treatment, while 67 percent favored research on human embryos.

The demographic characteristics were compared between the antenatal group and family planning group. In both groups, neither age nor social class appeared to be related to attitudes toward embryo research or a woman's willingness to donate eggs. However, religion appeared to be a factor in both groups, as Protestants were more pro-research, more willing to donate ova for research, and had a better idea of the size of a 14-day-old embryo than Roman Catholics. When the influence of religion was examined in more detail it was found that in both the family planning and antenatal groups, those with strong religious beliefs were more likely to be anti-research and less willing to donate eggs for research. More Roman Catholics than Protestants had stronger religious beliefs.

Caution should be taken when generalizing these findings to the attitudes of North American women, as this study used a sample of women residing in Scotland. These

findings, however, contribute to the limited empirical research on the relationship between demographic variables and attitudes toward ART.

In summary, the literature on the attitudes toward ART has shown that individuals generally have more accepting attitudes to less controversial methods of ART. Many factors undoubtedly are related to one's attitudes toward ART. However, only a few factors have been explored. The literature has shown that there are inconsistencies with regard to the effect of demographic characteristics on attitudes toward ART. The literature has also suggested that there may be a relationship between knowledge of ART and attitudes toward ART; however, no significant testing has ever been done on this possible relationship. One study found that there was a relationship between personality traits and attitudes toward certain ARTs. No research to date has explored the possible relationship between attitudes toward ART and parenthood motivation. This relationship needs to be explored in a sample of young women who are at a stage in their life cycle in which childbearing is an important concern and who may be prime candidates for the use of ART. Many of the previous studies have examined the attitudes toward ART of university students who are not yet at a stage in their lives in which childbearing or assisted reproductive technologies are important concerns. University students' attitudes are probably not representative of the public's attitudes. The studies reviewed above are also limited because they were conducted almost 10 years ago. Therefore, there is the need to examine current public attitudes toward ART. The next section of the review will address factors that may influence the attitudes of women experiencing infertility toward ART.

Attitudes of Women Experiencing Infertility Toward Assisted Reproductive Technologies

Because research is very limited on the public attitudes toward ART, the empirical studies on the attitudes of women with infertility toward ART will be reviewed. Caution should be taken, however, not to generalize the findings of these studies to women with no known infertility problems. The infertility experience has undoubtedly biased the attitudes of women with infertility toward ART. Therefore, their attitudes toward ART and factors affecting their attitudes to ART may likely be somewhat different than those of women not experiencing infertility. It is also important to point out that most of the research on the attitudes of infertile women toward ART has examined women who are users or past users of infertility treatments. Therefore, the findings cannot be generalized to those women experiencing infertility who do not use ARTs.

Miall (1989) investigated the attitudes toward ART of those women who were adoptive parents or in the process of adopting. The respondents were asked if they approved of artificial insemination by donor and surrogate motherhood. Not surprisingly, 90 percent of the women approved of artificial insemination by donor, while 70 percent approved of surrogate motherhood. Miall concluded from her study that infertile women were strongly in favor of certain ART procedures. Miall's findings showed that, as compared to previously mentioned findings on attitudes toward ART, women experiencing infertility had more favorable attitudes toward controversial reproductive methods than women not experiencing infertility.

Frank (1989) explored the factors that influenced decision-making about infertility treatments by examining a sample of infertile women and men from several infertility support groups. The majority of subjects had been involved in infertility treatments

for over three years. The subjects were asked to rank in terms of importance a list of factors that might have influenced their decisions about using various ART procedures. The three most important factors that influenced decision-making about ART were personal beliefs, partner's beliefs, and physician's advice. Factors that were moderately important were emotional stress of the treatments, the probability of treatment success, and the failure of prior infertility treatments. The factors that received the lowest ranking of importance were the opinions of family and friends, legal consequences, and religious beliefs. Frank speculated that the following additional factors also contributed to decision-making for using infertility treatments: length of time in treatment, nature of the treatments, financial costs of procedures, income, moral and ethical values, and the desire to have a child.

Further research by Frank (1990) also examined the attitudes toward treatment alternatives in a sample of men and women from several infertility support groups. The subjects were asked to rank order 14 treatment alternatives for infertility. The three most accepted treatments for women were medication use (79%), artificial insemination with husband's sperm (54%), and surgical procedures (41%). Only a minority of women (18%) ranked adoption as the most acceptable option. Frank reported that highly complex ART procedures (IVF and surrogate parenting) and remaining childfree were viewed unfavorably by most of the subjects. Frank concluded from her study that people experiencing infertility favor more routine, less invasive and noncontroversial ART procedures than adoption and highly complex ART methods. Frank's study was limited in generalizability because of the type of sample used in this study. The subjects' membership in the infertility support group may have biased their attitudes toward ART.

Callan, Kloske, Kashima, and Hennessey (1988) investigated women with infertility who had at least one IVF attempt without achieving a pregnancy, in order to gain a better understanding of the motivations involved for continuing or discontinuing in an IVF program. The majority of these women had known about their infertility for several years. The researchers found that women continuing in the IVF program had more positive attitudes toward IVF and its success rate, and perceived greater social pressures to continue IVF from significant people in their lives than women who were not pursuing another IVF attempt. Women continuing in the IVF program were less likely to have children and an IVF pregnancy than those stopping the IVF program. Both groups of women (those intending to continue and discontinue IVF) placed a high value on having children and the role of motherhood, and felt that they needed more purpose in life. Women continuing with IVF felt it more likely, compared to discontinuers, that another IVF attempt would give them the emotional rewards and costs of a child, make their marriages and life happier, make them mothers, and help them to become more like other women.

Other studies have suggested that the frustration and emotional impact of infertility may influence a woman's decision to use almost any treatment in order to get out of the infertility experience (Frank, 1989; Greil, Leitko & Porter, 1988). Blenner (1990) speculated that the feelings of being different from the fertile world influence a woman's decision to use ART (Blenner, 1990). He also surmised that the "what if" phenomenon may influence a woman's decision to seek infertility treatment. Blenner stated that "in the 'what if' phenomenon, couples questioned whether or not they could live the rest of their lives not knowing what would have happened had they had treatment" (p. 155). Zoeten, Tymstra, and Alberda (1987) empirically examined this phenomenon to see if it was a motivational factor in the decision to use

IVF. Using 83 women on a waiting-list for IVF, they found that the majority of women chose the IVF treatment because they did not want to be sorry in the future that they had given up the potential opportunity of having their own child. To these women, "a chance was a chance."

In conclusion, the literature identified several factors that are involved in the attitudes of infertile women toward ART. As previously mentioned, it is important not to generalize these findings to women not experiencing infertility or to those women experiencing infertility and who choose not to use ARTs. The next section of the review will address parenthood motivation in relation to attitudes toward ART.

Parenthood Motivation as a Possible Factor Involved in the Attitudes Toward Assisted Reproductive Technologies

The literature has identified that parenthood motivation is a factor that influences a woman's decision to have children. Women are motivated to have children for a number of reasons. Some of the specific motivational factors for having children are biological immortality, experiencing the birth process, and gender role fulfillment, while specific motivational factors against having children are the possibility of having a defective child and the discomforts of childbearing (Kirchner, Seaver, Straw & Vegega, 1977). No studies were found that specifically examined parenthood motivation or specific parenthood motives in relation to attitudes toward assisted reproductive technologies. One would assume that if a woman had high motivation for parenthood, she would have more favorable attitudes toward ART and be more willing to try ART, if she had an infertility problem.

What we know about the possible relationship between parenthood motivation and attitudes to ART comes mainly from the infertility literature that has briefly

touched on the subject but has not specifically addressed this relationship. These few studies have suggested that the importance of children may be a factor involved in an infertile woman's decision to use assisted reproductive technologies. They have also found that infertile women have great motivation for children. Undoubtedly, the infertility experience has affected their motivation. Therefore, it is important to point out that the attitudes of infertile women toward parenthood motivation and ART cannot be generalized to fertile women with no known infertility problems. Research in this area, however, will be discussed because there is no known research to date that examined the relationship between parenthood motivation and attitudes toward ART in women not experiencing infertility.

Holmes and Tymstra (1987) examined the attitudes of fertile and infertile women towards children, embryo research, and social and ethical concerns about IVF. The subjects consisted of four different groups: (a) fertile women who were in their thirties, with two or more children; (b) IVF mothers; (c) women who had had IVF, but had not achieved a pregnancy; (d) and women on an IVF waiting list. They were asked to respond to 57 Likert-type statements that ranged from "strongly agree" to "strongly disagree." Of the 57 items, only six questions enquired about their attitudes toward motherhood. Most of the questions were very broad and did not specifically examine parenthood motivation. More infertile women (90%) than fertile women (65%) agreed to the statement, "As long as I can remember I have always wanted to have children" (Holmes & Tymstra, 1987), p.118). More infertile women (67%) were willing to raise an adopted child than fertile women (47%). Seventy-nine percent of the infertile women felt that having a child was a "fundamental right," as compared to 59% of the fertile women. A small majority of women (33% of infertile

women; 12% of fertile women) believed that all women should experience pregnancy, childbirth, and raising children.

On the examination of attitudes toward current ethical and social issues surrounding IVF, Holmes and Tymstra (1987) found that fertile and infertile women agreed on most ethical and social issues surrounding IVF. Noticeable differences, however, were that more infertile women than fertile women approved of scientific experiments on spare embryos after IVF (18% infertile vs. 0% fertile), the reusing of spare embryos after IVF for other infertile women (48% infertile vs. 18% fertile), and the reusing of spare embryos after IVF for the same mother (77% infertile vs. 52% fertile).

Holmes and Tymstra (1987) concluded from their study that infertile women had slightly more favorable attitudes toward motherhood and social and ethical concerns regarding IVF than fertile women. Although this study had interesting findings, it is important to point out the limitations. When interpreting the results, one should remember that the fertile women in this study had two children and therefore the results cannot be generalized to fertile women with no children. The sample of fertile women was also limited by its small size ($n = 20$). In addition, the six questions that enquired about the subjects' attitudes toward motherhood were very broad and did not specifically examine parenthood motivation.

Miall (1989) examined the attitudes of infertile women toward the traditional view of motherhood and infertility. The respondents in her study had adopted children or were in the process of adopting a child. A standardized, open-ended interview or questionnaire that consisted of six general questions about the traditional expectations of parenthood was administered to the subjects. From the responses to the six questions, Miall found that the majority of subjects (87%) indicated that

motherhood was important to their notion of themselves as a person. Eighty-nine percent of the subjects emphasized the importance of motherhood to the role of woman in general. Seventy-three percent of the women revealed that they had always wanted to get married, while 78 percent had always wanted to have children. Interestingly, 75 percent had made the decision to have children even before they were married. The majority of women (82%) felt their satisfaction in life depended upon having children. These findings are consistent with previous research (Hoffman, 1974) which stated that of all the aspects of becoming an adult for a woman, becoming a mother is the most integral to gender role development. Miall further found that although most of the women felt their desire to parent was being fulfilled as an adoptive parent, they expressed regret about not being able to have a biological child or experience the birth process and pregnancy. According to Miall, these women differentiated between biological parenthood and adoptive parenthood.

Miall (1989) also enquired about the women's attitudes toward their careers and motherhood. She found that a large percentage of the subjects (69%) indicated that their career was very important to them, while 65 percent revealed that motherhood was more important than their career, and 21 percent of the women stated that motherhood was equally as important as their career. Only eight percent of the women stated that their career was more important than motherhood.

Miall (1989) also examined their attitudes toward surrogate parenting and artificial insemination by donor and found that the majority of women were in favor of these two procedures. Miall speculated that the subjects' favorable attitudes toward ART could likely be attributed to the high value that they placed on biologically related children. Unfortunately, the relationship between attitudes toward ART and the value of children was not examined.

Miall (1989) concluded that the women in this study showed a strong commitment to motherhood, valued highly the traditional notion of motherhood as an integral component of their role in society, expressed satisfaction with adoption but had regret about not being able to have a biological child or experience the birth process and pregnancy, and had favorable attitudes to artificial insemination by donor and surrogate parenting. Miall speculated that the women's traditional attitudes regarding children were likely influenced by the pronatalist beliefs of North American society.

Undoubtedly, many of these women in this study had experienced infertility for several years. It is difficult to know whether the great importance they placed on children reflects the importance given to children prior to their realization of infertility (Miall, 1989). It would be reasonable to expect that people have a much greater desire for something they have been denied. It is also difficult to know whether their attitudes toward ART reflected their attitudes before their infertility experience. It would be reasonable to assume that their attitudes toward ART had become more favorable as a result of their infertility experience.

Consistent with the above findings, Collins, Freeman, Boxer, and Tureck (1992) also found that women with infertility had a strong desire to have children. The researchers investigated the reactions to infertility of infertile couples just entering an IVF program. The Reactions to Infertility Scale (consisting of 15 items) were factor analyzed. Three factors emerged as a reaction to infertility: the desire to have children as a major focus of one's life, social functioning and work efficiency, and social pressure to have a child. These factors accounted for 50 percent of the total variance. Factor one, the desire to have children as a major focus of one's life, consisted of four items. These items showed that the majority of women (82%)

indicated that they would do anything to have a child, thought of their infertility (75%), having a child was a major focus of their existence (77%), and infertility was one of the most difficult problems in their lives (74%).

Collins et al. (1992) then correlated factor one (the desire to have children as a major focus of one's life) with anticipated stress of the IVF procedure. They found that a moderate correlation existed between these two variables ($r = 0.35$, $P < 0.001$), indicating that those women who had a strong desire to have a child had more anticipated stress of using the IVF procedure. Once again it is important to point out that these findings can only be generalized to women using IVF and not other women who experience infertility.

Bell, Bancroft, and Philip (1985) developed a questionnaire that measured the motivation for parenthood (perceived costs and benefits of having children) using three groups of couples from a family planning clinic, an antenatal clinic, and an infertility clinic. Two scales were devised that represented the perceived costs and benefits of having children. The mean differences between the groups demonstrated that the family planning clinic couples expressed the costs of having children, while de-emphasizing the benefits, whereas the opposite appeared to be true for couples attending the infertility clinic. Patients attending the antenatal clinic took more of a neutral position regarding the costs and benefits of having children. The researchers speculated that the overemphasis of the costs of children by the family planning group was because they had postponed the decision to have children, not because they rejected parenthood. It would be reasonable to assume from their results that the infertility clinic patients overemphasized the benefits of having children because they had already made the decision to have children and were having difficulties achieving a pregnancy.

Englund (1983) also used diversified couples to explore parenthood motivation by interviewing six retired couples representing six distinct family composition patterns: (a) childfree couple, (b) adoptive parents, (c) a "blended couple" (became a parent by marrying someone with children), (d) biological parents, (e) biological grandparents, (f) biological great-grandparents. The subjects responded to 30 statements concerning their attitudes toward children. Englund suggested that there are two dimensions of parenthood that motivate a person to have children. The first dimension, "parentage," is an interest in genetic continuity and the biological relationship between the parent and child, while the second dimension, "parenting," is the performance of the actual parenthood role. According to Englund, women value both parentage and parenting. Englund suggested that adoption appears to be a viable option for infertile couples who value the parenting role more than parentage. He further added that the importance of parentage should not be overlooked. It would be reasonable to assume that those women who highly value parentage would have more favorable attitudes toward ART than those women who do not highly value the biological aspect of having children.

In summary, the infertility literature has only briefly discussed parenthood motivation. The few studies that have made reference to this area have found that infertile women have great parenthood motivation and favorable attitudes toward ART. However, no empirical research has specifically examined the possible relationship between parenthood motivation and attitudes toward ART. The next section of the review will address a few specific motives for parenthood.

Motivation for Biological Children

Studies on parenthood motivation have emphasized the importance women place on the biological aspect of having children. Biological immortality (genetic

continuity) and the birth process experience have been identified in the literature as two of the many motives for having children (Seaver, Kirchner, Vegega, & Straw, 1977). The infertility research has also found that the biological aspect of having children is very important for many women.

North American society highly values the biological aspect of having children. Assisted reproductive technologies are a reflection of a society's value system that places great importance on pronatalism and biological family, and favors technology (Miall, 1989). The majority of ART procedures present the "chance" (not certainty) for some women to have their own biological child. This gives them the opportunity to experience both the birth process and biological immortality.

Research on infertile couples on the waiting list for IVF showed that the majority of couples chose IVF because it gave them an opportunity to experience the birth process, and a chance to have their own biological child, and because of the limited number of children available for adoption (Daniels, 1989). Daniels (1994) further found that couples who gave birth to a child by means of donor insemination viewed donor insemination as having certain advantages over adoption, including the experience of pregnancy and birth, genetic links, and the chance of greater bonding with the child.

Consistent with the above findings, Leiblum, Kemmann, Colburn, Pasquale, and DeLisi (1987) found that the pursuit of biological pregnancy is very important for infertile women using ART. For some women anything other than a biological child is unacceptable. When Leiblum et al. asked if they would be willing to undergo any new technology for achieving a biological pregnancy, the vast majority of the women in this study (93%) indicated they would.

Abbey, Halman, and Andrews (1992) found that infertile women who placed a high value on biological parenthood experienced more stress using infertility treatments than those infertile women who placed a lower value on biological parenthood.

In summary, North American society highly values the biological aspect of having children. This is demonstrated in the infertility research which shows that many women use ART and are willing to go to great lengths to have a biological child.

Motivation for Gender Role Fulfillment

Like biological parenthood, the role of motherhood is very important to women in North American society (Miall, 1989). The emphasis on pronatalism in Western society encourages many women to see their role in life as conceiving and rearing children (Miall; Hendricks, 1985). Thus, we would expect that many young women would have favorable attitudes to ART so that they are able to fulfill this role.

Dennerstein and Morse (1985) examined the gender role identity of infertile women who were on a waiting list for IVF, using Bem sex role inventory (Bem, 1974). They found the mean scores to be above normal, indicating that women who had decided to use IVF had a "strong identification with the feminine sex role" (p. 840). Similarly, other past research (Freeman, Boxer, Rickels, Tureck & Mastroianni, 1985) used the Minnesota Multiphasic Personality Inventory (MMPI) to measure masculinity and femininity of couples entering an IVF program. Women in this study had abnormally low scores, reflecting "stereotypically feminine traits such as passivity and sensitivity" (p. 51). The results of these two studies suggested that many women use ART because they conform to the feminine role (Mazure & Greenfeld, 1989).

Conclusion

This chapter reviewed several specific issues: parenthood motivation; the definition, prevalence, and causes of infertility; theories for understanding infertility; psychological reactions to infertility; effects on family relationships; assisted reproductive technologies; attitudes toward assisted reproductive technologies; attitudes of infertile women toward assisted reproductive technologies; parenthood motivation as a factor involved in the attitudes toward assisted reproductive technologies; motivation for biological children, and gender role fulfillment of having children.

Many factors are undoubtedly related to a woman's attitude toward ART. However, only a few factors have been explored in relation to these attitudes. A limited number of studies have addressed the possible association between demographic characteristics and attitudes toward ART. Findings from these studies, however, were inconsistent. One study suggested that knowledge of ART was a main determinant of attitudes toward it (Gallup, 1978). However, no significance testing was performed on the possible association between knowledge of ART and attitudes toward it.

As mentioned previously, no research to date has explored the possible relationship between parenthood motivation and attitudes toward ART. Several empirical studies illustrated that parenthood motivation involves many different benefits and costs of having children and likely influences a woman's decision to have children. Parenthood motivation has also been suggested to be a factor related to the attitudes of infertile women toward assisted reproductive technologies. Therefore, one would also expect that parenthood motivation may be related to the public attitudes of women of childbearing age toward ART. Basically, very little is known

about the public attitudes of women toward ART. It is the researcher's opinion that a good starting point for investigating this virtually unexplored area is to examine the possible relationship between the attitudes of recently married women (with no known infertility problems) toward parenthood motivation and ART. It is now appropriate to turn to the formal hypotheses of this study.

Statement of Hypotheses

Hypothesis 1:

There will be significant differences among certain demographic groups of recently married women in their attitudes toward assisted reproductive technologies.

- a. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between younger and older women.
- b. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between more educated and less educated women.
- c. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between non-Catholic and Catholic women.
- d. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between women with higher personal incomes and women with lower personal incomes.
- e. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between women with higher combined incomes and women with lower combined incomes.
- f. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between Caucasian and non-Caucasian women.

Hypothesis 2:

There will be significant differences among certain demographic groups of recently married women in their perceived knowledge of assisted reproductive technologies.

- a. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between younger and older women.
- b. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between more educated and less educated women.
- c. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between non-Catholic and Catholic women.
- d. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between women with higher personal incomes and women with lower personal incomes.
- e. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between women with higher combined incomes and women with lower combined incomes.
- f. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between Caucasian and non-Caucasian women.

Hypothesis 3: There will be a positive relationship between parenthood motivation and favorable attitudes toward assisted reproductive technologies in recently married women.

Hypothesis 4: Among recently married women, there will be positive relationships between favorable attitudes toward assisted reproductive technologies and parenthood motivation for biological immortality, experiencing the birth process, and gender role fulfillment of having children.

Hypothesis 5: Among recently married women, there will be negative relationships between favorable attitudes toward assisted reproductive technologies and motives against parenthood, which are the possibility of having a defective child and the discomforts of childbearing.

Hypothesis 6: There will be a positive relationship between the perceived knowledge of assisted reproductive technologies and favorable attitudes toward assisted reproductive technologies in recently married women.

Hypothesis 7: There will be a positive relationship between parenthood motivation and perceived knowledge of assisted reproductive technologies in recently married women.

CHAPTER IV: METHODS

Sample

The population studied was recently married women of childbearing ages (18 to 35). A total of 124 subjects participated in this study. This segment of the population was chosen because these women were likely in a stage in their life cycle in which childbearing was an important concern (Gerson, Berman, & Morris, 1991). They were also the most likely possible candidates for the use of ART and were a convenient sample. All subjects were selected from the marital registry at the Hennepin County Service Center in the Government Center, located in Minneapolis, Minnesota.

Participant Eligibility Criteria

Information regarding potential eligibility for the study was obtained from both the marriage licenses and marriage license applications attached to the marriage licenses. The names and addresses of 500 women who met the following outlined criteria were written down. The first criterion was that the women must have been married between six to nine months. This included marriages between March 1, 1995 and May 31, 1995. The second criterion was that the women must have been within childbearing ages (18 to 35). The third criterion was that the women must not have had any children. This criterion was partly determined from the information on the marriage license applications, as these applications indicated if the couples had any biological children together prior to the marriage. However, the records did not reveal or include information about whether the women had any children with previous partners. Therefore, eligibility was further determined by the subject's response to the questionnaire item, "Do you have any children?" The fourth criterion was that the women must not have been pregnant. This particular information was

also not available on the marriage license, therefore information was obtained by the woman's response to the questionnaire item, "Are you currently pregnant?"

Exclusion of pregnant women or women with children was also done by informing all possible participants in a cover letter to them that the research project was limited to only those women who were not pregnant or had no biological children. The potential subjects were asked to send back their unanswered questionnaire to the researcher if they were pregnant or had biological children. A fifth criterion was that their husband must not have had any children. This was determined by their answer to the item, "Does your spouse have any children?" Another eligibility factor was that the women must not have been currently separated or divorced from their husband. This information was also obtained from the questionnaire item that asked the subjects about their current marital status. The last criterion was that the women must not have had any known infertility problems. This information was obtained by the woman's response to the questionnaire item, "Do you have any known infertility problems?" This study used both first time and subsequent marriages.

Compliance Rates

Five hundred women were sent questionnaires. Twenty of them were returned by the post office. A total of 207 were received, which gave a response rate of 43.1% (207/480). Of those 207 questionnaires, 53 (10.6%) were returned unanswered. As previously mentioned, the potential participants were instructed in a cover letter that if they were pregnant or had biological children they were to send the questionnaires back unanswered. It was therefore assumed that those potential subjects were either pregnant or had biological children, as many of the unanswered questionnaires indicated. For the purposes of the study, the unanswered questionnaires were considered responses, although not usable questionnaires. Therefore, a total of 154

answered questionnaires (30.8%) were received. Of those, 30 did not fit the eligibility criteria for the study for the following reasons: divorced, had children, spouse had children, both wife and husband had children, both wife and husband had children and were pregnant, pregnant, and infertility problems. Therefore, this left a total of 124 questionnaires (24.8%) that were usable for the study.

The original response rate of 43.1% was quite high considering that participation in the study was strictly anonymous and voluntary, and that subjects did not receive any direct benefits. One possible reason for this relatively high response rate was that the subjects were at a stage in their life cycle in which childbearing was an important issue (Gerson, Berman, & Morris, 1991). Therefore, they were interested in filling out a questionnaire which involved the benefits and costs of having children.

Research Design

This study was exploratory and had multiple purposes. The research design was a correlational and descriptive survey that used self report questionnaires on a cross-section of newly married women. The main goal of this research project was to measure the possible relationship between the attitudes toward parenthood motivation, as measured by the costs and benefits of having children, and the attitudes toward assisted reproductive technologies, as measured by the openness to using assisted reproductive technologies, in a sample of recently married women who were within childbearing ages. A secondary goal of this study was to explore the relationship between the perceived knowledge of ART and attitudes toward ART in a sample of recently married women. The third objective of this study was to explore if there were differences in the attitudes toward ART and perceived knowledge of ART corresponding to differences in certain demographic characteristics. In

addition, the relationship between parenthood motivation and perceived knowledge of assisted reproductive technologies was explored.

Instruments

Parenthood Motivation Questionnaire

The Parenthood Motivation Questionnaire (Kirchner, Seaver, Straw, & Vegega, 1977) was utilized to measure the motivation for parenthood (see Appendix A). This self-administered questionnaire was developed from a sample of 332 recently married couples (Seaver, Kirchner, Straw, & Vegega, 1977). It measures motives for parenthood in terms of the perceived benefits and costs of having children (Seaver et al., 1977). A two-stage factor analytic procedure was performed in the development of this instrument which resulted in both female and male forms (Kirchner et al., 1977). This study used the female form which is composed of two scales: positive factors (benefits) of having a child and negative factors (costs) of having a child. Each scale consists of numerous subscales that measure specific motives for (12 positive) or against (10 negative) having a child (Kirchner et al.). The positive subscales are immortality, experiencing the birth process, experiencing love and life's fuller meaning, remembering and re-experiencing own childhood, old-age insurance, partnership benefits, sculptor, opportunity for personal growth, deeper love, fulfillment through nurturance, sex role fulfillment, and stimulation and feelings of pride. The negative subscales include social and personal restrictions, concern about ability to parent, possibility of defective child, pessimistic world view, financial considerations, worries and responsibilities of rearing a child, discomforts of childbearing, population concerns, emotional immaturity, and education and career interference.

The Parenthood Motivation Questionnaire consists of 103 statements that are divided into positive and negative categories. It uses an eight-point Likert scale ranging from extremely unimportant (1) to extremely important (8).

The overall score for strength of motivation for each individual is computed by subtracting the total negative scale score from the total positive scale score (Seaver, Kirchner, Straw, & Vegega, 1977). Some examples of the positive statements (items) are, "To have the warmth and closeness of a family," and "Because part of being a woman is to have children." Examples of negative statements are, "Because I would lose a lot of freedom" and "Because I'm still too immature."

According to Kirchner, Seaver, Straw, and Vegega (1977), the questionnaire contained two types of evidence for validity. The first type, content validity, was found because the items which comprise the scales were obtained from an exhaustive pool of statements for and against having a child. This pool of statements was derived from previous research (Kirchner, 1973), published literature, and questionnaire responses from over 300 subjects. The second type of validity found was construct validity. Using a longitudinal sample, the developers of this instrument correlated the scores and scales of the Parenthood Motivation Questionnaire with the Value Instrumentality Scale (Kirchner et al., 1977). It was found that the correlations between the scores were similar in strength and consistency. All female positive motive subscales positively correlated and were significant ($p < .01$), and all negative motive subscales negatively correlated and were significant ($p < .05$), except for one. Other evidence for construct validity was found by correlating the scale scores (positive and negative scales) and the total scale score with three other variables that were closely related to parenthood motivation. The strength of the

correlations for the scale scores ranged from .27 to .39, while the correlation strength of the total scale score ranged from .39 to .46.

The internal consistency of the questionnaire was determined at two times. At time one, the total positive and negative scales had a very good internal consistency (above .90). The subscales all had reliabilities above .70, except the three following subscales: remembering and reexperiencing own childhood (.67), deeper love (.56), and worries and responsibilities of rearing child (.67). At Time 2, the coefficients alpha remained above .90 for the positive and negative scales. The reliabilities for the subscales were all above .70 except two subscales: deeper love (.04) and worries and responsibilities of rearing child (.55).

ART Items

Additional questions were attached to the Parenthood Motivation Questionnaire to gather the appropriate information regarding perceived knowledge of assisted reproductive technologies, attitudes toward assisted reproductive technologies, and demographics. These additional items were divided into three sections.

The first section consisted of five items that measured the respondents' self-reported perceived knowledge of assisted reproductive technologies including hormonal medications, surgical procedures, artificial insemination by donor, in vitro fertilization, and surrogate parenting (see Appendix A). This section of the questionnaire used a five-point Likert score rating scale ranging from "very low" scored as "1" to "very high" scored as "5." Respondents were asked to indicate their current level of perceived knowledge regarding the five ART methods.

The second section began with brief definitions of assisted reproductive technologies including hormonal medication, surgical procedures, artificial insemination by donor, in vitro fertilization, and surrogate parenting (see Appendix

A). The definitions were provided so that all women would have some knowledge of ART. This would enable them to answer the items in this part of the questionnaire. A hypothetical situation was given which asked the respondents whether, if they were unable to become pregnant, they could see themselves using any of the following treatment choices: hormonal medications, surgical procedures, artificial insemination by donor, in vitro fertilization, and surrogate parenting (see Appendix A). This section used a five-point Likert score rating scale ranging from "very unlikely" scored as "1" to "very likely" scored as "5." This measured the strength of the respondents' attitudes regarding their level of approval of the various ART procedures.

The third section consisted of eleven basic demographic questions concerning marital status, presence of children, pregnancy, age, racial heritage, fertility status, education, religious preference, personal income, and combined income (see Appendix A).

The questionnaire and the additional items were reviewed by two individuals who were viewed as having expertise in developing questionnaires. Suggestions to improve the questionnaire and additional items were given to the researcher and appropriate revisions were made on the questionnaire. A Pilot Study was then done with five female acquaintances of the researcher who were married within the last two years. Questionnaires were given to each of the women and they were asked to complete the questionnaire and provide feedback to the researcher. Overall, the acquaintances liked the questionnaire and found it interesting. General complaints about the questionnaire included the length of the questionnaire and the large rating scale of the Parenthood Motivation Questionnaire. No revisions were made on the questionnaire. The researcher did not ask the women to return their questionnaires.

Procedure

The researcher phoned the Hennepin County Service Center that is located in the Government Center building in Minneapolis, Minnesota. Several different appointments were made to view the marriage licenses that are stored in file cabinets in this building. The marriage licenses are public records, therefore special permission was not necessary to gain access to the information needed for this study. The marriage licenses in the file cabinets are arranged according to the date on which the couples were married and image numbers (random numbers assigned to each marriage license). The names and addresses of 500 women married between the dates of March 1, 1995 and May 31, 1995 who fit the eligibility criteria were written down. A package was then mailed to each of the 500 potential volunteers. Each package included a questionnaire, cover letter explaining the purpose of the study, and a pre-addressed, stamped envelope. The potential volunteers were instructed in their cover letters to fill out the questionnaire and upon completion mail it to the University of Minnesota, using the pre-addressed, stamped envelope included in the package (see Appendix B). At the end of the second week, if more than 100 completed questionnaires had not been obtained, the researcher was to mail a reminder postcard to each respondent in the hopes of increasing the response rate. Reminder post cards were not necessary, as the return rate was greater than 100.

Ethical Considerations

Precautions were taken to minimize the risks of participation. Women experiencing infertility may have been sensitive to the questionnaire as it contains issues regarding children and assisted reproductive technologies. The following safeguards were taken to minimize the risks of participating in this research project:

(a) Potential participants were provided with the phone number of a licensed

psychologist who deals with infertility and adoption issues, and related areas of concern. (b) Potential participants were also provided with the phone number of RESOLVE of the Twin Cities. RESOLVE is a nationwide American support group that provides advocacy, information, and support regarding infertility issues. RESOLVE also offers a 24-hour crisis line for immediate crisis counselling.

Anonymity was maintained by not coding the questionnaires and not having the names or addresses of the women written or attached to the questionnaires. Therefore, their responses on the questionnaires could not be linked to their names or addresses. Confidentiality was also provided by storing the names and addresses in a locked file separately from the questionnaires. Only the researcher had access to the names and addresses of those women who were sent questionnaires. The names and addresses were shredded once the research project was completed. Confidentiality was also provided by reporting the data only in statistical form.

Methods of Data Analysis

This section discusses the data analysis procedures for the study, which included: (a) treatment of missing data and multiple responses, (b) descriptive statistics, (c) coding of major variables, (d) tests for normality of distribution of data and homogeneity of variance, (e) Analyses of Variances (ANOVAs), and (f) Pearson product correlations. The Statistical Package for the Social Sciences (SPSS) was used to perform the statistical analyses in this research project.

Treatment of Missing Data

Data were inspected for missing data points and errors. Any missing data points were assigned the number 999. Out of the data, a total of nine missing data points were found on the Parenthood Motivation Questionnaire. Other missing data points were found on the following demographic items: education (for 1 case), personal

income (for 2 cases), combined income (for 1 case), and religion (for 3 cases).

Multiple responses (more than one value assigned to a given question) were assigned the higher number of the two values that were given. There were only a total of two separate occurrences of multiple responses given.

Descriptive Statistics

Descriptive statistics were calculated for the following variables: (a) demographic variables (racial heritage, age, religious preference, education level, personal gross income, and combined gross income); (b) parenthood motivation; (c) three specific motives for parenthood (biological immortality, experiencing the birth process, and gender role fulfillment); (d) two specific motives against parenthood (possibility of defective child, and discomforts of childbearing); (e) attitudes toward assisted reproductive technologies; and (f) perceived knowledge of assisted reproductive technologies.

Coding of Major Variables

Each of the 103 items from the Parenthood Motivation Questionnaire were placed into their appropriate positive or negative motivation subscales. Overall average scores were calculated for each of the 12 positive and 10 negative motivation subscales. A variable called "Total Positive Motivation for Parenthood" was then created by calculating an overall average of the 12 positive motivation subscales scores. A variable called "Total Negative Motivation for Parenthood" was also created by calculating an overall average of the 10 negative motivation subscales scores. To yield an overall index of strength for total parenthood motivation, a variable called "Overall Parenthood Motivation" was created by subtracting the total scale score of "Total Negative Motivation for Parenthood" from the scale score of

"Total Positive Motivation for Parenthood." This new variable yielded an overall index of strength for parenthood motivation.

To obtain an overall global score of attitudes toward assisted reproductive technologies, the variable **"Attitudes Toward ART"** was created by calculating an overall average of the attitudes toward the five ARTs. The variable **"Perceived Knowledge of ART"** was also created by computing the overall average of the perceived knowledge of the five ARTs.

The distribution of the demographic data was examined by computing visual tables, including frequency tables, histograms, and stem and leaf displays. These visual displays helped to determine if the categories of the demographic variables needed to be combined into more manageable categories for further statistical analyses. The categories of the demographic variables were placed into more manageable groups by creating new categories based on the values of the original categories. The categories of the demographic variable **"Age"** were combined into only two categories: (a) 26 years of age and under, and (b) over 26. For the variable **"Religious Preference,"** it was determined that only the Protestant and Catholic categories could be further statistically analyzed because there were not enough subjects in the other groups (Jewish, other religion, and no religion). Combining these three other groups into one group could not be justified. For the variable **"Education Level,"** it was decided that the various education levels should be combined into three groups: (a) high school or associate/technical education (includes completion of high school, or associate program, or technical program, or some university); (b) university education (completion of a bachelor's degree); and (c) advanced education (includes professional degrees, master's degrees or doctorate degrees). For the demographic variable **"Personal Income,"** it was determined that

the various categories would be combined into three groups: a) \$20,000 and under; b) \$20,001 to \$30,000; c) and over \$30,000. The data for the variable "Combined Income" were placed into two groups: a) \$50,000 and under, and b) over \$50,000. It was determined that the data for the variable "Racial Heritage" were not widely distributed enough for any statistical testing (93.5% of the sample were Caucasian). Therefore, hypotheses 1f and 2f were not able to be tested.

Tests for Normality of Distribution and Homogeneity of Variance

It was predetermined that t-tests and Analyses of Variance tests would be used to compare the mean differences by demographic characteristics of the subjects in their attitudes toward ART and perceived knowledge of ART (hypotheses 1 and 2). However, to use these tests certain assumptions must be met (Norusis, 1993). The first assumption of an ANOVA and t-test is that the data comes from a normal distribution. Lilliefors tests and normal probability plots were computed to examine this assumption. It appeared that the data were approximately normally distributed. A second assumption of the ANOVA and t-test is that the variances of the groups are equal. According to Norusis, tests such as the ANOVA are quite robust to departures from normality. This assumption, however, was still checked by performing Levene tests. These tests showed that the majority of the variances of the groups were equal. Finally, a third assumption of these two tests is that each of the groups is an independent random sample taken from a population. This assumption was met by the type of sample that was chosen. Although the sample for this study was not random, a fairly indiscriminate method was used in selecting the sample and as mentioned previously, the tests are robust. Therefore, the researcher thought that ANOVAs and t-tests were appropriate as statistical tests.

Analysis of Variances

Analysis of Variance is an inferential statistical technique that examines if there are significant differences among more than two groups in their mean scores (Grimm & Wozniak, 1990). Two separate one-way Analysis of Variance procedures were used in the study to compare the mean differences in overall attitudes toward ART for the different education levels and personal incomes.

To assess the differences in overall perceived knowledge of the assisted reproductive technologies for the different education levels and personal incomes, two separate one-way Analyses of Variance (ANOVAs) were generated.

T-Tests

T-tests are used to determine if two sample means are different from one another (Grimm & Wozniak, 1990). T-tests were used in the study to compare the mean differences in overall attitudes toward ART for the different age groups, religious preferences, and combined income levels.

T-tests were also used to compare the differences in overall perceived knowledge of ART for the different age groups, religious preferences, and combined income levels.

Pearson Correlation Coefficients

Pearson correlation coefficient is a measure of association which demonstrates the strength and direction of a relationship between two variables. A positive relationship is indicated by the value of a positive r , whereas a negative relationship is indicated by the value of a negative r . The magnitude of the value of r (-1 to +1) indicates the strength of the association between the two variables (Grimm & Wozniak, 1990).

In the initial stages of correlation analyses, a complete Pearson product correlation matrix was generated to examine possible associations between the variables as outlined in hypotheses 3 to 7. These variables included overall parenthood motivation, three motives for parenthood (biological immortality, experiencing the birth process, and gender role fulfillment), two motives against parenthood (possibility of defective child and discomforts of childbearing), overall attitudes toward ART, and overall knowledge of ART.

Several separate Pearson product correlation coefficients were then performed to get a closer look at the possible associations as described in hypotheses 3 to 7. A Pearson product correlation was performed between overall parenthood motivation and overall attitudes toward ART. Three separate Pearson correlation coefficients were conducted to examine the possible relationships between the three motives for parenthood (biological immortality, experiencing the birth process, and gender role fulfillment) and the overall attitudes toward ART. The association between two motives against parenthood (possibility of defective child and discomforts of childbearing) and overall attitudes toward ART was also analyzed by performing two separate Pearson product correlations. The association between overall perceived knowledge of ART and overall attitudes toward ART was then tested using a Pearson correlation coefficient. Finally, another Pearson correlation coefficient was conducted to examine the relationship between overall parenthood motivation and overall perceived knowledge of assisted reproductive technologies. Scatterplots for all of the possible relationships were generated.

Post Hoc Tests

Post hoc multiple comparison tests were to be done if significant mean differences were found in any of the Analyses of Variance that were conducted for the

demographic variables with overall attitudes toward ART and overall perceived knowledge of ART. This included Tukey's b and Scheffe tests.

To get a closer look at the possible relationship among certain demographic characteristics with attitudes toward ART and perceived knowledge of ART, the appropriate Pearson product correlations or Spearman correlations were conducted. The nature of the correlation testing allowed the demographic variables to be examined in their original form, rather than in their collapsed form. For the demographic variable Age (in its continuous form), a matrix of Pearson product correlation coefficients was generated between age, attitudes toward ART and perceived knowledge of ART. A matrix of Spearman correlation coefficients was also generated to examine the relationships among the demographic variables, education, personal income, and combined income (in their original categorical forms) with attitudes toward ART and perceived knowledge of ART.

In addition, the mean differences in overall parenthood motivation for the demographic characteristics of the subjects were examined using the appropriate Analyses of Variance and t-tests. Tukey's b and Scheffe tests were to be done in the event of finding any significant results on the ANOVAs. This additional testing between parenthood motivation and demographic characteristics was done to explore the possible interrelation between the various variables in the research project.

CHAPTER V: RESULTS

Descriptive Statistics

Demographic Data

Descriptive statistics were calculated for the demographic variables, including racial heritage, age, religious preference, education level, personal gross income, and combined gross income. Demographic information of the subjects is presented in Table 1. The demographic data in the combined categorical form is presented in Table 2.

Only women ($N = 124$) of childbearing age, with no children, married between six to nine months were used in the present study. Almost all of the subjects (93.5%) were Caucasian. Minorities accounted for 6.4% of the sample. The ages of the women ranged from 18 to 35 years, with a mean age of 26.9 years ($SD = 3.5$).

Slightly over half of the respondents were Protestants (54.8%), with the majority (60.2%) of the Protestant subjects being of the Lutheran faith. The large number of Lutherans was expected, as Minnesota has a high Scandinavian population of which many are Lutherans. The sample also consisted of a fair number of Catholics (29.8%), while the few remaining subjects were Jewish (1.6%), had other religious preferences (4.0%), and had no religion (7.3%).

The education levels ranged from the completion of high school to doctoral degrees. Overall, the level of education of the sample was high. The lowest level of education was the completion of high school (10.5%). Over 13% had obtained an associate degree or technical degree. Almost 5% had some university or college. By far, the most common response for level of completed education, and the sample median, was the attainment of a bachelor's degree (58.9%). Slightly over 6% of the subjects had a master's degree, while 4.8% had obtained a doctoral degree.

Table 1
Demographic Data For Sample

Variable	Frequency	Percent
Racial Heritage		
Caucasian	116	93.5
African-American	1	.8
Hispanic	1	.8
Asian	1	.8
Native	0	0
Bi-racial	5	4.0
Age		
18	1	.8
19	2	1.6
20	2	1.6
21	1	.8
22	1	.8
23	10	8.1
24	16	12.9
25	12	9.7
26	17	13.7
27	11	8.9
28	14	11.3
29	10	8.1
30	8	6.5
31	7	5.6
32	2	1.6
33	4	3.2
34	1	.8
35	5	4.0
Religious Preference ^a		
Protestant	68	54.8
Catholic	37	29.8
Jewish	2	1.6
None	9	7.3
Other	5	4.0

Table 1 (Continued)

Variable	Frequency	Percent
Education Level ^b		
Completed High School	13	10.5
Associate/Technical Degree	17	13.7
Some University or College	6	4.8
Bachelor's Degree	73	58.9
Master's Degree	8	6.5
Doctoral Degree	6	4.8
Personal Gross Income ^c		
Less Than \$10,000	9	7.3
\$10,001 - \$20,000	19	15.3
\$20,001 - \$30,000	57	46.0
\$30,001 - \$40,000	25	20.2
\$40,001 - \$50,000	7	5.6
\$50,001 - \$60,000	3	2.4
\$60,001 - \$70,000	0	.0
\$70,001 - \$80,000	1	.8
\$80,001 and Above	1	.8
Combined Gross Income ^d		
\$10,001 - \$20,000	4	3.2
\$20,001 - \$30,000	3	2.4
\$30,001 - \$40,000	20	16.1
\$40,001 - \$50,000	28	22.6
\$50,001 - \$60,000	28	22.6
\$60,001 - \$70,000	20	16.1
\$70,001 - \$80,000	4	3.2
\$80,001 - \$90,000	5	4.0
\$90,001 - \$100,000	4	3.2
\$100,001-\$110,000	1	.8
\$110,001 and Above	6	4.8

Note. n=124 unless otherwise indicated. Percentages in some categories may not add up to 100% because of missing data.

^a Missing 3 cases. ^b Missing 1 case. ^c Missing 2 cases. ^d Missing 1 case.

Table 2
Demographic Data In Combined Categorical Form

Variable	Frequency	Percent
Age		
26 years and under	62	50.0
Over 26	62	50.0
Religious Preference ^a		
Protestant	68	54.8
Catholic	37	29.8
Education Level^b		
High School/Technical Diploma ^c	36	29.0
Bachelor's Degree	73	58.9
Master's/Doctorate Degree	14	11.3
Personal Gross Income^d		
\$20,000 and Under	28	22.6
\$20,001 - \$30,000	57	46.0
Over \$30,000	37	29.8
Combined Gross Income^e		
\$50,000 and Under	55	44.4
Over \$50,000	68	54.8

Note. n=124 unless otherwise indicated. Percentages in some categories may not add up to 100% because of missing data.

^a Only Protestant and Catholic categories could be further statistically analyzed because there were not enough cases in the other religious categories (Jewish [n=2], other religion [n=5], no religion [n=9]). Religious Preference has 3 missing cases.

^b Missing 1 case. ^c Includes completion of high school, or associate program, or technical program, or some university. ^d Missing 2 cases.

^e Missing 1 case.

Compared to the U.S. Bureau of the Census (1990), this sample was much more highly educated than the Minnesota population. Only 21.8% of the Minnesota general population have a bachelor's degree or higher, whereas in the present study, 70.2% of the subjects had completed a bachelor's degree or higher. Also, 82.4% of the Minnesota general population have a high school diploma, whereas in this study, all of the subjects had completed high school (U.S. Bureau of the Census, 1990).

Personal gross income levels were assessed using categories that started from under \$10,000 to over \$80,001 in increments of \$10,000. By far, the most common response, and the sample median, was personal income levels between \$20,001 and \$30,000 (46.0%).

The combined gross income of the subjects and their spouses was also assessed using categories that started from under \$10,000 to over \$110,001 in increments of \$10,000. The median combined income level for the sample was between \$50,001 and \$60,000, with the majority of the sample (77.4%) between \$30,001 and \$70,000.

Parenthood Motivation Data

Descriptive statistics for the 22 specific positive and negative motives for parenthood were computed. Table 3 shows the descriptive information of the three specific motives for parenthood, "Biological Immortality," "Experiencing the Birth Process," and "Gender Role Fulfillment," and the two specific motives against parenthood, "Possibility of Defective Child," and "Discomforts of Childbearing."

Descriptive statistics for total positive motivation for parenthood, total negative motivation for parenthood and Overall Parenthood Motivation is presented in Table 4. The data showed that subjects had a fairly high motivation to have children. Subjects tended to emphasize the benefits, rather than the costs of children. Certain benefits and costs were viewed as more important than other benefits and costs.

Table 3
Means and Standard Deviations of Specific Motives For or Against Parenthood

Variable	Frequency	Mean	Std. Dev.
Motives For Parenthood			
Biological Immortality	124	3.78	1.37
Experiencing the Birth Process	124	5.64	1.42
Gender Role Fulfillment	124	3.83	1.88
Motives Against Parenthood			
Possibility of Defective Child	124	3.05	1.59
Discomforts of Childbearing	124	2.77	1.57

Note. Each motive is a subscale from the Parenthood Motivation Questionnaire. Motivation was measured using an 8-point Likert scale (1 = extremely unimportant, 8 = extremely important)

Table 4
Means and Standard Deviations for Total Parenthood Motivation Variables

Variable	Frequency	Mean	Std. Dev.
Total Positive Motivation ^a	124	4.89	1.14
Total Negative Motivation ^b	124	2.98	1.13
Overall Parenthood Motivation ^c	124	1.91	1.79

Note. The respondent's parenthood motivation was measured using an 8-point Likert scale (1 = extremely unimportant, 8 = extremely important).

^a Total Positive Motivation is the average of the 12 positive motivation subscales scores. ^b Total Negative Motivation is the average of the 10 negative motivation subscales scores. ^c Overall Parenthood Motivation is the total positive motivation scale minus the total negative motivation scale.

Attitudes Toward Assisted Reproductive Technologies

Descriptive statistics were calculated for each of the five items that measured attitudes toward the five different assisted reproductive technologies (Table 5). The most favorable attitude toward an ART procedure was toward hormonal medications ($M = 4.40$), followed in descending order by surgical procedures ($M = 3.86$), in vitro fertilization ($M = 3.52$), artificial insemination by donor ($M = 1.51$), and surrogate parenting ($M = 1.22$). The overall mean of attitudes toward ART was 2.90 (Table 5).

Knowledge of Assisted Reproductive Technologies

Descriptive statistics were also calculated for each of the items that measured perceived knowledge of the five different ARTS (Table 5). The greatest perceived knowledge of ART was for surrogate parenting ($M = 3.00$), followed in descending order by artificial insemination by donor ($M = 2.97$), in vitro fertilization ($M = 2.76$), hormonal medication ($M = 2.35$), and surgical procedures ($M = 2.29$). The overall mean of perceived knowledge of ART was 2.67 (Table 5). Interestingly, the data showed that the subjects had greater perceived knowledge of those ART methods that they viewed less favorably.

Table 5
Means and Standard Deviations for Attitudes Toward and Perceived Knowledge of Assisted Reproductive Technologies (ART)

	Attitudes Toward ART ^a		Knowledge of ART ^b	
	(N=123)		(N=124)	
	Mean	SD	Mean	SD
Hormonal Medication	4.40	1.07	2.35	1.16
Surgical Procedures	3.86	1.24	2.29	1.14
Artificial Insemination by Donor	1.51	.93	2.97	1.15
In vitro Fertilization	3.52	1.32	2.76	1.21
Surrogate Parenting	1.22	.55	3.00	1.24
Overall Mean Scores of Attitudes and Knowledge				
Overall Attitudes				
Toward ART ^c	2.90	.67	---	---
Overall Knowledge of ART ^d	---	---	2.67	.96

Note. Dashes indicate not applicable.

^a Attitudes toward the ARTs were measured by asking each respondent whether if she were unable to become pregnant, she would be willing to use the ARTs to become a parent. The 5-point Likert scale ranged from *very unlikely* (1) to *very likely* (5). ^b Perceived knowledge of the ARTs were measured using a 5-point Likert Scale (1 = very low knowledge, 5 = very high knowledge).

^c Overall Attitudes Toward ART is the overall average of the attitudes to the 5 ARTs. ^d Overall Knowledge of ART is the overall average of the perceived knowledge of the 5 ARTs.

Hypotheses Testing

Hypothesis 1:

There will be significant differences among certain demographic groups of recently married women in their attitudes toward assisted reproductive technologies.

- a. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between younger and older women.**
- b. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between more educated and less educated women.**
- c. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between non-Catholic and Catholic women.**
- d. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between women with higher personal incomes and women with lower personal incomes.**
- e. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between women with higher combined incomes and women with lower combined incomes.**
- f. There will be significant differences in the means of favorable attitudes toward assisted reproductive technologies between Caucasian and non-Caucasian women.**

Results of the testing of hypotheses 1a to 1e are shown in Table 6. None of these hypotheses were supported. Hypothesis 1a suggested that there would be significant differences in the means of attitudes toward ART between younger and older recently married women. A two-tailed t-test was conducted to determine whether the means in the attitudes toward ART for the two women's age groups were significantly different. The t-test showed that there were no significant differences in the attitudes toward ART between the two age groups of women,

Table 6
Analyses of Variance and T-Tests for Attitudes Toward Assisted Reproductive Technologies (ART) by Demographic Variables

T-tests			
<u>Attitudes Toward Assisted Reproductive Technologies</u>			
	t	df	Significance level
Age Categories	-1.06	121	.291
Religion	.82	102	.413
Combined Income Categories	-.73	120	.465
Analyses of Variance			
<u>Attitudes Toward Assisted Reproductive Technologies</u>			
	F	df	Significance level
Education Categories	.899	2, 121	.410
Personal Income Categories	2.01	2, 120	.14

Note. None of these t-values or F ratios are significant at the .05 level.
 All t-tests were two-tailed.

$t(121) = -1.06, p > .05$. Hypothesis 1a was not supported.

Hypothesis 1b suggested that there would be a difference in the mean attitudes toward ART between more educated and less educated women. To test this hypothesis, an Analysis of Variance was conducted. Although the means for attitudes toward ART appeared to be slightly higher for those that were more educated, the differences were not significant, $F(2, 121) = .89, p > .05$. Hypothesis 1b was not supported.

Hypothesis 1c suggested that favorable attitudes toward ART would differ between the different religious preferences of the recently married women. As mentioned previously, it was determined that only the Protestant and Catholic categories could be statistically analyzed because there were not enough values in the other groups (Jewish, other religion, and no religion). A two-tailed t-test was then conducted to examine the difference in mean attitudes toward ART between Catholic and Protestant women. No significant differences were found between the two groups of women, $t(102) = .82, p > .05$. Hypothesis 1c was not supported.

Hypothesis 1d suggested that there would be differences in the means of attitudes toward ART between recently married women with higher personal incomes and those with lower personal incomes. An ANOVA was used to assess if there were any significant differences in these attitudes between the various income groups. Results showed that there were no significant differences in the attitudes toward ART between female higher income earners and female lower income earners, $F(2, 120) = .20, p > .05$. Hypothesis 1d was not supported.

Hypothesis 1e suggested that favorable attitudes toward ART would differ significantly between recently married women with higher combined incomes and those with lower combined incomes. This hypothesis was tested using a two-tailed

t-test. The t-tests showed that the mean attitudes between the two income levels did not significantly differ, $t(120) = -.73, p > .05$. Therefore, Hypothesis 1e was not supported.

Hypothesis 1 f suggested that there would be differences in the means of favorable attitudes toward ART between Caucasian and non-Caucasian women. This hypothesis was not able to be tested as the data were not widely distributed enough for statistical testing (93% of the sample of recently married women were Caucasian).

Hypothesis 2:

There will be significant differences among certain demographic groups of recently married women in their perceived knowledge of assisted reproductive technologies.

- a. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between younger and older women.
- b. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between more educated and less educated women.
- c. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between non-Catholic and Catholic women.
- d. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between women with higher personal incomes and women with lower personal incomes.
- e. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between women with higher combined incomes and women with lower combined incomes.
- f. There will be significant differences in the means of perceived knowledge of assisted reproductive technologies between Caucasian and non-Caucasian women.

Results of the testing of hypotheses 2a to 2e are shown in Table 7. Hypothesis 2a suggested that there would be significant differences in the means of perceived knowledge of ART between younger and older recently married women. A two-tailed t-test was conducted to determine whether the means in the perceived knowledge of ART between the two age groups were significantly different. The t-test showed that there were significant differences in perceived knowledge of ART between the two age groups of recently married women, $t(122) = 1.95, p < .05$. Younger recently married women (26 and under) had greater perceived

Table 7
Analyses of Variance and T-Tests for Perceived Knowledge of Assisted Reproductive Technologies (ART) by Demographic Variables

T-tests			
Perceived Knowledge of Assisted Reproductive Technologies			
	t	df	Significance level
Age Categories	1.95	122	.053*
Religion	.17	103	.865
Combined Income Categories	-.83	121	.407
Analyses of Variance			
Perceived Knowledge of Assisted Reproductive Technologies			
	F	df	Significance level
Education Categories	1.33	2, 122	.269
Personal Income Categories	.445	2, 121	.642

Note. * $p < .05$. All t-tests were two-tailed.

knowledge of ART ($M = 2.8$, $SD = 1.0$), than older recently married women over 26 ($M = 2.5$, $SD = .84$). Therefore, hypothesis 2a was supported.

Hypothesis 2b suggested that there would be mean differences in perceived knowledge of ART between more educated and less educated women. Although the means for perceived knowledge of ART appeared to be higher for those who were more educated, the differences were not significant, $F(2, 122) = 1.3$, $p > .05$. Thus, Hypothesis 2b was not supported.

Hypothesis 2c suggested that the level of perceived knowledge of ART would differ between the religious preferences of the recently married women. A two-tailed t-test was conducted to examine if the means of the Catholic and Protestant recently married women were different in perceived knowledge of ART. No significant differences were found between the two groups of women, $t(103) = .17$, $p > .05$. Hypothesis 2c was not supported.

Hypothesis 2d suggested that there would be differences in the perceived knowledge of ART between recently married women with higher personal incomes and those with lower personal incomes. An ANOVA was used to assess if there were significant differences in perceived knowledge between the three income groups. Results of the ANOVA showed that there were no significant differences in the perceived knowledge of ART between the different income levels of recently married women, $F(2, 121) = .45$, $p > .05$. Therefore, Hypothesis 2d was not supported.

Hypothesis 2e suggested that the level of perceived knowledge of ART would differ between higher combined incomes and lower combined incomes of the recently married women. This hypothesis was tested using a two-tailed t-test. The t-tests comparing the mean perceived knowledge of ART scores between the two combined

income levels of recently married women was not significant, $t(121) = -.83, p > .05$.

Hypothesis 2e was not supported.

Hypothesis 2 f suggested that there would be differences in the means of perceived knowledge of ART between Caucasian and non-Caucasian women. This hypothesis was not able to be tested as the data were not widely distributed enough for statistical testing (93.5% of the sample of recently married women were Caucasian).

Hypothesis 3: There will be a positive relationship between parenthood motivation and favorable attitudes toward assisted reproductive technologies in recently married women.

To test this hypothesis, a Pearson product correlation was performed between overall parenthood motivation and overall attitudes toward ART. The results of the statistical analyses are shown in Table 8. The correlation coefficient was in the hypothesized positive direction, but was not significant, $r(123) = .13, p > .05$. These results suggested that parenthood motivation was not related to attitudes toward ART. Therefore, Hypothesis 3 was not supported.

Hypothesis 4: Among recently married women, there will be positive relationships between favorable attitudes toward assisted reproductive technologies and parenthood motivation for biological immortality, experiencing the birth process, and gender role fulfillment of having children.

To test this hypothesis, Pearson product correlation coefficients were computed between overall attitudes toward ART and three specific motives for parenthood, which were subscales from the Parenthood Motivation Instrument. Results of the statistical analyses are presented in Table 8.

Table 8
Pearson Product Correlation Coefficients Among Parenthood Motivation Variables, Attitudes Toward and Perceived Knowledge of Assisted Reproductive Technologies (ART)

	Attitudes Toward ART	p	Perceived Knowledge of ART	p
Overall Parenthood Motivation	.13	.16	-.08	.40
Biological Immortality ^a	.03	.78	---	---
Experiencing the Birth Process ^a	.08	.36	---	---
Gender Role Fulfillment ^a	.22*	.02	---	---
Possibility of Defective Child ^b	-.02	.86	---	---
Discomforts of Childbearing ^b	-.10	.26	---	---
Perceived Knowledge of ART	.15	.11	---	---

Note. Dashes indicate that a Pearson product correlation was not computed.

* $p < .05$, two-tailed

^aMotives for parenthood. ^b Motives against parenthood.

Correlation coefficients were in the predicted positive direction, but were not significant between biological immortality and attitudes toward ART, $r(123) = .03$, $p > .05$, and between experiencing the birth process and attitudes toward ART, $r(123) = .08$, $p > .05$. The correlation coefficient for gender role fulfillment and attitudes toward ART showed a weak but significant relationship, $r(123) = .22$, $p < .02$. That is, the more traditional a woman, the more likely she was to have favorable attitudes toward ART. A scattergram was produced to examine the linearity of attitudes toward ART and gender role fulfillment. The scattergram exhibited a slightly positive relationship between the two variables.

Hypothesis 4 was therefore partially supported, with gender role fulfillment having a weak and significant positive relationship with attitudes toward ART. There was, however, no significant relationship of attitudes toward ART with biological immortality and experiencing the birth process.

Hypothesis 5: Among recently married women, there will be negative relationships between favorable attitudes toward assisted reproductive technologies and motives against parenthood, which are the possibility of having a defective child and the discomforts of childbearing.

To test this hypothesis, Pearson product moment correlations were calculated between overall attitudes toward ART and two specific motives against parenthood, which are subscales from the Parenthood Motivation Instrument. Results of the statistical analyses are presented in Table 8. Correlation coefficients were in the correct negative direction, but were not significant between possibility of having a defective child and attitudes toward ART, $r(123) = -.02$, $p > .05$, and also between the discomforts of childbearing and attitudes toward ART, $r(123) = -.10$, $p > .05$. Therefore, Hypothesis 5 which suggested that attitudes toward ART were negatively

related to possibility of defective child and discomforts of childbearing was not supported.

Hypothesis 6: There will be a positive relationship between the perceived knowledge of assisted reproductive technologies and favorable attitudes toward assisted reproductive technologies in recently married women.

A Pearson product correlation was performed to determine whether perceived knowledge of ART was related to attitudes toward ART. The results are shown in Table 8. The Pearson product correlation between overall perceived knowledge of ART and overall attitudes toward ART was in the correct hypothesized direction, but nonsignificant, $r(123) = .15, p > .05$. Hypothesis 6 was not supported.

Hypothesis 7: There will be a positive relationship between parenthood motivation and perceived knowledge of assisted reproductive technologies in recently married women.

To test this hypothesis, a Pearson product correlation was conducted between overall parenthood motivation and overall perceived knowledge of ART. The results of the statistical analysis are presented in Table 8. The correlation coefficient was nonsignificant between parenthood motivation and perceived knowledge of ART, $r(124) = -.08, p > .05$. Therefore, Hypothesis 7 was not supported.

Post Hoc Testing

Post hoc multiple comparison tests were to be done in the event of significant differences being found in any of the Analyses of Variance that were conducted among the demographic variables and overall attitudes toward ART and overall perceived knowledge of ART. This included Tukey's b and Scheffe tests. No significant differences were found in the Analyses of Variance; therefore, these additional tests were not performed.

Additional post hoc testing included correlations between the demographic variables with attitudes toward ART and perceived knowledge of ART. The results are presented in Table 9. The nature of the correlation testing allowed the demographic variables to be examined in their original form, rather than in their collapsed form. For the demographic variable Age by year, a matrix of Pearson product correlation coefficients was generated to explore the possible relationships between age, attitudes toward ART and perceived knowledge of ART. The correlation coefficients between age and attitudes toward ART, and age and perceived knowledge of ART were nonsignificant. A matrix of Spearman correlation coefficients was also generated to examine the relationships between the demographic variables, education, personal income, and combined income (in their original categorical forms) with attitudes toward ART and perceived knowledge of ART. The results are shown in Table 10. All of the possible relationships between the demographic variables and attitudes toward and perceived knowledge of ART were nonsignificant.

Table 9
Pearson Product Correlation Coefficients Among Age, Attitudes Toward
and Perceived Knowledge of Assisted Reproductive Technologies (ART)

	Attitudes Toward ART	Sig.	Perceived Knowledge of ART	Sig.
Age	.14	.13	-.04	.68

Note. None of these correlations are significant at the .05 level using a two-tailed test.

Table 10
Spearman Correlation Coefficients Among Original Demographics, Attitudes
Toward and Perceived Knowledge of Assisted Reproductive Technologies
(ART)

	Attitudes Toward ART	Sig.	Perceived Knowledge of ART	Sig.
Education	.13	.17	.10	.28
Personal Income	.12	.21	.02	.84
Combined Income	.15	.09	.09	.34

Note. None of these correlations are significant at the .05 level using a two-tailed test.

To examine if there were differences in the means of parenthood motivation for certain demographic characteristics, the appropriate Analyses of Variance and t-tests were conducted. Three separate two-tailed t-tests were calculated to examine the differences in parenthood motivation for the demographic characteristics of age, combined income and religion. The results are presented in Table 11. The mean differences in parenthood motivation between the different age groups were not significant, $t(122) = -.06, p > .05$. The mean differences in parenthood motivation between the combined income levels also were not significant, $t(121) = -.79, p > .05$. The means in parenthood motivation between the religions were significantly different, $t(103) = -2.7, p < .008$. Results showed that Catholics had greater parenthood motivation ($M = 2.6, SD = 1.5$) than Protestants ($M = 1.6, SD = 1.8$).

Two Analyses of Variance were calculated for the mean difference in parenthood motivation on the demographic variables, education and personal income. The results are also shown in Table 11. The mean difference in parenthood motivation between the three education levels was nonsignificant, $F(2, 122) = 1.64, p > .05$., while the differences in parenthood motivation between the three personal income levels were also insignificant, $F(2, 121) = .84, p > .05$.

Table 11
Analyses of Variance and T-Tests for Parenthood Motivation by Demographic Variables

T-tests			
Parenthood Motivation			
	t	df	Significance level
Age	-0.06	122	.953
Religion	-2.72	103	.008**
Combined Income	-.79	121	.434
Analyses of Variance			
Parenthood Motivation			
	E	df	Significance level
Education	1.64	2, 122	.198
Personal Income	.837	2, 121	.436

Note. * $p < .05$. ** $p < .01$. All t-tests were two-tailed.

The results of the post hoc tests showed that there were no significant relationships between any of the demographic variables and attitudes toward ART or perceived knowledge of ART. The possible differences in the means of parenthood motivation among the demographic variables were also nonsignificant except for the demographic variable religion. The t-test showed that Catholics had significantly greater parenthood motivation than Protestants.

CHAPTER VI: DISCUSSION

This section reviews the purpose and objectives of the research project, discusses the findings and limitations, and suggests implications for future research, education, practice, and public policy.

Purpose and Objectives

This study was exploratory and had many objectives. The primary purpose of the research project was to explore the relationship between parenthood motivation, as measured by the costs and benefits of having children, and attitudes toward assisted reproductive technologies in a sample of recently married women who were within childbearing ages. A secondary goal was to examine the relationship between the perceived knowledge of assisted reproductive technologies and attitudes toward them. A third objective was to investigate the differences in the means of attitudes toward ART and perceived knowledge of ART among certain demographic characteristics. The fourth objective was to explore the relationship between parenthood motivation and perceived knowledge of assisted reproductive technologies.

Hypotheses 1 and 2 explored the mean differences in attitudes toward ART and perceived knowledge of ART among the following demographic variables: age, education, religion, personal income, and combined income. Hypotheses 3, 4, and 5 tested the correlational relationships between parenthood motivation measures and attitudes toward ART. Hypothesis 6 explored the relationship between perceived knowledge of ART and attitudes toward ART, while Hypothesis 7 tested the relationship between parenthood motivation and perceived knowledge of ART.

Interpretation of the Results

The present study compared the differences in subjects' attitudes toward ART among the demographic characteristics of age, education, religion, personal income, and combined income. Differences among women's demographic characteristics were examined because of mixed findings from past research on the association between demographic characteristics and attitudes toward ART.

Present results showed there were no significant differences in the attitudes of recently married women toward ART for the demographic characteristics of age, education, religion, personal income, or combined income. Additional testing also showed no significant relationships between the demographic variables and attitudes toward ART. The results of this study were consistent with findings in some studies, but contradicted results in other studies.

In the present study, the findings that attitudes toward ART did not significantly differ by the demographic variables of age, education, and religion were inconsistent with previous research (Gallup, 1978). According to Gallup, younger adults, as compared to older adults, were more in favor of IVF and were more willing to use IVF should they experience an infertility problem. Gallup also found that education and religion were important as determinants in the attitudes toward IVF. More highly educated and Protestant adults, as compared to less educated and Catholic adults, were in greater favor of IVF and more willing to use it should they experience infertility. One possible explanation for the discrepancy in findings between the present study and Gallup's study may be because Gallup examined only one ART procedure (IVF), whereas the present study examined the overall combined attitudes toward several ART procedures. Also, he only examined descriptive statistics, whereas the present study performed inferential tests to explore the possible

differences among the demographic variables. Another possible explanation for the discrepancy in findings between the present study and Gallup's study may be due to the different compositions of the subject groups. Gallup examined a wider range of ages (18 to over 50), whereas the present study examined a significantly smaller age span (18 to 35). His subjects also had a wider range of education levels (grade school to college), whereas the current study used a much more educated sample (high school to doctoral degrees). According to the following statistics by the U.S. Bureau of the Census (1990), the subjects in the present study also appeared to be more highly educated than the general population. Only 21.8% of the Minnesota general population have a bachelor's degree or higher, whereas in the present study, 70.2% of the subjects had completed a bachelor's degree or higher. All of the subjects in the present study had also completed high school, whereas only 82.4% of the Minnesota general population have a high school diploma. Perhaps if there were greater age and education ranges of the women in the present study, there may have been significant differences in attitudes toward ART.

Also contrary to present findings, but similar to past findings (Gallup, 1978), other research has also found that religion likely plays an important role in influencing the attitudes of women of childbearing age toward ART (Alder, Baird, Lees, Lincoln, Loudon, & Templeton, 1978). Alder et al. found that women who were Roman Catholic, especially with strong beliefs, were more likely to be anti-research regarding infertility treatments and unwilling to donate ova for research than Protestant women. However, it is important to point out that Alder's study examined attitudes toward more ethically and morally controversial reproductive technologies than the present study.

Congruent with the present study's findings, Dunn, Ryan, and O'Brien (1988) found that Protestants and Catholics were more similar than dissimilar in their attitudes toward several kinds of ARTs. Other research has also found that religious beliefs were not that important as determinants in the attitudes of university students toward in vitro fertilization (Turtle, Harrajchi, Perry & Tully, 1988). Therefore, based on the present study's findings and past research, it may be possible that religion only plays an important role in the attitudes of women toward ART as the technologies become more extreme.

As mentioned previously, results of the present study showed no significant differences in the attitudes toward ART between the two different age groups (26 and under, and over 26). Consistent with these results, Alder, Baird, Lees, Lincoln, Loudon, and Templeton (1978) found that age was not related to the attitudes of women of childbearing age toward ART. Although Alder et al. did not specifically examine the attitudes toward the same ART procedures as the present study, they found that age was not related to attitudes toward embryo research, willingness to donate ova, or accuracy of the size of a 14-day embryo. On the other hand, as discussed earlier, Gallup (1978) found that age was an important determinant in the attitudes toward ART. Therefore, more research is needed in this area.

The current findings that attitudes toward ART did not differ among personal income levels and combined income levels appeared similar to those obtained by Alder, Baird, Lees, Lincoln, Loudon, and Templeton (1978), who found that social class did not influence the attitudes of women of childbearing age toward embryo research and willingness to donate ova. Alder et al. measured social class by either the partner's occupation or the woman's occupation.

The present study also compared the differences in perceived knowledge of ART for the demographic variables of age, education, religion, personal income, and combined income.

Research in this area was exploratory, as there was no known study that examined the differences in the knowledge of ART among the demographic characteristics of recently married women. Gallup (1978) speculated, however, that knowledge of ART was likely greater among people in the upper educational and income brackets. The present results revealed that perceived knowledge of ART did not significantly differ by education, religion, personal income, or combined income. Additional post hoc testing also showed no significant relationships between the demographic variables with perceived knowledge of ART.

Significant differences, however, were found in the perceived knowledge of ART between the two different age groups (26 and under, and over 26). Younger women (26 and under) had greater perceived knowledge than older women (over 26). One possible explanation for the differences between the two age groups may be due to cohort effects. Probably the most important factor was that younger women had been raised during a highly advanced technologic era, as compared to the older women. Therefore, younger women may have embraced technology more than older women, thereby increasing their interest and knowledge of ART. For example, many of the younger subjects were likely not even in school yet at the time the first test tube baby was born in 1978. They were, therefore, likely exposed to ART during their early socialization, whereas many of the older subjects may have been old enough at the time of the first test tube baby to have remembered the skepticism that went along with the highly publicized birth.

Another possible explanation for the differences may be that the older women, as compared to the younger women, may be more set in their lifestyles and with nonparenthood, and therefore did not feel the need or interest to obtain knowledge about ART. On the other hand, however, one could certainly argue that the older women should have had more knowledge because they likely had more friends or acquaintances who had experienced infertility and used ART than the younger women. However, although more of their friends and acquaintances may have experienced infertility problems, they may not have acquired increased knowledge of ART because they did not feel that they themselves would experience any infertility problems.

It is important to point out that the perceived knowledge of ART refers to subjective knowledge rather than actual knowledge. One could argue that it may have been possible for the younger women to have overestimated their perceived knowledge of ART. Therefore, their actual knowledge of ART may not have been any greater than that of the older women. Nevertheless, the current study supported the finding that younger recently married women had greater perceived knowledge of ART than older recently married women.

In the present study, correlation analysis found that parenthood motivation was not significantly related to attitudes toward ART among recently married women. It should be mentioned, however, that the correlation between the variables was in the expected positive direction. The testing of this relationship was exploratory, as no other studies had specifically examined the possible association between parenthood motivation and attitudes toward ART. The speculation that led to research in this specific area was Tallman's problem solving theory (1988). According to a basic proposition of this theory, the higher the value placed on a specific benefit, the more

costs and risks an individual is willing to undergo in order to obtain that benefit. It was therefore expected that when the subjects were asked about their willingness to use ART if experiencing infertility (a measure of attitudes toward ART), it was expected that the greater the parenthood motivation, the more willing they would be to use ART. The nonsignificant finding in the current study was not in accord with Tallman's problem-solving theory.

One possible explanation for the inconsistency between the theory proposition and the present study's findings may be that Tallman's problem-solving theory is based on the premise of solving an actual problem. The women in this study, however, did not have an actual problem. Rather, they were given a hypothetical problem. Perhaps if these women were to experience infertility and be denied children, parenthood motivation would become related to attitudes toward ART. It may be possible that the problem-solving methods of women with a hypothetical infertility problem are completely different from the problem-solving methods of women with an actual infertility problem. It is also possible that some of the women may have had more difficulty than others imagining themselves experiencing infertility. Therefore their responses to attitudes toward ART may have been affected by the inability to imagine an infertility problem. Possibly, using a more sophisticated instrument that measured the extent of the subjects' approval of ART, rather than measuring attitudes toward ART by the hypothetical use of ART, may have made a difference in the significance of the relationship between parenthood motivation and attitudes toward ART. On the other hand, there may simply be no relationship between overall parenthood motivation and attitudes toward ART in recently married women of childbearing age with no infertility problems. Other factors besides parenthood motivation may be more important in the formation of attitudes toward ART. However, the expected

positive direction of the correlation, although not significant, was suggestive that there may be a relationship between parenthood motivation and attitudes toward ART. Further research is needed in this area.

Correlation analyses also explored the possible relationships between attitudes toward ART and three specific parenthood motives: biological immortality, experiencing the birth process, and gender role fulfillment of having children. It was expected that the three parenthood motives would be positively related to attitudes toward ART.

The speculation that generated the assumption that biological immortality would be positively related to attitudes toward ART was that North American society highly values the biological aspect of having children, and assisted reproductive technologies are simply a reflection of a society's value system that places great importance on biological parenthood and favors technology (Miall, 1989). Previous studies have found that one of the major reasons for infertile women using ART is to have a biologically related child (Daniels, 1989, 1994; Leiblum, Kemmann, Colburn, Pasquale, & DeLisi, 1987). Thus, it was assumed that, like infertile women, recently married women would also highly value biological parenthood and this specific motive would be correlated to attitudes toward ART. As mentioned previously, according to the basic proposition of Tallman's problem solving theory, the higher the value placed on a specific benefit, the more costs and risks an individual is willing to undergo in order to obtain that benefit. Therefore, it was expected that the greater the motivation for biological immortality, the more willing they would be to use ART if experiencing infertility.

Results showed that the relationship between biological immortality and attitudes toward ART was in the predicted positive direction, but the correlation was found to

be nonsignificant. Therefore, one must take a conservative approach when interpreting this finding and determine that there was no significant relationship between the motivation for biological immortality and attitudes toward ART. The examination of the descriptive statistics showed that this specific motive was only fairly important to the subjects. Out of an eight point rating scale that ranged from extremely unimportant (1) to extremely important (8), the average importance of biological immortality for the subjects was only 3.77.

One possible explanation for the nonsignificant correlation may be that, unlike the studies examining women with infertility, many of the women in the study may have postponed the final decision to have children until they were more settled in their careers or marriage. Therefore, they may not yet desire biological parenthood to the degree that infertile women do, because of their postponement of children. It is also possible that there may not be a relationship between biological immortality and attitudes toward ART because the women in the present study have not experienced infertility and probably feel they will never experience it. Therefore, they did not view ART as a last resort for experiencing biological parenthood. It would be interesting to examine at a later date the relationship between biological immortality and attitudes toward ART when many of the women have come closer to the childbearing decision or are experiencing infertility.

The specific parenthood motive for experiencing the birth process was also explored in relation to attitudes toward ART. It was also expected that motivation for experiencing the birth process would be positively related to attitudes toward ART. In other words, the greater a woman's motivation for experiencing the birth process, the more favorable her attitudes would be to ART. The speculation that led to this hypothesis was similar to the above-mentioned motive for biological

immortality and attitudes toward ART. Like the motive for biological immortality, experiencing the birth process is highly valued in North American society by women both with or without infertility. Most of the assisted reproductive technologies provide a chance to experience the birth process. Previous infertility research has found that one of the major reasons for infertile women using ART is to experience the birth process (Daniels, 1989, 1994).

The findings showed the correlation between the motivation for experiencing the birth process and attitudes toward ART was in the expected positive direction, but failed to reach significance. The examination of the descriptive statistics showed that out of an eight point rating scale that ranged from extremely unimportant (1) to extremely important (8), the average importance of experiencing the birth process for the subjects was 5.6, which indicated that the women in the present study had high motivation for experiencing the birth process. The descriptive statistics also showed that the birth process experience was the most important motive of the three specific parenthood motives. The question then remains: Why wasn't there a significant relationship between experiencing the birth process and attitudes toward ART? One explanation may be that, as previously mentioned, many of the recently married women in the present study had not yet made the final decision to have children and also did not experience infertility, and therefore did not view ART as a last resource to experience the birth process. Another explanation may be because of the instruments used to measure the birth process experience and attitudes toward ART. Perhaps if more sophisticated instruments would have been used, the birth process experience may have been related to attitudes toward ART. Further research is needed in this area.

Other exploratory analysis found that the specific motive for gender role fulfillment of having children was positively related to attitudes toward ART. The correlation between the two variables was weak, but significant. The results suggested that the greater the parenthood motivation for gender role fulfillment, the more favorable the attitudes toward ART. In other words, recently married women who viewed children as a means of fulfilling their gender role (traditional-type motivation for children) were more likely to have favorable attitudes toward ART. The speculation that generated this assumption was that other research has found that female users of ART have a strong identification with the feminine sex role (Dennerstein & Morse, 1985; Freeman, Boxer, Rickels, Tureck & Mastroianni, 1985).

Previous research (Pohlman, 1969) has found that for some women who are uncertain of their identity and role, having a first baby provides them with a clearer identity and role. Hoffman, Thornton, and Manis (1978) have found that traditional women place greater importance on children than nontraditional women. These same researchers suggested that gender role orientation plays an important role in women's fertility desires and behaviors. Based on these past research findings, it would therefore also be expected that traditional-type gender orientations would be related to more favorable attitudes toward ART.

Hoffman, Thornton, and Manis (1978) suggested that women with traditional gender roles have access to fewer alternative sources, besides children, for fulfilling a need and therefore place greater importance on having children. Therefore, it may be possible that women with traditional orientations have more favorable attitudes toward ART because they have fewer alternative sources for fulfilling their needs. On the basis of the significant statistical results, it is concluded that there was a positive

relationship between the traditional motivation for gender role fulfillment and attitudes toward ART.

Correlation testing explored the possible relationships between attitudes toward ART and two specific motives against parenthood: possibility of defective child and discomforts of childbearing. It was expected that the higher a woman's concern for the possibility of a defective child and the discomforts of childbearing, the less favorable attitudes she would have toward ART.

The findings showed that the correlations between the two specific motives against parenthood and attitudes to ART were in the predicted negative direction, but failed to reach statistical significance. The speculation that generated this hypothesis was that assisted reproductive technologies not only provide women with the physical benefits of having children, such as the chance to experience pregnancy and the birth process, but they may also include physical costs, such as the possibility of a defective child and the discomforts of childbearing. It was assumed that if a potential positive relationship existed between the positive motives for having children and favorable attitudes toward ART, then a significant negative relationship may exist between the negative motives for having children and favorable attitudes toward ART. Results, however, did not support this assumption.

A possible explanation for the nonsignificant results of this hypothesis might be that although ART is ethically controversial, it is not usually known to be associated with birth defects. It is worthwhile to note here that perhaps if more refined instruments would have been used to measure the two motives against parenthood and attitudes toward ART, there may have been significant findings between these variables.

Attitudes toward ART were also examined in relation to perceived knowledge of ART. The results showed that perceived knowledge of ART was not significantly related to attitudes toward ART. It is important to mention that, as predicted, the correlation was in the positive direction. A conservative approach, however, was taken when interpreting these findings and it was determined that there was no significant relationship.

This assumption was based on previous research (Gallup, 1978), which suggested that knowledge of IVF was a key determinant in the formation of attitudes toward it. Gallup made this assumption by simply looking at the descriptive statistics of his study, which showed that more highly educated people had more favorable attitudes to IVF. He then inferred that more educated people would likely have had greater access to information regarding IVF. Therefore, Gallup assumed that an understanding of IVF was a factor that contributed to the more favorable attitudes of more highly educated people toward IVF.

This assumption in the present study was also based on a proposition from Tallman's problem-solving theory (1988) which states that when people are confronted with a problem, they will gather and process information about the risks, costs, and benefits associated with each alternative available for solving the problem. Although this proposition did not directly apply to the present study since the subjects did not have an infertility problem, and therefore had no need to seek alternatives for a solution, it emphasized the importance that acquired knowledge had on the decision-making process. That is, it was expected that when the attitudes of the women toward ART were measured by presenting them with a hypothetical infertility question which asked whether if they were unable to have children they

would be willing to use ART, their perceived knowledge of ART would be related to their responses.

A possible explanation for the inconsistency between the present study's finding that attitudes toward ART were not related to perceived knowledge of ART and Tallman's proposition may be that Tallman's problem-solving theory is based on solving an actual problem, rather than a hypothetical one. Therefore, the problem-solving methods of women with a hypothetical infertility problem would likely be completely different than the problem-solving methods of women with an actual infertility problem. For example, women with infertility would likely seek out information regarding ART, whereas women in the present study likely had no reason to seek information about it. It is possible that there may have been an association between perceived knowledge of ART and attitudes toward ART if the women had infertility and actually had to make the decision of whether or not to use ART.

It is important to point out that the knowledge measure in the present study measured perceived knowledge of ART as opposed to actual knowledge. In other words, it was a subjective measure of knowledge, rather an objective measure of it. Therefore, some women may have over- or underestimated their actual knowledge of ART. In turn, this possibly may have affected the present finding. Perhaps if a more refined objective measure of perceived knowledge of ART would have been used in the present study, this may have yielded a significant finding between knowledge of ART and attitudes toward ART.

According to Rettig (1993), most decisions are based on information and intuition. The subject's perceived knowledge in the present study does not appear to be overly high. An overall average of the five ART procedures showed that out of a

five point rating scale, the perceived knowledge of ART was 2.7. Therefore, it may have been possible that their hypothetical willingness (decision) to use ART may have been based more on intuition rather than on knowledge of ART. The descriptive data also revealed that the women had greater perceived knowledge of those ART methods that they viewed less favorably. ART methods viewed less favorably were more ethically and morally controversial, such as artificial insemination by donor and surrogate parenting. One possible explanation for this finding may be that controversial ART methods receive more negative publicity than the conservative techniques. The significance of the possible relationships between the perceived knowledge of each of the five different ART techniques and the corresponding attitudes toward each of the ART methods were not tested.

The women's perceived knowledge of ART was also examined in relation to parenthood motivation. Correlation analysis revealed that the women's perceived knowledge of ART was not significantly related to parenthood motivation. It was assumed that a woman's values would influence her acquired knowledge about a matter. That is, women who highly valued parenthood (had high motivation for parenthood) would likely have acquired great knowledge about ART. The results, however, did not support this assumption.

A possible explanation for the nonsignificant relationship between parenthood motivation and perceived knowledge of ART may be that the recently married women in the present study had no need to gather information regarding ART because they did not experience infertility. As stated previously, most of the women in the present study likely assumed that they were able to have children. Therefore, they would have had no need to increase their knowledge about ART. We would assume, however, that women highly motivated for parenthood, upon learning of

their infertility, would gather more information about ART to increase their chances of having a child. No data, however, currently support this speculation.

Post hoc tests compared the differences in parenthood motivation for the demographic characteristics of age, education, religion, personal income, and combined income. The mean differences were tested using t-tests and ANOVAs, depending upon the size of the categories.

Results of the post hoc tests showed that parenthood motivation did not significantly differ by age, education, personal income, or combined income. Mean differences for parenthood motivation were found between the religions (Protestants and Catholics), with Catholics being more motivated for parenthood than Protestants. In other words, Catholic women placed greater importance on having children than Protestant women. A possible explanation for this finding is that the Catholic religion emphasizes the importance of children as a moral imperative. Catholicism tends to stress the morality of childbearing, which is reflected in the attitudes and values of Catholic women (Hoffman, Thornton, & Manis, 1978).

It is worthwhile to note here that, as mentioned earlier, motivation for gender role fulfillment of having children was found to be positively related to attitudes toward ART in the present study. Perhaps there also may be an association between motivation for gender role fulfillment of having children and Catholicism. Future research could examine this area.

Limitations of the Study

This section discusses the limitations of the present study. Several limitations of the study should be pointed out. The sample was limited to subjects who had applied for marriage licenses at Hennepin County, one of several counties in the Minneapolis/St. Paul area. The sampling process was not random. Only self-

selected subjects were included in the sample. The subjects who chose to participate were predominantly Caucasian, middle class, had obtained high levels of education and were either Protestant (largely of the Lutheran faith) or Catholic. Therefore, the findings of the study may be generalizable to some extent to Caucasian, well-educated, middle class women who are recently married and within childbearing ages, but they should not be generalized to the population of all recently married women within childbearing years. It is important to note that, less educated women with lower incomes and a non-Caucasian background may have had different attitudes toward parenthood motivation, toward ART and perceived knowledge of ART. A less homogeneous, random, and larger sample may have possibly yielded different findings.

Another limitation of the study may have been the instrument used to measure attitudes toward ART. It is possible that some of the women's responses in their openness to using ART may have been affected by their inability to imagine themselves with infertility. Possibly, using a different instrument that measured the extent of the subjects' approval of ART, rather than measuring their hypothetical use of ART, may have been a more appropriate measure for attitudes toward ART. Some of the subjects also may have given more thought than others to the use of ART because they may have known other women who have used it. It is likely, however, that many of the subjects in the study gave little thought to the use of ART, because they assumed that they would be able to have children. Future studies examining attitudes toward ART could use an instrument that measures both the extent of the subjects' approval of ART and their openness to using it. This would give a broad measure of attitudes to ART. It also would be interesting to compare the results of the two measures. Previous research (Gallup, 1978) on the general

public compared both attitudes toward the approval of IVF and the willingness to use IVF, if having an infertility problem. The results showed that when presented with the hypothetical infertility problem, the willingness to use IVF was approximately 10 percent less than the approval of IVF. These data suggest that although people may have favorable attitudes to IVF, they may not be willing to use it. It also should be pointed out that the attitudes of the subjects toward ART refers to hypothetical use of ART rather than actual intended use of ART. In other words, there is no way that one can predict the actual use of ART in the future, should these recently married women experience infertility.

Another limitation of the study is that the instruments used to measure attitudes toward ART and perceived knowledge of ART each contained only five items. In addition, the validity and reliability of the two measures for attitudes to ART and knowledge of ART were not tested, as not enough literature was available on these subjects and too few items made up the measures. Perhaps if measures that were tested to be valid and reliable would have been used, more significant results may have been found in the present study.

It is also necessary to mention that the instrument that was used to measure perceived knowledge in the present study was a subjective measure of the subject's knowledge, rather than an objective measure of it. Therefore, some women may have over- or underestimated their actual knowledge of ART. This also may have affected the findings in the study.

The instrument used to measure parenthood motivation measured expressed as opposed to intended motivation (Gerson, Berman & Morris, 1991). Therefore, many of the subjects' expectations regarding parenthood may change in the future.

Another limitation of the instrument was that some of the women may have been

closer than others to making the decision to have a child. It was also difficult to know whether the subjects were expressing their overall motivation to be parents, to have children now or in the future, or to have a child of a certain sex (Gerson, 1978). It should also be pointed out that the subscales that measure motives for or against parenthood each contain only a few items.

A final limitation of the study was the subscale sex role fulfillment, which was used to measure gender role fulfillment of having children. Although the developers of this instrument (Kirchner, Seaver, Straw, & Vegega, 1977) found the subscale to be reliable at two points in time (coefficient alpha at Time 1 = .83 and Time 2 = .80), it contains a total of only two items. Therefore, one should interpret the results of this measure with caution.

Implications of the Study

This section discusses the implications of the present study for future research, education, practice, and policy.

Implications for Future Research

This study was exploratory. It explored the relationships between certain factors related to attitudes toward ART, and perceived knowledge of ART. In addition, it also examined the differences in attitudes toward ART and perceived knowledge of ART among certain demographic characteristics. Three significant results were found in the present study. It is important to mention, however, that most of the tested relationships in the study were in the predicted direction, but did not reach statistical significance. Further studies should be conducted that replicate these possible relationships, using different measures. There is still very little known about the factors related to attitudes toward ART and knowledge of ART. This study offers several suggestions for future research.

Future research should be conducted that uses a larger and broader sample of women with more diverse backgrounds, including differing social, racial, and cultural backgrounds. This would be more representative of the general population of women. This may possibly yield more significant results than the present study.

The current study performed only bivariate analysis. Future research using multivariate analysis could help explore the connections among variables in this area. Also, studies that explore the relationships between attitudes toward ART and other variables should be pursued. Such variables could include psychological, sociological, demographics, gender roles, partner relationships, and parenthood motivation. The differences amongst genders in their attitudes toward ART and factors that influence or are related to these attitudes should also be explored.

This study's significant finding, the relationship between gender roles and attitudes toward ART, should be further explored. A well developed, multi-item instrument measuring gender role identity is recommended. Two suggestions are the Bem Sex Role Inventory and the Minnesota Multiphasic Personality Inventory (MMPI).

In the future, the development of more refined instruments that measure attitudes toward and knowledge of ART would greatly contribute to this area of study. Currently, the quantity of measures are extremely limited. More objective instruments that measure knowledge of ART, along with more thorough measures of attitudes toward ART are needed. More parenthood motivation measures also need to be developed, as they are quite limited in number.

The current study examined only overall parenthood motivation and specific motivation subscales of the Parenthood Motivation Questionnaire with overall attitudes toward ART and overall perceived knowledge of ART. Perhaps in the future, the relationships could be explored between each of the 22 motivation

subscales from the Parenthood Motivation Questionnaire, and attitudes toward ART and knowledge of ART. Also, it would be interesting to examine the relationships between parenthood measures, and each of the five separate items that measured attitudes toward the different ARTs and knowledge of the different ARTs.

The descriptive data in the present study revealed that the women had greater perceived knowledge of those ART methods that they viewed less favorably. However, the significance of this possible relationship was not tested. Perhaps future research could examine the significance of the relationships between perceived knowledge of different ART techniques and the corresponding attitudes toward each of these ART methods.

A qualitative study should be pursued to get a closer look at the attitudes toward ART and the variables that are related to these attitudes. The few significant findings in the present study revealed that there are likely other factors that are more influential in the attitudes toward ART.

More theoretically guided research needs to be conducted on attitudes toward ART. The conceptual framework that guided this study was Tallman's problem solving theory (Tallman, 1988). Further ART research using Tallman's problem solving theory could be useful for the exploration of parenthood motivation and attitudes toward ART of women experiencing infertility. In this study, Tallman's problem solving theory may not have been as adequate in guiding the research because the women had only a hypothetical problem, rather than an actual problem.

Longitudinal studies should be conducted to examine the relationship between parenthood motivation and attitudes toward ART of women who are recently married, and several years after marriage. These particular studies could then compare the relationship between parenthood motivation and ART attitudes of

women with and without infertility. These data would help demonstrate whether or not the relationship between parenthood motivation and attitudes toward ART changes over time and upon experiencing infertility. Longitudinal studies, however, are very expensive and time-consuming, and therefore may not be possible. In this case, a cross-section of recently married women and infertile women, married a few years, could be chosen from the marital registry. The differences in their parenthood motivation and attitudes toward ART could then be analyzed.

Implications for Education

The significant finding in the present study, that gender role fulfillment was positively related to attitudes toward ART, suggested that the more traditional the sex role orientation held by a woman, the more favorable her attitudes would be toward ART. In other words, the women most likely to have favorable attitudes to ART are traditional women. As mentioned previously, past research (Hoffman, Thorton, and Manis, 1978) has found that women with traditional gender roles have access to fewer alternative sources, besides children, for fulfilling a need and therefore place greater importance on having children. Therefore, it may be possible that women with traditional orientations may have more favorable attitudes toward ART because they have fewer alternative sources for fulfilling their needs. It is therefore important for educators, especially in the school system, to emphasize the importance to girls to explore other options in achieving life goals, besides parenthood. As mentioned earlier in the literature review, approximately one out of five couples will eventually experience infertility. Therefore, girls must be taught at a young age about all the other alternatives available, besides motherhood, for achieving their needs, goals, and values. Also, girls should be taught that not all women will be mothers and a woman can still fulfill her gender role even though she

is not a mother. Although more women than ever are becoming educated and working in the public workplace, societal pressure is still put upon women to fulfill the role of mother. The researcher is not underestimating the importance of children, but believes that less societal pressure should be put on women to have children and less stigma upon those women who do not have children. Educating girls to fulfill their gender roles in other ways besides motherhood may help to lessen the stigmatization of infertility that currently exists in Western society. This could also eventually lead to more women having children out of choice, rather than necessity, which would likely lead to increased maternal satisfaction.

There is also a need for the school system to educate adolescents about assisted reproductive technologies. This is an important consideration because the use of ART is rapidly increasing and more children than ever are born with the assistance of ART. Education would likely help those individuals born with the assistance of complex ART methods, such as surrogate parenting and artificial insemination by donor, to better understand their particular situation.

A final recommendation is to educate adolescents and young adults about infertility. The present study showed that young women of childbearing age do not have a great amount of knowledge about ART. Educating people about assisted reproductive technologies could be done in family life programs. Surely, the public should be educated about these medical technologies that are used so often. The curriculum could include education about infertility rates, causes of infertility, prevention of infertility, and ARTs and their success rates.

Implications for Practice

The significant finding of the positive relationship between gender role fulfillment and attitudes toward ART may help practitioners who work with infertile couples to

better understand the reasons couples seek infertility treatments. It is recommended that practitioners give the Parenthood Motivation Questionnaire, used in the present study, to infertile clients to better understand their parenthood motives. Having a better understanding of parenthood motives could possibly lead to resolutions to their infertility problems. For example, infertile couples who highly value the parenting aspect of having children may want to consider such options as adoption or foster-parenting as possible solutions to their infertility, whereas couples who place great importance on the biological aspect of having children may want to consider ART as an option.

Policy Implications

The descriptive statistics in the present study showed that recently married women of childbearing age tended to emphasize the benefits of children, rather than the costs of them. The descriptive information also showed that the women had more favorable attitudes to those ART procedures that were more conservative and did not involve a third party. That is, they were more willing to try hormonal medications, surgical procedures, and in vitro fertilization, than artificial insemination by donor and surrogate parenting. These particular findings could help policymakers have a better understanding about the importance of children to this subgroup of women and their attitudes toward the various ART procedures. It could also possibly lead to public funding of research on those ART procedures that are viewed more favorably by the public. Research on assisted reproductive technologies is currently only funded by private institutions. More research in this area is needed because, contrary to popular belief, many ART methods still have very low success rates. For example, in vitro fertilization has a success rate of only 15 to 20 percent. Findings from this study appeared to indicate that policy makers of ART should

consider the significance of asking young women within childbearing years about the importance they place on children and their attitudes toward ART.

The findings from this study showed that many women were willing to use certain ART procedures. Therefore, another policy implication that could stem from this research is the issue of public subsidization of the use of ART. As previously mentioned, approximately one out of five women will eventually experience infertility and be a candidate for the use of ART. Currently, subsidization for the use of ART is very limited. Many ARTs are very expensive and are limited to those women who can financially afford them. Society needs to decide if they are willing to subsidize the use of ART for couples who are unable to afford them.

The descriptive statistics in the present study on the attitudes toward ART could also aid in establishing legislation and regulation regarding the use and development of ART. Presently no enforced legislation exists in this rapidly evolving area. Any information about the attitudes of ART would likely be of assistance in this currently ambiguous area.

Conclusion

The primary purpose of this study was to explore the relationship between parenthood motivation, as measured by the costs and benefits of having children, and attitudes toward assisted reproductive technologies in a sample of recently married women who were within childbearing ages. A secondary goal was to explore the relationship between the perceived knowledge of assisted reproductive technologies and attitudes toward assisted reproductive technologies. The third objective was to examine if there were any differences in the attitudes toward ART and perceived knowledge of ART between certain demographic characteristics in the sample of recently married women. Finally, the fourth objective was to explore if there was a

relationship between parenthood motivation and the level of perceived knowledge of assisted reproductive technologies.

Three significant results were found in the study. First, there was a weak, positive relationship between gender role fulfillment and attitudes toward ART. These results showed that a woman most likely to have favorable attitudes toward ART would likely have a traditional-type gender orientation. A possible explanation for this relationship was that women with traditional orientations likely have access to fewer alternative sources, besides children, for fulfilling a need, and therefore are more willing to use ART than women who have other alternatives for fulfilling life's goals, values, and needs.

The second significant result found in this study was that younger recently married women (26 years and under) had greater perceived knowledge of ART than older recently married women (over 26 years). These differences may be attributable to cohort effects. That is, the younger subjects had been raised during a highly advanced technologic era, as compared to the older subjects. Therefore, they may have embraced technology more, thereby increasing their interest and knowledge of ART. Another possible explanation for the differences in perceived knowledge between the two age groups was that the older subjects, as compared to the younger subjects, may have been more set in their lifestyles and nonparenthood, and therefore did not feel the need or interest to obtain knowledge about ART. These significant findings should be further explored.

The third significant finding was that recently married Catholic women were more motivated for parenthood than recently married Protestant women. A possible explanation for the differences between the two religions were that Catholicism tends

to stress the morality of childbearing, which is reflected in the attitudes and values of Catholic women (Hoffman, Thornton, & Manis, 1978).

In the present study, most of the tested relationships between the different variables were in the predicted direction, but did not reach statistical significance. A conservative approach was taken when interpreting these findings and it was therefore determined that there were no significant relationships between the variables. They provide a springboard for future studies on parenthood motivation and attitudes toward ART. Perhaps if there were modifications in the methodology, such as a larger sample size and more refined instruments, the correlations would have reached statistical significance.

The descriptive data in this research project showed that recently married women had a fairly high motivation to have children. The subjects tended to emphasize the benefits, rather than the costs of children. Certain benefits and costs were viewed as more important than other benefits and costs. The women had relatively favorable attitudes to ART. They were more willing to try those ARTs that were more conservative and did not involve a third party. The descriptive data also revealed that the women had greater perceived knowledge of those ART methods that they viewed less favorably. The descending order of preference for the ARTs was hormonal medications, surgical procedure, in vitro fertilization, artificial insemination by donor, and surrogate parenting. The perceived knowledge of ART was not overly high. The descending order of perceived knowledge of the ARTs was surrogate parenting, artificial insemination by donor, in vitro fertilization, hormonal medications, and surgical procedures.

The conceptual framework that guided this study was Tallman's problem solving theory (Tallman, 1988). The framework was useful for providing information about

the general association between values and willingness to fulfill one's values, and the importance of knowledge in the decision-making process. Unfortunately, the findings in the study did not completely support the theory. One possible explanation for the inconsistency was that the women in this study were presented only with a hypothetical infertility problem, rather than having an actual infertility problem. Tallman's problem solving theory is based on the premise that an individual is trying to solve an actual problem, not just an imaginary problem.

The findings of the study have implications for future research, education, practice, and policies. More research is needed on the attitudes of women toward ART as there is very limited research in this area. Further exploration of the various factors related to or influencing the attitudes of women of reproductive age to ART would contribute to a better understanding of these attitudes.

REFERENCES

- Abbey, A., Halman, L., & Andrews, F. (1992). Psychosocial, treatment, and demographic predictors of the stress associated with infertility. Fertility and Sterility, 57, 123-128.
- Alder, E., Baird, D., Lees, L., Lincoln, D., Loudon, N., & Templeton, A. (1986). Attitudes of women of reproductive age to in vitro fertilization and embryo research. Journal of Biosocial Science, 18, 155-167.
- American Fertility Society. (1992). Therapeutic donor insemination: a guide for patients. [Booklet]. Birmingham, AL: The American Fertility Society.
- Aral, S., & Cates, W. (1983). The increasing concern with infertility: why now? Journal of American Medical Association, 250, 2327-2331.
- Arnold, F., Bulatao, R., Buripakdi, C., Chung, B., Fawcett, J., Iritani, T., Lee, S., & Tsong-shien, W. (1975). The value of children: a cross-national study. Honolulu: East-West Population Institute.
- Asch, R., & Marrs, R. (1992). ART: assisted reproductive technologies. [Booklet]. Norwell, MA: Serono Laboratories, Inc.
- Baluch, B., Fallone, A. & Khan, J. (1994). Gender differences and personality correlates in attitudes towards controversial aspects of human reproduction. Journal of Social Behavior and Personality, 9, 229-334.
- Beck, A., Steer, R., Garbin, M. (1988). Psychometric properties of the Beck Depression Inventory: twenty five years of evaluation. Clinical Psychology Review, 8, 77-100.
- Bell, S., Bancroft, J., & Philip, A. (1985). Motivation for parenthood: a factor analytic study of attitudes towards having children. Journal of Comparative Family Studies, 16 (1), 111-119.

- Bem, S. (1974). The measurement of psychological androgyny. Journal of Consulting and Clinical Psychology, 42, 155-162.
- Berger, G., Goldstein, M., & Fuerst, M. (1989). The couple's guide to fertility. How new advances can help you have a baby. New York: Doubleday.
- Blenner, J. (1990). Passage through infertility treatment: a stage theory. IMAGE: Journal of Nursing Scholarship, 22, 153-158.
- Boss, P. (1990). Ambiguous Loss. In F. Walsh & M. McGoldrick (Eds.), Living beyond loss: death and the family. Norton.
- Burns, L. (1987). Infertility as boundary ambiguity: one theoretical perspective. Family Process, 26, 359-372.
- Burns, L. (1990, October). Family building options: Issues of adoption and childlessness. Paper presented at the American Fertility Society post graduate course: counselling the infertile couple. Washington, DC.
- Burns, L. (1993). An overview of the psychology of infertility. Infertility and Reproductive Medicine Clinics of North America, 4, 433-454.
- Butler, R., & Koraleski, S. (1990). Infertility: a crisis with no resolution. Journal of Mental Health Counseling, 12, 151-163.
- Callan, J., & Hennessey, J. (1988). The psychological adjustment of women experiencing infertility. British Journal of Medical Psychology, 61, 137-140.
- Callan, V., Kloske, B., Kashima, Y., & Hennessey, J. (1988). Toward understanding women's decisions to continue or stop in vitro fertilization: the role of social, psychological, and background factors. Journal of in Vitro Fertilization and Embryo Transfer, 5, 363-369.

Collins, A., Freeman, E., Boxer, A., & Tureck, R. (1992). Perceptions of infertility and treatment stress in females as compared with males entering in vitro fertilization treatment. Fertility and Sterility, *57*(2), 350-356.

Cook, E. (1987). Characteristics of the biopsychosocial crisis of infertility. Journal of Counseling and Development, *65*, 465-470.

Cooper, S., & Glazer, E. (1994). Beyond infertility: the new paths to parenthood. New York: Lexington.

Daniels, K. (1989). Psychosocial factors for couples awaiting in vitro fertilization. Social Work in Health Care, *14*(2), 81-98.

Daniels, K. (1994). Adoption and donor insemination: factors influencing couples' choices. Child Welfare, *73*, 5-14.

Daniluk, J. (1988) Infertility: intrapersonal and interpersonal impact. Fertility and Sterility, *49*(6), 982-990.

Dennerstein, L., & Morse, C. (1985). Psychological issues in IVF. Clinics in Obstetrics and Gynecology, *12*, 835-846.

Domar, A., Broome, A., Zuttermeister, P., Seibel, M., & Friedman, R. (1992). The prevalence and predictability of depression in infertile women. Fertility and Sterility, *58*(6), 1158-1163.

Draye, M., Woods, N., Mitchell, E. (1988). Coping with infertility in couples: gender differences. Health Care for Women International, *9*, 163-175.

Dunn, P., Ryan, I., & O'Brien, K. (1988). College students' acceptance of adoption and five alternative fertilization techniques. The Journal of Sex Research, *24*, 282-287.

Duvall, E. (1977). Family development (5th ed.). Philadelphia: Lippincott.

Englund, C. (1983). Parenting and parentage: distinct aspects of children's importance. Family Relations, 32, 21-28.

Fagan, P., Schmidt, C., Rock, J., Damewood, M., Halle, E., & Wise, T. (1986). Sexual functioning and psychologic evaluation of in vitro fertilization couples. Fertility and Sterility, 46(4), 668-672.

Fawcett, J. & Arnold, F. (1973). The value of children: theory and method. Representative Research in Social Psychology, 4, 23-26.

Frank, D. (1989). Factors related to decisions about infertility treatment. Journal of Obstetrics, Gynecologic and Neonatal Nursing, 19, 162-167.

Frank, D. (1990). Gender differences in decision making about infertility treatment. Applied Nursing Research, 3, 56-62.

Freeman, E., Boxer, A., Rickels, K., Tureck, R., Mastroianni, L. (1985). Psychological evaluation and support in a program of in vitro fertilization and embryo transfer. Fertility and Sterility, 43(1), 48-53.

Gallup, G. (1978, December 14). Test-tube baby procedure. The Gallup Poll: Public Opinion, 1978, 270-272.

Gallup, G., & Newport, F. (1990, June). Virtually all adults want children, but many of the reasons are intangible. The Gallup Poll Monthly, 8-14.

Gernsheim, E. (1990). The changing duties of parents: from education to bio-engineering? International Social Science Journal, 42, 451-463.

Gerson, M. (1978). Motivations for motherhood. Doctoral dissertation, New York University. New York, New York.

Gerson, M., Berman, L., & Morris, A. (1991). The value of having children as an aspect of adult development. The Journal of Genetic Psychology, 152(3), 327-339.

Gormly, A., Gormly, J., & Weiss, H. (1987). Motivations for parenthood among young adult college students. Sex Roles, 17, 31-39.

Greil, A., Leitko, T., & Porter, K. (1988). Infertility: his and hers. Gender & Society, 2(2), 172-199.

Grimm, J. & Wozniak, P. (1990). Basic social statistics and quantitative research methods. Belmont: Wadsworth.

Halman, J., Abbey, A., & Andrews, F. (1993). Why are couples satisfied with infertility treatment? Fertility and Sterility, 59(5), 1046-1054.

Heltsley, M., Warren, R., & Hong-Min Lu, H. (1981). Determinants of family size for low-income families: sex role orientation and value of children. Home Economics Research Journal, 9(2), 284-296.

Hendricks, M. (1985). Feminist therapy with women and couples who are infertile. In L. Rosewater & L. Walker (Eds.), Handbook of feminist therapy: women's issues in psychotherapy (pp. 147-158). New York: Springer.

Higgins, B. (1990). Couple infertility: from the perspective of the close-relationship model. Family Relations, 39, 81-86.

Hoffman, L. (1974). The employment of women, education and fertility. Merrill-Palmer Quarterly, 22, 99-119.

Hoffman, L., & Hoffman, M. (1973). The value of children to parents. In J. Fawcett (Eds.), Psychological perspectives on population. (pp. 19-76). New York: Basic Books.

Hoffman, L., Thornton, A., & Manis, J. (1978). The value of children to parents in the United States. Journal of Population, 1(2), 91-131.

Holbrook, S. (1990). Adoption, infertility, and the new reproductive technologies; problems and prospects for social work and welfare policy. Social Work, 35, 333-337.

Holmes, H., & Tymstra, T. (1987). In vitro fertilization in the Netherlands: experiences and opinions of Dutch women. Journal of in Vitro Fertilization and Embryo Transfer, 4(2), 116-123.

Ilfeld, F. (1976). Methodological issues in relating psychiatric symptoms to social stressors. Psychological Reports, 39, 1251.

Kirchner, E. (1973). Reasons for wanting children: factors and correlates (Grant No. HD06258). University Park: Pennsylvania State University, Institute for Research on Human Resources.

Kirchner, E., Seaver, W., Straw, M., Vegega, M. (1977). Developing measures of parenthood motivation. Final report (Grant No. HD06258-03, NICHD, DHEW). University Park, PA: Pennsylvania State University, Institute for Research on Human Resources.

Lauritzen, P. (1990). What price parenthood? Hastings Center Report, 20(2), 38-46.

Leiblum, S., Kemmann, E., Colburn, D., Pasquale, S., & DeLisi, A. (1987). Unsuccessful in vitro fertilization: a follow-up study. Journal of in Vitro Fertilization and Embryo Transfer, 4, 46-50.

Link, P., & Darling, C. (1986). Couples undergoing treatment for infertility: dimensions of life satisfaction. Journal of Sex & Marital Therapy, 12(1), 46-59.

Mahlstedt, P. (1985). The psychological component of infertility. Psychological Component of Infertility, 43(3), 335-346.

Mahlstedt, P., Macduff, S., & Bernstein, J. (1987). Emotional factors and the in vitro fertilization and embryo transfer process. Journal of in Vitro Fertilization and Embryo Transfer, 4, 232-236.

Matthews, R., & Matthews, A. (1986). Infertility and involuntary childlessness: the transition to nonparenthood. Journal of Marriage and the Family, 48, 641-649.

Mazure, C., & Greenfeld, D. (1989). Psychological studies of in vitro fertilization/embryo transfer participants. Journal of in Vitro Fertilization and Embryo Transfer, 6(4), 242-256.

McCubbin, H., & Patterson, J. (1982). Family adaption to crises. In H. McCubbin, E. Cauble, & F. Patterson (Eds.), Family stress, coping, and social support. Springfield, IL: Charles C. Thomas Publisher.

Menning, B. (1980). The emotional needs of infertile couples. Fertility and Sterility, 34(4), 313-319.

Menning, B. (1982). The psychological impact of infertility. Nursing Clinics of North America, 17(1), 155-163.

Miall, C. (1985). Perceptions of informal sanctioning and the stigma of involuntary childlessness. Deviant Behavior, 6, 383-403.

Miall, C. (1989). Reproductive technology vs. the stigma of involuntary childlessness. Social Casework, 70, 43-50.

Mueller, D. (1986). Measuring social attitudes: a handbook for researchers and practitioners. New York: Teachers College Press.

Nachtigall, R., Becker, G., & Wozny, M. (1992). The effects of gender-specific diagnosis on men's and women's response to infertility. Fertility and Sterility, 57(1), 113-121.

Newman, N., & Zouves, C. (1991). Emotional experiences of in vitro fertilization participants. Journal of in Vitro Fertilization and Embryo Transfer, 8(6), 322-328.

Norusis, M. (1993). SPSS for windows: base system user's guide, release 6.0. Chicago, IL:SPSS.

Pohlman, E. (1973). Psychology of birth planning. (2nd ed.). Cambridge, MA: Shenkman Publishing Company.

Rabin, A., & Greene, R. (1968). Assessing motivation for parenthood. The Journal of Psychology, 69, 39-46.

Radloff, L. (1977). The CES-D Scale: a self-report depression scale for research in the general population. Applied Psychology Measure, 1, 385-401.

Rettig, K. (1993). Problem-solving and decision-making as central processes of family life: an ecological framework for family relations and family resource management. Marriage & Family Review, 18, 187-222.

Royal Commission on New Reproductive Technologies. (1993). Proceed with care: final report of the Royal Commission on New Reproductive Technologies: summary and highlights. (DSS Catalogue. No. Z1-1989-3-3). Ottawa, Canada: Canada Communication Group.

Salzer, L. (1991). Surviving infertility: a compassionate guide through the emotional crisis of infertility. (2nd ed.). New York: Harper Perennial.

Schwan, K. (1988). The infertility maze: finding your way to the right help and the right answers. Chicago: Contemporary Books.

Seaver, W., Kirchner, E., Straw, M., & Vegega, M. (1977). Parenthood motivation questionnaire: scales for measuring motivations for and against parenthood. JSAS catalog of selected documents in psychology, 7(3), 69, 1-23.

Turtle, A., Harrajchi, N., Perry, A., & Tully, L. (1988). University student attitudes to in vitro fertilization and its ramifications. Australian Journal of Sex, Marriage & Family, 9(4), 189-201.

Tallman, I. (1988). Problem solving in families: a revisionist view. In D. M. Klein & J. Aldous (Eds.), Social stress and family development (pp. 102-128). New York: Guilford Press.

Thibeault-Mulley, F. (1995, January/February). Miracle babies and the high cost of hope: beyond the birds & the bees. The Penn Stater, 30-33.

Thornton, J., McNamara, H., & Montague, I. (1994). Would you rather be a "birth" or a "genetic" mother? If so, how much? Journal of Medical Ethics, 20, 87-82.

Ulbrich, P., Tremaglio-Coyle, A., LLabre, M. (1990). Involuntary childlessness and marital adjustment: his and hers. Journal of Sex & Marital Therapy, 16(3), 147-158.

U.S. Bureau of the Census. (1990). Census of Population (CP-2-1)

Valentine, D. (1986). Psychological impact of infertility: identifying issues and needs. Social Work in Health Care, 11(4), 61-69.

Veevers, J. (1973). The social meanings of parenthood. Psychiatry, 36, 291-310.

Willen, H. (1988). Why children? A research review. Goteborg Psychological Reports, 18, 1-41.

Wright, J., Duchesne, C., Sabourin, S., Bissonnette, F., Benoit, J., & Girard, Y. (1991). Psychosocial distress and infertility: men and women respond differently. Fertility and Sterility, 55(1), 100-108.

Zimmerman, S. (1982). Alternatives in human reproduction of involuntary childless couples. *Family Relations*, 31, 233-241.

Zoeten, M., Tymstra, T., & Alberda, A. (1987). The waiting-list for IVF. The motivations and expectations of women waiting for IVF treatment. *Human Reproduction*, 2(7), 623-626.

APPENDICES

APPENDIX A
PARENTHOOD MOTIVATION QUESTIONNAIRE
AND ADDITIONAL QUESTIONS

1. Below are a number of reasons why you might want to have a child now or in the future. Please rate how important each reason is to you. Be sure to answer every question. Please do not put more than one answer on any question.

extremely unimportant	very unimportant	moderately unimportant	slightly unimportant	slightly important	moderately important	very important	extremely important
1	2	3	4	5	6	7	8

	EXTREMELY UNIMPORTANT							EXTREMELY IMPORTANT
1. To pass on my genes to a new generation	1	2	3	4	5	6	7	8
2. To feel really useful	1	2	3	4	5	6	7	8
3. To give me something to live for	1	2	3	4	5	6	7	8
4. To be able to learn as well as teach	1	2	3	4	5	6	7	8
5. To participate in what seems like a miracle	1	2	3	4	5	6	7	8
6. To mold someone with characteristics I believe are important	1	2	3	4	5	6	7	8
7. To fulfill my role as a woman	1	2	3	4	5	6	7	8
8. To see the effects of raising children according to my ideals	1	2	3	4	5	6	7	8
9. To experience the birth process	1	2	3	4	5	6	7	8
10. To have a family like the one I grew up in	1	2	3	4	5	6	7	8
11. To have the constant change and stimulation that children bring	1	2	3	4	5	6	7	8
12. To have a love even greater than wife-husband love	1	2	3	4	5	6	7	8
13. To have someone who can receive joy and happiness from just being alive	1	2	3	4	5	6	7	8
14. To try not to make the mistakes I feel my parents made with me	1	2	3	4	5	6	7	8
15. To have a real opportunity to make someone happy	1	2	3	4	5	6	7	8
16. To prevent loneliness for a couple	1	2	3	4	5	6	7	8
17. To carry on the family talents	1	2	3	4	5	6	7	8
18. To deepen the relationship with my partner	1	2	3	4	5	6	7	8
19. To experience the challenge of parenthood	1	2	3	4	5	6	7	8
20. To experience the honesty and freshness of children	1	2	3	4	5	6	7	8
21. To broaden my understanding of life	1	2	3	4	5	6	7	8

	extremely unimportant 1	very unimportant 2	moderately unimportant 3	slightly unimportant 4	slightly important 5	moderately important 6	very important 7	extremely important 8
	EXTREMELY UNIMPORTANT				EXTREMELY IMPORTANT			
22. To remind me of my own childhood	1	2	3	4	5	6	7	8
23. Because life just wouldn't be complete without being a parent ...	1	2	3	4	5	6	7	8
24. To actually be a part of the creation of another human being	1	2	3	4	5	6	7	8
25. To reexperience things I can no longer do	1	2	3	4	5	6	7	8
26. To carry on my goals when I am dead	1	2	3	4	5	6	7	8
27. To have the satisfaction of giving of myself to someone else	1	2	3	4	5	6	7	8
28. To have someone to share the things that can't be shared with my spouse	1	2	3	4	5	6	7	8
29. To be a comfort in my old age	1	2	3	4	5	6	7	8
30. To live a full life	1	2	3	4	5	6	7	8
31. To actually grow something alive and human inside me	1	2	3	4	5	6	7	8
32. To enjoy teaching things I really like and know about	1	2	3	4	5	6	7	8
33. To raise a child as I would like to have been brought up	1	2	3	4	5	6	7	8
34. It is a basic part of me to create someone else	1	2	3	4	5	6	7	8
35. To be able to give someone my values and ideals	1	2	3	4	5	6	7	8
36. To have someone (or someone else) to love	1	2	3	4	5	6	7	8
37. To watch my child grow	1	2	3	4	5	6	7	8
38. To experience the sheer entertainment children can provide	1	2	3	4	5	6	7	8
39. To have someone to stand by me when I am old	1	2	3	4	5	6	7	8
40. To experience the simple beauty of a child	1	2	3	4	5	6	7	8
41. To be loved	1	2	3	4	5	6	7	8
42. To provide a reason for my existence	1	2	3	4	5	6	7	8
43. To have someone to take care of	1	2	3	4	5	6	7	8
44. To carry on the good traits of me or my partner	1	2	3	4	5	6	7	8
45. To make my other accomplishments more outstanding	1	2	3	4	5	6	7	8

extremely unimportant	very unimportant	moderately unimportant	slightly unimportant	slightly important	moderately important	very important	extremely important
1	2	3	4	5	6	7	8

EXTREMELY
UNIMPORTANT

EXTREMELY
IMPORTANT

46. To feel important to someone	1	2	3	4	5	6	7	8
47. To be like a mark left by me on this world	1	2	3	4	5	6	7	8
48. To experience more fully my love for children	1	2	3	4	5	6	7	8
49. To have the warmth and closeness of a family	1	2	3	4	5	6	7	8
50. Because part of being a woman is to have children	1	2	3	4	5	6	7	8
51. To bring my spouse and me closer together	1	2	3	4	5	6	7	8
52. To have someone I can be proud of	1	2	3	4	5	6	7	8
53. To produce someone who may be able to change the world for the better	1	2	3	4	5	6	7	8

Below are a number of reasons why you might **NOT** want to have a child now or in the future. Please rate how important each reason is to you. Be sure to answer every question even if you plan to have children. Do not put more than one answer on any question.

1. Because of the discomforts that go with pregnancy	1	2	3	4	5	6	7	8
2. Because a child would interfere with the mother's career	1	2	3	4	5	6	7	8
3. Because childbearing can be painful	1	2	3	4	5	6	7	8
4. Because children limit a couple's privacy	1	2	3	4	5	6	7	8
5. Because children mean I would have to change my life style	1	2	3	4	5	6	7	8
6. Because I might abuse the child	1	2	3	4	5	6	7	8
7. Because I'm afraid I couldn't love the child enough	1	2	3	4	5	6	7	8
8. Because the mother may lose her figure	1	2	3	4	5	6	7	8
9. Because the child might be mentally retarded	1	2	3	4	5	6	7	8
10. Because it takes more financial security than I have	1	2	3	4	5	6	7	8
11. Because I might neglect the child	1	2	3	4	5	6	7	8
12. Because there are so many children needing adoption	1	2	3	4	5	6	7	8
13. Because I'm still too immature	1	2	3	4	5	6	7	8

	extremely unimportant 1	very unimportant 2	moderately unimportant 3	slightly unimportant 4	slightly important 5	moderately important 6	very important 7	extremely important 8
	EXTREMELY UNIMPORTANT				EXTREMELY IMPORTANT			
14. Because I just don't have enough patience	1	2	3	4	5	6	7	8
15. Because I simply can't afford it	1	2	3	4	5	6	7	8
16. Because children would restrict my own growth and development	1	2	3	4	5	6	7	8
17. Because I don't want to raise a child in a world with so much war and hate	1	2	3	4	5	6	7	8
18. Because you have to be responsible for the child for a great part of your life	1	2	3	4	5	6	7	8
19. Because I just don't think I'd be a good parent	1	2	3	4	5	6	7	8
20. Because childbearing is a burden on the mother	1	2	3	4	5	6	7	8
21. Because children are too expensive to raise	1	2	3	4	5	6	7	8
22. Because today's world is no place for a child	1	2	3	4	5	6	7	8
23. Because I'm not yet ready emotionally	1	2	3	4	5	6	7	8
24. Because having a child would mean using up more of the earth's resources	1	2	3	4	5	6	7	8
25. Because the child might rebel when he or she grows up	1	2	3	4	5	6	7	8
26. Because the child might not be healthy	1	2	3	4	5	6	7	8
27. Because my social life would be restricted	1	2	3	4	5	6	7	8
28. Because there are too many children in the world already	1	2	3	4	5	6	7	8
29. Because I don't have the time to raise a child properly	1	2	3	4	5	6	7	8
30. Because I might be too strict	1	2	3	4	5	6	7	8
31. Because I can be a whole person without having children	1	2	3	4	5	6	7	8
32. Because I would lose a lot of freedom	1	2	3	4	5	6	7	8
33. Because I could not travel freely	1	2	3	4	5	6	7	8
34. Because the child might be physically handicapped	1	2	3	4	5	6	7	8

	extremely unimportant 1	very unimportant 2	moderately unimportant 3	slightly unimportant 4	slightly important 5	moderately important 6	very important 7	extremely important 8
	EXTREMELY UNIMPORTANT				EXTREMELY IMPORTANT			
35. Because there wouldn't be enough time to spend with a child with my spouse and me both working	1	2	3	4	5	6	7	8
36. Because having a child would interfere with my educational plans	1	2	3	4	5	6	7	8
37. Because I would lose a lot of leisure time	1	2	3	4	5	6	7	8
38. Because I want to do my part to control population growth	1	2	3	4	5	6	7	8
39. Because the child might have a birth defect	1	2	3	4	5	6	7	8
40. Because I'm insecure around children	1	2	3	4	5	6	7	8
41. Because my spouse is not yet ready emotionally	1	2	3	4	5	6	7	8
42. Because children can limit the kinds of activities in which a couple can participate	1	2	3	4	5	6	7	8
43. Because children cause a lot of worry	1	2	3	4	5	6	7	8
44. Because I don't know my own values and goals yet	1	2	3	4	5	6	7	8
45. Because I would lose time to be by myself	1	2	3	4	5	6	7	8
46. Because it would tie me down too much	1	2	3	4	5	6	7	8
47. Because I'm afraid I couldn't help my child develop the proper values	1	2	3	4	5	6	7	8
48. Because I couldn't handle both children and a career well	1	2	3	4	5	6	7	8
49. Because I don't want to raise a child in an environment which is rapidly being destroyed	1	2	3	4	5	6	7	8
50. Because I don't want a child to have to face all of the social problems of our time	1	2	3	4	5	6	7	8

II. This asks about your current level of knowledge of treatment alternatives available for infertility problems. For each of the following questions please circle the level of understanding you have about the following infertility treatment alternatives.

LEVEL OF YOUR KNOWLEDGE OF:

	VERY LOW					VERY HIGH				
1. Hormonal medication	1	2	3	4	5					
2. Surgical procedures	1	2	3	4	5					
3. Artificial insemination by donor	1	2	3	4	5					
4. In-vitro fertilization	1	2	3	4	5					
5. Surrogate parenting	1	2	3	4	5					

Stop. Please don't read further until you have answered the previous 5 questions.

III. Below are brief definitions of these different infertility treatments available. Please read the definitions before proceeding to the next section.

A. Hormonal medication: medication taken by the woman to increase chance of pregnancy.

B. Surgical Procedures: surgical repairs of the women's reproductive system by a physician.

C. Artificial Insemination by donor: donated sperm from an unknown male is inserted with a syringe into the woman's reproductive tract by a physician or nurse.

D. In-Vitro Fertilization: when the wife's egg is removed from the uterus, fertilized with her husband's sperm in the laboratory and then later implanted in her uterus. This procedure is also known as "test tube babies."

E. Surrogate Parenting: when another woman is artificially inseminated with the semen of the husband of the couple desiring a child. She then carries the child to full-term and after giving birth gives the child to the couple.

This asks for your attitudes about alternative responses to deal with infertility. Imagine if you were unable to become pregnant. Could you see yourself using any of the following treatment alternatives to become a parent? Please circle the number to show how likely you are to use each of the following treatments.

SCALE OF HOW LIKELY:

	VERY UNLIKELY					VERY LIKELY				
1. Hormonal Medications	1	2	3	4	5					
2. Surgical Procedure	1	2	3	4	5					
3. Artificial Insemination Donor	1	2	3	4	5					
4. In-Vitro Fertilization	1	2	3	4	5					
5. Surrogate Parenting	1	2	3	4	5					

IV. This asks you some general information. Please circle or fill in the blank as indicated.

1. What is your current marital status?
 1. Married
 2. Separated
 3. Divorced
2. Do you have any children? Yes No
3. Does your spouse have any children? Yes No
4. Are you currently pregnant? Yes No
5. What was your age on November 1, 1995? _____
6. What is the highest level of education you have completed?

1. Grade School	5. Bachelors Degree
2. Some high school	6. Masters Degree
3. High school completed	7. Ph.D. or Ed.D.
4. Associate Degree or Technical Degree	8. Other _____
7. What is your religious preference?
 1. Protestant "specify _____"
 2. Catholic
 3. Jewish
 4. None
 5. Other _____
8. What is your racial heritage (circle all that apply) ? Caucasian African-American Hispanic Asian Native Other _____
9. What is your own personal income range (before taxes)?

1. less than \$10,000	6. \$50,001-\$60,000
2. \$10,001-\$20,000	7. \$60,001-\$70,000
3. \$20,001-\$30,000	8. \$70,001-\$80,000
4. \$30,001-\$40,000	9. \$80,001 and above
5. \$40,001-\$50,000	
10. What is the approximate combined income of you and your spouse (before taxes)?

1. less than \$10,000	7. \$60,001-\$70,000
2. \$10,001-\$20,000	8. \$70,001-\$80,000
3. \$20,001-\$30,000	9. \$80,001-\$90,000
4. \$30,001-\$40,000	10. \$90,001-\$100,000
5. \$40,001-\$50,000	11. \$100,001-\$110,000
6. \$50,001-\$60,000	12. \$110,001 and above
11. Do you have any known infertility problems? Yes No

THANK YOU

If you would like a copy of the results from this study (whether or not you participate) please phone me at (612) 881-3109 and leave your name, address, and zip code on the answering machine. Confidentiality is promised, therefore, your name and address will not be associated with your response, and will be immediately erased from the answering machine. If you would like to further discuss any issues regarding infertility and adoption, and related areas of concern, please refer to the resources on the back of the cover letter.

APPENDIX B
CONTACT LETTER

November 27, 1995

Dear Newlywed,

I am a Master's student at the University of Manitoba currently in the process of conducting research for my thesis under the direct supervision of Dr. Mary Warmbrod. I am doing part of my Master's work here in Minnesota. I am interested in learning more about how newly married women feel about children and treatments for infertility problems. Knowledge in these areas is very important since there is an increase of infertility problems which do not allow some couples to have children. Your name and address was obtained from the Hennepin County marriage license registry of people married within the last year. Thus, your opinions will represent the opinions of thousands of newly married women much like yourself.

I hope you will take 10 - 15 minutes to complete the enclosed questionnaire. The information you provide will contribute greatly to my study. Return the questionnaire to me in the enclosed pre-stamped, self-addressed envelope that is provided for you. This research will be studying only those women who do not have any biological children or are not pregnant, so if you have any biological children or are pregnant, please send the unanswered questionnaire back to me, using the self-addressed envelope.

I promise you confidentiality under the academic ethics standards. This study has been approved by the University of Minnesota and University of Manitoba Ethics Committees. If you decide to participate, your answers are kept confidential, and the results are only reported in summary statistical form so no one can identify you personally.

I would appreciate your willingness to help me in my research effort, as very little is known about women's feelings toward children and treatments for infertility problems. There are no direct benefits for completing the questionnaire and you are under no obligation to offer a response. By returning a completed questionnaire, you are consenting to my using the data in a statistical form.

If you would like a copy of the results from the study (whether or not you participate) please phone me at (612) 881-3109 and leave your name, address, and zip code on my answering machine. I promise you confidentiality, therefore, your name and address will not be associated with your response, and will be immediately erased on the answering machine. I will make certain that you receive a copy upon completion of this study. I believe that you will find the questionnaire interesting and look forward to receiving your reply as soon as possible. If you have any questions or concerns, please feel free to call me at (612) 881-3109, my thesis advisor, Dr. Mary Warmbrod at (204) 255-8305, or Dr. Kathy Rettig at (612) 625-7745.

Sincerely yours,

Brenda Morrow

APPENDIX C
LETTERS OF APPROVAL FOR STUDY


THE UNIVERSITY OF MANITOBA

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INTER-DEPARTMENTAL CORRESPONDENCE

DATE: November 24, 1995

TO: Brenda Morrow

FROM: G. P. Sevenhuysen, Chair Ethics Review Committee 

RE: Ethics Review: Parenthood motivation and attitudes towards assisted reproductive technologies.

The Ethics Committee has reviewed the proposed research procedures you submitted on 20 September 95. The Committee understands from your submission that Prof. Warmbrod, Dept. of Family Studies, will ensure that procedures are implemented as described. The procedures meet ethical guidelines with exception of the following additions:

The researcher should indicate in the contact letter where the subject's name and address was obtained.

The researcher should mention in the contact letter that by completing the questionnaire and mailing it back, the respondent consents to the researcher using the data.

The sentence in the contact letter: "Be sure to fill out all sections of the questionnaire" should be qualified by adding a sentence that indicates that the respondent is free to omit questions they prefer not answering.

The wording of the reminder postcard should allow for the fact that some people will have answered the first mailing.

The first page of the questionnaire could show the questions that are now in Section II, questions 2, 3, 4 and 11. In that case women without biological children and who are not pregnant will be able to stop and the researcher can re-use the remainder of the questionnaire.

The Committee approves the proposed research procedures with these additional steps.

Twin Cities Campus

*Institutional Review Board:
Human Subjects Committee*

*Box 820
DS28 Mayo Memorial Building
420 Delaware Street S.E.
Minneapolis, MN 55455-0392
612-626-5654
Fax: 612-626-6061*

November 06, 1995

COPY

Brenda P. Morrow
10320 Devonshire Circle
#328D
Bloomington, MN 55431

RE: "The Value of Children and Attitudes Toward Assisted Reproductive Technologies"

Human Subject Code Number: 9510S10355

Dear Ms. Morrow:

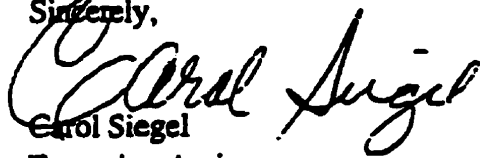
The referenced study was reviewed by expedited review procedures and approved on October 31, 1995. If you have applied for a grant, this date is required for certification purposes as well as the Assurance of Compliance number which is M1337. Approval for the study will expire one year from that date. A report form will be sent out two months before the expiration date.

The code number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

As the Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur. Research projects are subject to continuing review and renewal. If you have any questions, call the IRB office at (612) 626-5654.

On behalf of the IRB, I wish you success with your research.

Sincerely,


Carol Siegel
Executive Assistant

CS/wdj

cc: Kathryn Rettig
Mary Warmbrod