ASSESSING THE PSYCHOLOGICAL IMPACT
OF FERTILITY TREATMENT

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

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Denton, Texas

This controlled descriptive study was designed to investigate the psychological status of couples who are engaged in advanced fertility treatments. A battery of psychological test instruments, including the Millon Behavioral Health Inventory (MBHI), the Health Attribution Test (HAT), the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), and the Marlowe-Crowne Social Desirability Scale (MCSDS), was used to measure psychological variables that have been shown in the infertility research literature to be associated with the psychological experiences of infertility patients. The scores from the four assessment instruments were compared with those of pregnant couples in childbirth education classes to differentiate the impact of stress associated with fertility treatment from the stress experienced by third trimester pregnant couples.

Eighty-five subjects (42 male and 43 female) volunteered for the study and completed packets of questionnaires. The groups were designated Treatment (infertile couples) and Control (pregnant couples). The resulting data were collected and analyzed on the basis of group mean scores on the test instruments.

Treatment group subjects were found to have higher depression (BDI) and social desirability (MCSDS) scores compared to the Control group. Treatment group females reported the highest levels of depressive symptomatology and practiced a higher degree of
socially desirable responding than all other subjects in the study. Treatment group BDI and MCSDS scores were not significantly correlated. For the Treatment group females, HAT Powerful Others scores correlated highly with their scores on a number of other measures. The value of the MBHI and the BAI to the assessment of this sample of patients proved to be limited.
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CHAPTER I

INTRODUCTION

All mammals regulate their rates of birth in response to environmental and physiologic stimuli (Roberts & Lowe, 1975). Wasser and Isenberg, in an exhaustive 1986 study, pointed out that the biological suppression of reproduction is considered adaptive in all other mammalian life forms, but is considered pathologic in humans. They advanced the argument that nothing is more normal than differential reproduction in the service of natural selection (Wasser & Isenberg, 1986). In fact, approximately 78% of all human pregnancies spontaneously abort (Shepard & Fantel, 1979). Despite these odds the human reproductive drive is strong. In fact, it is estimated that only 5% of the world population who are of child bearing age choose to remain voluntarily childless (Veevers, 1980).

In North America and in Western Europe it is estimated that one out of every six couples of childbearing age will be confronted with some form of fertility problem (Berkowitz, 1986; Muller, 1985). In order to receive a diagnosis of infertility a couple must have engaged in 12 months of unprotected intercourse without achieving conception (Berg & Wilson, 1991; U.S. Congress, 1988). It was estimated that in 1988, 2.4 million couples in the United States met this medical definition of infertility (Mosher & Pratt, 1990). In 1987 alone Americans spent approximately 1 billion dollars on medical care for infertility (U.S. Congress, 1988).
Although data from the National Center for Health Statistics indicate that the incidence of infertility is not increasing (Mosher & Pratt, 1990), there has been a rapid increase in the use of medical services for infertility over the last 2 decades. The Office of Technology Assessment (OTA) estimated that the number of visits to private physicians for infertility-related consultation rose from 600,000 in 1968 to 1.6 million in 1984 (U.S. Congress, 1988). Over the same span of time the OTA reported that the incidence of primary infertility doubled from 500,000 to over 1 million cases. Couples with primary infertility (those who have never conceived a child) are twice as likely as those with secondary infertility (those couples who have at least one previous documented conception) to seek medical treatment (OTA, 1988).

The type of medical treatment that the couple receive will depend on the particular infertility diagnosis. A number of different diagnoses are possible for infertile couples. Infertility etiologies are divided into four major groups: male-factor, female-factor, mixed-factor, and unidentified or idiopathic infertility. Davajan and Israel (1991) reported that male-factor etiologies, including low sperm count, low sperm motility, low semen volume, or high semen viscosity account for approximately 40% of infertility cases. Female-factor etiologies include ovulatory failure and problems involving the cervical mucus ("cervical factor"), as well as tubal occlusions, adhesions, and endometriosis ("pelvic factors"). Female factors are also thought to account for approximately 40% of infertility cases (Davajan & Israel, 1991). Estimates of mixed-factor etiologies are sometimes reported to be as high as 35%, whereas in approximately 2% to 15% of infertility cases no diagnosis can be made after a complete
medical evaluation (Davajan & Israel, 1991). It is estimated that organic causes account for over 80% of all infertility cases and that only 5% of infertility cases appear attributable purely to stress or emotional factors (U.S. Congress, 1988). However, several researchers have discussed the mechanisms by which stress may affect spermatogenesis and ovulation (Domar, Seibel, & Benson, 1990; Edelman & Golombok, 1989; Seibel & Taymor, 1982). Thus, stress and emotional factors are possible interactive etiologic factors in infertility.

The treatments for male-factor infertility may involve antibiotic administration for reproductive tract infection, surgical repair of varicocele in the testes or, most commonly, intrauterine insemination (IUI). Vitamins, corticosteroids, and hormone treatments have been prescribed for male-factor infertility, but the efficacy of these treatments is not clear (U.S. Congress, 1988). Treatments for female-factor fertility problems are more numerous and better understood. The treatment for female-factor infertility ranges from mild (using clomiphene citrate) to aggressive (using human gonadotropin) ovarian stimulation, to surgical diagnosis and correction of structural defects and, if more basic treatments fail, to the advanced infertility treatments known as the Assisted Reproductive Technologies (ARTs). ARTs include such procedures as in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), zygote intrafallopian transfer (ZIFT), and embryo transfer (ET). A basic description of these ART procedures can be found in Appendix A.

The technological advances in the field of assisted reproduction have produced a variety of new treatment options for couples encountering a fertility problem. The personal experience of infertility and its treatment has, over the last 15 years, become the focus of investigation for many researchers in psychology and medicine. Researchers have
consistently found patients seeking infertility treatment to be no different from the general population in terms of their reported psychological well-being (Callan & Hennessey, 1989; Downey & McKinney, 1992; Dunkel-Schetter & Lobel, 1991; Freeman, Garcia, & Rickles, 1983; Paulson, Harmon, Selarino, & Asmar, 1988). However, many studies have found that during and after infertility treatment some patients appear to experience significant levels of psychological distress (see Appendix B) including depression, feelings of loss of control over their lives, grief, and confusion related to their self-identities (Anderson, 1989; Baram, Tourtelot, Eberhard, & Huang, 1988; Dennerstein & Morse, 1988; Domar et al., 1990; Domar, Zuttermeister, Seibel, & Benson, 1992; Edelmann & Connolly, 1986; Greenfield, Mazure, Haseltine, & DeCherney 1983; Kemeter, 1988; Mahstedt, 1985; McEwan, Costello & Taylor, 1987; Menning, 1980; Seibel & Taymor, 1982; Stewart, Boydell, McCarthy, Swerdlyk, Redmond, & Cohrs, 1992). The identification of those couples who are likely to experience the most difficulty in adjusting to the psychological demands of infertility treatment is a topic of research that is particularly relevant to the field of behavioral medicine.

It is the contention of the author that past and current strategies for the assessment of infertile patients are in many respects inadequate. The purpose of this study is to develop and test a psychological assessment strategy for investigating the psychological impact of receiving fertility treatment, which effectively addresses the shortcomings of previous assessment approaches. The proposed assessment strategy includes a rationale for the administration of the assessment and a battery of psychological assessment instruments, which represents an improvement over the past and current approaches used
in the psychological assessment of infertility patients. An examination of the psychological challenges encountered by fertility patients can provide a basis for understanding the development of the assessment strategy used in this study.

The Personal Experience of Infertility

The majority of patients undergoing treatments for infertility report that the requirements of the treatment program demanded immediate changes in their lifestyle (Berg & Wilson, 1991). The infertility treatment experience is consistently perceived by patients as one involving a major loss of control over their lives and is reported by most patients as highly stressful (Anderson, 1989; Nachtigall, Besker, & Wozny, 1992). Early treatment requirements may include morning blood and urine samples from the woman, necessitating daily early-morning visits to the clinic or hospital. The physical demands of infertility treatment alone can be sufficient to cause considerable stress, especially for the woman. Many forms of infertility treatment may include endometrial biopsies, laparoscopies, repeated series of painful hormone injections, and a variety of other invasive procedures for her to endure. The infertile couple may be required to have intercourse in the fertility clinic or to report there immediately after intercourse for post-coital examination.

In addition to the potentially stressful demands of fertility treatment described above, there is the issue of financial cost. Ovarian stimulating hormones can cost $200 for a single injection. In a typical infertility treatment a woman may receive one injection per day for the first 10 days of her cycle. A woman undergoing treatment will commonly be
required to repeat this routine for three to four cycles, for a total of 30 to 40 injections. Estimates of the average cost of fertility treatment with ARTs begin at around $14,000.00 (Medical Research International & the Society for Assisted Reproductive Technology, 1991). Most insurance plans do not cover infertility treatments (Litt, Tennen, Affleck, & Klock, 1992), and the cost of the majority of these infertility procedures falls directly on the patients. Costs may run even higher considering that the average couple seen in an infertility clinic have been in some form of treatment for more than 3 years (Sabourin, Wright, Duchesne, & Belisle, 1991). The financial and physical challenges of infertility treatment are probably not completely unexpected by the couple seeking fertility treatment. At the very least, these types of medical procedures and their costs will be conveyed to patients very early on by the medical professionals at the infertility clinic. These medical procedures and costs are the most predictable aspects of the treatment. The unpredictable aspects of infertility treatment include a variety of potential psychosocial factors that may influence infertility treatment outcome and the couples' subsequent long-term psychological adjustment (Domar et al., 1990; Edelman & Golombek, 1989; Litt et al., 1992).

Social Stressors

Social factors that are associated with infertility treatment include social stigmatization, secrecy, and withdrawal. Most patients who are involved in infertility treatment keep it a secret (Anderson, 1989; Dennerstein & Morse, 1988). This tendency isolates infertility patients from their normal social support networks, prevents word-of-mouth dissemination of information concerning the infertility experience, and
hinders society's already tentative acceptance of infertility treatment by preserving its mystery (Anderson, 1989). A substantial percentage of Therapeutic Donor Insemination (TDI) and oocyte donor patients report that they will tell no one, not even the child, about their manner of conception (Abbey, Halman, & Andrews, 1992; Klock & Maier, 1991a; Litt et al., 1992). In Western society there is a lingering stigma associated with the choice to be childless, which patients are apparently highly motivated to avoid (Anderson, 1989; Collins, Freeman, Boxer, & Tureck, 1992; Woods, 1987). It has been found by a number of researchers that the majority of patients involved in fertility treatments tend to tell no one, except their spouse, about what they are going through (Abbey et al., 1992; Litt et al., 1992, Klock & Maier, 1991a). There can be a variety of motivations for this secrecy. In their survey of 185 couples recruited from infertility clinics, Abbey et al. (1992) found that 40% of the men were Catholic and 46% of the women were Catholic. Conception outside of the body is forbidden in Catholicism. The Catholic Church recognizes only the GIFT procedure as acceptable because it involves immediate insertion of the male and female gametes in combination into the fallopian tube and therefore presumably involves no fertilization outside the body (Abbey et al., 1992). Couples from different religious backgrounds may face difficult decisions such as whether or not to continue with the more advanced forms of fertility treatment.

In addition to the existence of formal social rules restricting the use of ARTs there are myths equating fertility problems with impotency, and frigidity. Individuals with fertility problems may be stigmatized by the infertile label and stereotyped as unfulfilled, incomplete, or less masculine or feminine (Anderson, 1989). Health professionals
involved in the treatment of infertility patients should be aware that, for some, the primary motivation to seek treatment may not be to give birth to a child (Harrison, 1991). Couples may feel pressured by the attitudes of society, friends, and relatives into seeking help. One or both members of a couple may seek a child to cement a crumbling relationship. In either case the process of treatment and its consequences may have disastrous results for patients with misplaced or ulterior motivations (Harrison, 1991). The desire to have a child as the major focus in life has also been shown to be correlated significantly with post-failure depression, which indicates a point of diminishing returns, even for traditional treatment motivation (Collins et al., 1992)

Psychological Stressors

Infertility treatments pose a number of potential psychological stressors for the couples receiving them. In a survey of 200 infertile couples 50% of the women and 15% of the men reported that infertility was the most upsetting experience of their lives (Freeman, Boxer, Rickels, Tureck, & Mastrioanni, 1985). The diagnosis of infertility is associated with stress and depression, along with social stigma and the permanent loss of prized social and sexual rolls (Morse & Van-Hall, 1987). The threat of permanent loss of the biological parent role may precipitate a crisis in some infertility patients (Downey & McKinney, 1992; Edelmann & Connolly, 1986; Mahstedt, 1985; Menning, 1980; McEwan et al., 1987; Seibel & Taymor, 1982). The inability to fulfill the goal of parenthood may require significant reorganization of a patients' identity in relation to the self and to others. If patients decide to abandon treatment, they may need to reexamine their feelings regarding parenthood and mourn the loss of a biological child they can never
have. At such a time a therapist can help the couple put the infertility problems in the context of their entire lives (Mazor, 1984; Muller, 1985).

It has been estimated by a number of researchers that approximately 15 to 20% of women who have undergone unsuccessful fertility treatments exhibit signs of clinical depression, including inability to return to work, or meet DSM-III-R criteria of adjustment reaction with depressed mood (Anderson, 1989; Dennerstein & Morse, 1988; Domar et al., 1990). Baram et al. (1988), who in studying 86 couples undergoing IVF, found that 66% of the women reported depression following the failure of that treatment. Litt et al. (1992) found that 17% of the women in their study met the DSM-III criteria for adjustment reaction with depressed mood following their IVF failure. Similarly, in 1990, Newton, Hearn, and Yuzpe studied a sample of infertile couples consisting of 947 women and 899 male partners admitted to an IVF program and reported that the failure of IVF treatment seemed to precipitate a significant increase in depressive symptomatology for both sexes.

The success rates of various infertility treatments range from 7 to 25% (Domar et al., 1990; Mazure & Greenfeld, 1989; Medical Research International & the Society for Assisted Reproductive Technologies, 1990). Expending considerable resources on an endeavor which is likely to fail provides a constant source of cognitive dissonance for the infertile couple. To avoid feelings of dissonance and justify their efforts (Aronson, 1969; Osherow, 1992), the infertile couple may repeatedly choose to continue treatment, thereby prolonging their exposure to this stressor. Patients describe the experience of infertility treatment as a roller-coaster ride, beginning with the shock of the diagnosis and continuing
with the invasive, controlling, and cyclical nature of treatment (Berg & Wilson, 1991; Daniluk, Leader, & Taylor, 1987). Taken together, the findings that have been presented indicate that participating in repeated treatment for infertility can be a chronic source of stress for many couples.

Counseling Out of Infertility Treatment

As the advances in modern reproductive technologies continually expand the treatment options available to infertile patients, the issue of counseling out of fertility treatment is becoming increasingly important to the clinical consideration of the psychological health of fertility patients. Many couples continue in treatment for fertility problems for 3 to 6 years or more. The emotional, physical, and financial costs of persevering in the face of low treatment success rates and repeated treatment failures can be high (Dunkel-Schetter & Lobel, 1991; Koropatnick, Daniluk, & Pattinson, 1993; Newton et al., 1990; Sabourin et al., 1991). Garcia et al. (1985) found that, in their sample, subjects who discontinued treatment reported fewer feelings of anxiety, depression, and obsessive behavioral indications and had lower scores on the MMPI scales than treatment group continuers. This suggests that discontinuing treatment may produce a decrease in distress for the fertility patient. This finding may suggest that the act of making the decision to stop treatment may produce a surge in the patients' sense of control and this, in combination with distancing themselves from a powerful stressor, may be associated with the healthier responses of the treatment discontinuers. Boivin, Takefman, Tulandi, and Bender (1995) found a curvilinear pattern to infertility patient distress, as a function of the number of failed cycles experienced. Patients with moderate numbers of
failed treatment cycles were more distressed than those with few or high numbers of failed cycles. How the decision to discontinue treatment affects the long-term adjustment of fertility patients remains to be identified by longitudinal research.

Assessing the cost-benefit of continuing fertility treatment may become even more complex with couples in advanced forms of treatment. For example, IVF and gamete transfer techniques are associated with higher than normal rates of multiple pregnancies. It is easy to see how twins or triplets could be a tremendous burden on a couple who may be emotionally depleted because of the process of treatment or unconsciously ambivalent towards having a child in the first place. Infertility researchers (Kemeter, 1988; Vauthier-Brouzes & Lefebvre, 1992) refer to cases of termination of artificially induced multiple pregnancies because the couple felt unable to cope with them. Mahlstedt (1985) reported that emotional strain was a major factor reported by patients in the decision to discontinue IVF after failure.

For the infertile couple, the process of pursuing control over fertility requires accepting the many negative aspects of treatment. A survey of fertility treatment participants and Resolve support groups found that after failed fertility treatment some women still found the issue difficult to deal with and experienced emotional distress for years (Flemming & Burry, 1988). In contrast to the aforementioned finding, Leiblum, Kemmann, and Lane (1987) found that 90% of infertile women assessed at least 8 months after completed IVF treatments said they would resume fertility treatment if a new technique became available. Exercising certain kinds of control may be costly for infertile couples to the extent that it is inconsistent with their individual or combined coping styles.
For example, individuals who feel uncomfortable asking physicians questions or expressing their personal concerns may have difficulty exercising control over medical treatment. There are potential negative consequences associated with continuing treatment, including the strain of infertility treatment on the marital relationship (Lasker & Borg, 1987), as well as the expenditure of resources such as time, money, and energy that might be needed elsewhere (Campbell, Dunkel-Schetter, & Peplau, 1991). Furthermore, as pointed out by Campbell et al. (1991), disconfirmation of a strong sense of control by treatment failure is a major psychological risk for IVF couples since for them the last chance at conception has failed and they are faced with the prospect of permanent infertility. The identification of couples who are likely to experience significant difficulty in making decisions to continue, delay, or discontinue fertility treatment could provide an opportunity for psychological intervention before the consequences of ineffective coping take their toll. At this point couples may reassess their relationships and self-identities as well as their ideas about a childless lifestyle and/or decide on alternative paths to parenthood (e.g., adoption), which may present new difficulties. Mazor (1979) suggested that patients must be prepared to use resources other than reproduction in order to consolidate a comfortable identity as a middle-aged and older adult whether or not parenthood is achieved. Psychological assessment of a couple's personality and coping styles may permit identification of risk factors of maladaptive response to the outcome of treatment. Organization and mobilization of alternative coping resources at earlier stages of treatment may avoid serious problems later.
The decisions facing a couple in fertility treatment may be confounded by the effects of their own perceptual biases toward information they receive from the fertility clinic staff or by the nature of the presented information itself. Some authors (e.g., Reading & Kerin, 1989) have expressed concern about how information concerning the success rates of different treatments is expressed to fertility patients. Patient responses to success rates may vary according to the ways in which the figures are expressed. For instance, clinics may focus on rates of success while avoiding discussion of failure rates. The perceptions of couples can be influenced by whether the information is framed as probabilities of success or failure. For example, greater emphasis is given to highly valued outcomes such as success, which may override considerations related to the probability of treatment failure and its consequences. Alternatively, clinics may present the pregnancy rates as opposed to the percentage of successful deliveries. A resolution from a select committee of the United States Congress recommended that the “take home baby” rate per treatment cycle commenced as the only meaningful and honest statistic, thereby enabling the infertile couple to maintain realistic expectations for a particular treatment program (Reading & Kerin, 1989).

There may be no clear end to infertility treatment for many couples. Many couples may rely upon the physician to discontinue treatment. The physician may be unaccustomed to playing this role and may continue to extend hope, especially when confronted by the patient’s distress over a failed treatment cycle period. Just as gamblers are convinced that their next bet will be successful, so equivalent processes may be working with fertility treatment patients and the accompanying feeling that the next try
will be successful (Reading & Kerin, 1989). Extending short-term hope by prolonging treatment may reduce immediate distress but may retard long-term adjustment. The term IVF psychosis has been used to describe the tunnel vision that can develop with regard to continuing treatment. Reading and Kerin (1989) referred to the case of a woman undergoing her 19th IVF treatment cycle after having been treated on three continents. Koropatnick et al. (1993) questioned the advisability of protracted medical intervention with some couples and emphasized the importance of psychological assessment and early intervention in the effective management and treatment of fertility problems.

Failed treatment is not the only potential source of stress. When treatment is successful, the couple may be required to deal with the issue of embryo reduction, the selective removal of one or more viable embryos from the uterus that is necessitated by a fertility treatment that results in a multiple pregnancy, involving from two to as many as six viable embryos (Vauthier-Brouzes & Lefebvre, 1992). Successful treatments which result in two to four viable implanted embryos are not uncommon (Attia, & Downey, 1992). Ironically, after an infertile couple has overcome the cognitive dissonance produced by participating in a difficult, costly treatment that is likely to fail, they may succeed only to be faced with the option of multiple abortions versus exposing the mother (and the embryos) to the considerable health risks of a multiple pregnancy involving three, four, or even five fetuses (Boivin et al., 1995; McKinney, Downey, & Timor-Tritch, 1995).
Interventions

Health care professionals have become increasingly aware that medical infertility treatments can be extremely stressful for the patients undergoing them (Baram et al., 1988; Domar et al., 1990; Domar et al., 1992; Greenfeld et al., 1983; Kemeter, 1988; Mahlstedt, 1985; Stewart et al., 1992). Some recent experimental studies have provided evidence of the potential psychological benefit to fertility patients of cognitive-behavioral interventions conducted parallel with infertility treatment.

In 1990, Domar et al. introduced the Behavioral Medicine Program for infertility. Their psychological treatment program consisted on a 10-week series of educational lectures on fertility, health, and lifestyle issues; instruction in the development of coping skills; and daily practice in relaxation techniques and opportunities for patients to interact. Domar et al. (1990) compared psychological test results before and after the 10-week program in a sample of 54 infertile women. The tests used were the Profile of Mood States (POMS), the Spielberger State Trait Anxiety Inventory (STAI), and the Spielberger Anger Expression Scale (SAES). Results indicated dramatic subjective improvements in patients' sense of well-being, sense of control, security and self-esteem in both patients who did and did not conceive. Additionally, in this initial study, 34% of the women in the sample conceived within 6 months of completion of the program. In general, success rates for infertility treatments are estimated to range from 10 to 20% (Anderson, 1989; Litt et al., 1992). Domar et al. replicated this study in 1992 with 50 subjects and obtained comparable group test score improvements. In the replication, 32% of the sample became pregnant within 6 months of completion of the study.
A similar study was recently undertaken in Toronto (Stewart et al., 1992) to evaluate the effectiveness and patient acceptability of professionally led support groups designed to alleviate psychological distress among infertility patients. This intervention consisted of a series of eight 2-hour weekly support group sessions that were led by a nurse and a physician. Seventy-eight patients participated in this controlled study. Effectiveness was gauged by the reduction of psychological and stress-related symptoms as reflected in before and after administration of a battery of tests (Brief Symptom Inventory, Beck Depression Scale, Moos Coping Responses Inventory). Results showed that the support group experienced a significant reduction in symptoms over the course of the program and that the control group of fertility patients who were not offered the program showed no such change. As in the Domar et al. (1990) study, the support group patients reported that they were highly satisfied with the program and found the opportunity to share with others undergoing like experiences to be the most satisfying aspect of the 8-week program. Pregnancy rates were not reported in this study.

These results are consistent with the repeated findings that fertility patients overestimate their chances of treatment success (Johnston, Shaw, & Byrd, 1987; Lasker & Borg, 1987), underestimate the stress and length of treatment, and in retrospect, report that they would have benefited from psychological counseling before, during, and after fertility treatment (Daniluk, 1988; Dennerstein & Morse, 1988; Klock & Maier, 1991b; Litt et al., 1992; Sabourin et al., 1991; Schover, Collins, & Richards, 1992; Valentine, 1986).
Researchers have also addressed psychological intervention issues related to adjustment of infertility patients to the acceptance of permanent infertility. The probable sequela of adjustment issues following discontinuance of fertility treatment has been elucidated by Judith Daniluk (1991) and may be a useful framework for intervention and planning of psychological support. Speaking at the 1993 APA conference on women's health, Daniluk discussed nine themes relevant to individuals in the early stages of accepting the permanence of their infertility: a sense of futility and hopelessness; a sense of physical, emotional and spiritual depletion; a profound sense of loss and grief; a sense of emptiness and missed experience; a sense of exclusion and being different; a desire for closure; a sense of needing to redefine self in the future; a need for acceptance and support from significant others; and a sense of relief at taking back their lives.

Infertile couples may maintain optimism through the final attempt at treatment and beyond. As treatment proceeds, the resources of many couples may dwindle and strategies of coping that were effective early on may become liabilities in the later stages of treatment. Earlier recognition and psychological processing of the ramifications of potential treatment outcomes may prove to be far less disruptive to some patients. The monitoring of high-risk couples over the course of treatment would provide opportunities for both the identification of any developing coping liabilities and the implementation of measures to prevent undue hazards to the patients' health and the efficiency and success of their treatment.

The decision by a couple to discontinue treatment marks the end of one quest and the beginning of another. The usefulness of assessments designed to identify couples
who are likely to have significant difficulty adapting to the outcome of their treatment, as well as interventions to assist couples in processing their experience, effectively begins with the foresight afforded by a thorough understanding by the therapist of the impact of treatment demands on infertile couples. In terms of future research, investigation is needed not only to further examine the potential negative psychological effects and adjustment difficulties associated with infertility, but also to explore how positive attitudes towards parenting and child-free living might facilitate adjustment to this problem.

The findings from the studies reviewed to this point offer evidence of the potential benefit of behavioral medicine programs to couples in infertility treatment. However, judging from the literature, it is likely that only a minority subgroup of infertile couples will require assistance in the form of psychological intervention to adjust adequately to treatment and avoid potential health problems (Dunkel-Schetter & Lobel, 1991; Newton et al., 1990). Newton et al. (1990) reported that 15% of the women in a sample of 947 women and 899 male partners admitted to an IVF program were in acute distress, with elevated levels of anxiety after a failed cycle of treatment. The prevalence of actual depression in their sample rose sharply in both sexes after treatment failure. The percentage of women experiencing mild depression (as measured by the BDI) approximately doubled (to 18%) and the comparable figure for men, although lower overall, rose almost three fold (to 8%). Perhaps of greater concern in this study was the finding that 7.5% of the women reported more serious difficulties characteristic of moderate levels of depression. These findings are derived from the largest population
sample found in the infertility literature. The portion of patients found to be experiencing mild to moderate depression in this sample may provide the best estimate of the population parameters and the size of the subgroup of infertility patients who may be at risk for maladjustment in response to infertility treatment and in need of psychological support.

The majority of people with infertility do not experience clinically significant emotional reactions, loss of self-esteem, or adverse marital and sexual consequences (Dunkel-Schetter & Lobel, 1991). If anything, the effects of infertility on the marriage appear to be positive as often as they are negative, as measured by self-report (Dunkel-Schetter & Lobel, 1991). The ongoing assessment of all infertility patients over the course of their treatments is an unrealistic and unnecessary burden on the patients and the providers of fertility programs. The ability to identify couples who are the most in need is crucial to the efficient distribution of psychological services.

In light of evidence indicating that the stress of infertility treatment poses a potential health threat to some individuals undergoing it, and the availability of beneficial interventions, it is reasonable to develop an assessment strategy designed to identify those patients most in need of psychological services. Such an assessment strategy should inform the efficient implementation of those services.

Assessment

In the past both infertility treatment and research have been primarily concerned with the causes of infertility rather than with the patient issues resulting from extended fertility treatment, such as emotional distress, disturbance of sexual dysfunction, and
impact on the marital relationship (Kemeter, 1988). Some infertility clinics today screen for signs of psychopathology in their patients prior to treatment for the purpose of identifying patient factors, such as ongoing depression and psychopathology, that require therapeutic attention and/or preclude the patient from participation in a fertility treatment program (Campagnoli, Di Gregorio, & Fessia, 1985; Stauber, Maassen, Spielmann, & Dincer, 1985).

Clinicians and researchers in the fields of medicine, psychology, sociology, and nursing have implemented a variety of assessment strategies, employing numerous instruments, in the attempt to define a characteristic psychological profile of fertility patients. Infertile women and men have been reported to experience a variety of difficulties (see Appendix B), including grief, denial, anger, high levels of anxiety and depression, lowered self-esteem, poor body image, marital difficulties, and problems with sexual identity and functioning while undergoing evaluation and treatment for infertility (Connolly, Edelmann & Cooke, 1987; Daniluk, 1988; Dunkel-Schetter & Lobel, 1991; Lalos, Lalos, Jacobson & von Schoultz, 1986).

Although infertility can be stressful, controlled studies support the view that fertile and infertile women do not differ in psychological well-being (Downey & McKinney, 1992; Dunkel-Schetter & Lobel, 1991). In a study of inovulatory infertile women, other infertile women, and a comparison group with no known fertility problems, Freeman et al. (1983) found no differences among the women in neurotic personality structure or psychopathology. Paulson et al. (1988) reported that infertile women were as psychologically well-adjusted as fertile study volunteers and had personality profiles
remarkably similar to them. Callan and Hennessey (1989) found no differences in the reported levels of self-esteem and life satisfaction or in expected levels of success, fulfillment, achievement, and stimulation among women undergoing in vitro fertilization, regardless of whether or not they had a previous child.

Despite some conflicting findings, which do indicate higher levels of distress in fertility patients (Freeman et al., 1985; Garner, Kelly, & Arnold, 1984; Leiblum et al., 1987; Newton et al., 1990), and the problems of comparing results obtained with different instruments and at different points in the treatment process, when studies are weighted according to their power and considered with regard to the particular sample involved, it appears evident that the majority of couples entering a infertility program will present with normal personality functioning (Dunkel-Schetter & Lobel, 1991). In vitro fertilization patients are often considered to be a special case, and especially vulnerable emotionally, because IVF is seen as the "last chance" for biological conception.

Previous researchers (Stauber et al., 1985; Campagnoli et al., 1985) have emphasized the need for psychological screening to single out those applicants for whom an in vitro fertilization attempt might be psychologically contraindicated. Other researchers (e.g., Campagnoli et al., 1985; Freeman et al., 1985; Garner et al., 1984; Muller, 1985; Stauber et al., 1985) have emphasized the infertility patients' need for psychological support, as well as investigation of the degree of dysfunctional emotional distress shown by in vitro fertilization participants. Hearn, Yuzpe, Brown, and Casper (1987) found that, as a group, couples entering IVF programs seem to be free of pathology and are likely to report a higher than average quality of life. In their 1987
study, Hearn et al. investigated 300 couples entering an IVF program and found that fewer than 1% showed signs of psychopathology. Indeed, infertility patients presenting for treatment have been found by some investigators to be very well adjusted. Given, Jones, and McMillen (1985), using the California Personality Inventory, found that men scored high on psychological mindedness and sensitivity to other people's needs. Male and female patients in their sample were found to be high achievers, independent, ambitious, and highly motivated. In 1988 Sahaj et al., using a battery which included the Eysenck Personality Inventory, assessed a sample of 134 infertile couples and reported "surprisingly" intact couples with sound psychosocial profiles. The low level of pretreatment psychopathologic findings reported across studies, together with the evidence of psychological distress for some couples following treatment failure, suggests that concentration on personality styles and coping mechanisms rather than psychopathologic conditions may prove more profitable in assisting the couple to cope with stress as they proceed through fertility treatment programs (Hearn et al., 1987). Callan and Hennessey (1989) pointed out the need to collect more empirical data on the coping strategies used by the infertile, and in particular, to study the combination or sequence of coping skills, and the mix of interpersonal and intrapersonal resources that best assist them. Increased emphasis on the study of coping is shifting the focus of assessment toward measuring the changeable aspects of patients' experiences with infertility treatment such as patient preparation and education, as well as their development and use of coping skills.
The patient factors salient to the understanding of an individual response to fertility treatment have proven somewhat elusive. Litt et al. (1992), in studying the relationship between patient factors and the prevalence of post-treatment distress, found that a number of factors usually considered by health care providers to be relevant to psychological well-being were unable to predict adjustment to IVF failure. Discrepant findings have been reported when researchers have examined the mediating impact on fertility treatment stress of factors such as age, gender, religiosity, duration of infertility, stage of treatment, childlessness, diagnostic status, and perception of successful outcome (Abbey, Andrews, & Halman, 1991; Berg & Wilson, 1991; Daniluk, 1988; McEwan et al., 1987). Abbey et al. (1992) found that, contrary to expectation, demographic factors such as age and number of years married were not related to reports of stress in their study of 185 infertile couples. Similarly, Litt et al. (1992) found that none of the patient variables they measured prior to entering IVF treatment concerning patient demographics, obstetrical history, marital adjustment, having had a child previously, or the effects of infertility on patients' lives were predictive of post-IVF distress.

Specific issues from the descriptive literature that do seem reliable and salient to the study of the infertile couple are those of the patients' perceived control of infertility (Campbell et al., 1991; Matthews & Matthews, 1986; Sandelowski & Jones, 1986; Seibel & Taymor, 1982; Valentine, 1986), the patients' situational appraisals (Litt et al., 1992), and the types of coping strategies the patients employ (Callan & Hennessey, 1989). The importance of the issues of control and appraisal may be best understood with respect to their contributions to the formulation and implementation of coping strategies. The
issues of control, appraisal, and coping effectiveness have been considered together by a
dnumber of infertility researchers.

Coping and Control Issues in Infertility Assessment

Two types of responses to infertility involve loss of control (Campbell et al.,
1991). One concerns control over events that are current, including the loss of control
over one's daily activities, bodily functions, and emotions. The second concerns control of
the future, specifically the ability to predict or plan the future and to meet life goals. Loss
of control over current events includes emotional and mood lability due to the chronic
stress associated with infertility and with hormone treatment (Mazor, 1979). These two
dimensions of control can be conceptualized as situational and global, respectively
(Mazor, 1979). In relationship to infertility, the more specific situational control
dimension has been shown to be associated with depression, which is seen as a situational
outcome, whereas global control is associated with quality of life, the more global
outcome (Campbell et al., 1991).

Campbell et al. (1991) found measures of general control and fertility control to be
unrelated and predictive of different aspects of psychological adjustment. Generalized
beliefs about control were related to quality of life, while perceptions of control over
infertility were related to depression. In this study, situational control was divided into
three domains of control: control over pregnancy, control over medical care, and control
over emotions. These three domains of control were differentially predictive of the level
of psychological adjustment in this sample, thereby providing evidence for the usefulness
of the distinction. These findings also provide support for the distinction between general
and situation-specific control. In addition to the distinctions between the three dimensions of fertility control, Campbell et al. (1991) proposed a further distinction between cognitive and behavioral control over infertility. Cognitive and behavioral control can be defined as the belief that one has a cognitive or behavioral strategy, respectively, that can affect the averseness of an event (Thompson, 1981). The usefulness of this latter distinction was not quantified in the study; however, Campbell et al. (1991) suggest that it is a valid topic of further study.

The benefit of separating the sense of control over infertility into more discrete domains is also suggested by the work of Litt et al. (1992), who found that, prior to IVF, 50% of their sample reported that they could do nothing themselves to help increase their chances of a good outcome. However, 65% of the women reported feeling that they had not lost much control. The fact that most instrumental actions appear to have been taken away from a couple by the time they present for IVF suggests that whatever sense of control remains to them is something other than perceived instrumental control. Rothbaum, Weisz, and Snyder (1982) referred to a perception of "secondary control," in which an individual faced with an apparently uncontrollable stressor simply "flows with the current," making attributions that serve to protect against disappointment. A process similar to secondary control may be reflected in results reported by Litt et al. (1992). In their sample, dispositional optimism, as well as a sense of being partially responsible for the infertility, was found to be protective of emotional distress following IVF failure.

A patient’s sense of control over various aspects of his or her fertility treatment procedures may be influenced by a dynamic process of cognitive manipulation in which
different aspects of the situation are weighted and considered differentially to maintain an adequate level of control as perceived by the individual. As treatment proceeds without conception taking place, the situation with which a couple must cope transforms from threat to loss (Dunkel-Schetter & Lobel, 1991). This situational change may require a change in coping strategies. Patients would seem more likely to experience depression at this point if they responded to the sense of loss by self-blaming. The alternative to a self-blaming interpretation is to attribute the treatment failure to something external such as the quality of the treatment itself. Such an external attribution would allow for a self-protective rationalization of the causes of treatment failure. Such a coping process may explain why Litt et al. (1992) found that positive adjustment in women following treatment failure was associated with their taking responsibility for their infertility, but not for their failure to become pregnant after treatment. Such a strategy would allow the women to retain control of the global situation, while distancing themselves, in terms of responsibility, from the negative effects of the treatment failure (the more specific situation). The same process may be operating in Campbell's (1991) sample of IVF women. These women reported no substantial loss of control overall, but they did report significantly lower perceived control over becoming pregnant than they did over other domains of control, such as control of medical treatment and control over emotional reactions.

Maintaining their optimism about the chances for success is one way in which patients may foster an increased sense of control while anticipating a cycle of treatment. Administrators of IVF programs often report that couples seeking treatment are convinced
that their chances of conception are much higher than the reported success rates (Lasker & Borg, 1987). One study of men and women undergoing IVF and embryo transfer procedures found that, after receiving information on the past success rates of the treatment, all but one of 70 participants overestimated the likelihood of success of the procedures (Johnston, Shaw & Byrd, 1987). Newton, Hearn, Yuzpe, and Houle (1992) reported that couples in their sample overestimated the likelihood of treatment success, and many indicated their readiness to participate in any new treatment option that became available. Individual attributions of control appear intimately related to coping. However, traditional approaches to the interpretation of coping may not be sufficient to explain coping in the circumstances of fertility treatment. Infertility treatment and its outcomes have previously been seen as stressful and largely uncontrollable life events and therefore not amenable, within the persons-environment model of Lazarus and Folkman (1984), to the use of coping strategies associated with success in controllable conditions.

Hynes, Callan, Terry, and Gallois (1992) found the effects of instrumental coping strategies to be positive even in the relatively low-control context of fertility treatment, contrary to what would be expected by the goodness-of-fit model. The three-dimensional view of fertility control developed by Campbell et al. (1991) provides one possible explanation for findings such as these; however, the precise nature of the controllability-coping strategy-effectiveness interaction remains unclear in regards to fertility patients (Hynes et al., 1992). Newton et al. (1990) studied the psychological impact of failed in vitro fertilization and evaluated psychological test scores as predictors of reaction to treatment failure. Predisposition towards anxiety, pre-IVF depressive
symptoms, and fertility history were found to be the most important predictors of emotional response in their sample, which consisted of approximately 900 couples admitted to an IVF program. Although the findings provide encouraging preliminary support for the use of psychological test measures before IVF, only a moderate proportion of variability in post-IVF response was actually accounted for in this large sample, indicating that some salient factors remain to be uncovered. Neither the inclusion of demographic data nor information about marriage quality appeared to offer additional predictive utility in this study.

In 1992, Litt et al. identified patient coping characteristics that predicted 67% of the total pre-post treatment variance in adaptation test scores of women following an unsuccessful attempt at in vitro fertilization. This study attempted to identify factors that would predict the level of adaptation to unsuccessful IVF and therefore make it possible to identify early in treatment those women who might be most at risk and most in need of support. A unique feature of this study is that Litt et al. (1992) also proposed to look for specific coping strategies predictive of emotional adaptation and use this knowledge to devise interventions to alter the coping skills of those women believed to be at risk (Litt et al., 1992).

General appraisals, situational appraisals and attributions, and coping strategies were the three domains of variables proposed by Litt et al. (1992) as being predictive of adaptation. The goal of their study was to examine the unique contributions of these factors to the emotional adjustments to IVF failure. Coping strategies were included because they provide a link between appraisals of the situation and adaptational outcome.
(Litt et al., 1992). Several general appraisal, situational appraisal, and coping strategy variables were found to be predictive of post-IVF distress.

Specifically, the dispositional optimism variable and three situational appraisal measures were found to be predictive. Optimism was negatively related to distress. The extent to which women believed they had contributed to their IVF failure was positively related to the distress felt, as was perceived loss of control over their lives prior to the IVF procedure. The extent to which women felt they had contributed to their own infertility, however, was negative related to the level of distress after IVF failure. Of the coping strategies measured, only the use of avoidance strategies contributed significantly to post-IVF distress. The optimism score was the most powerful predictor, accounting for 16% of the total of 67% of the variance in post-IVF distress. Pre-IVF distress, on the other hand, contributed substantially and uniquely to the prediction of post-IVF distress. None of the coping strategies measured was associated with better adaptation. This may be related to the instrument used to measure patient coping, the Ways of Coping Questionnaire, which lacks a validity scale, or to the unique nature of the experience of infertility treatment as a threatening event. The shortcomings of this study include a relatively small sample size and an emphasis on the coping of only the women in the sample.

In 1993, Koropatnick et al. studied individual characteristics of infertility patients, including self-esteem, locus of control, sex role, health, age, race, and socioeconomic status in relation to their adaptation to infertility as a non-event. A number of factors were
identified that, when considered together, appeared to provide a profile of individual patterns of adaptation or distress in response to the non-event transition of infertility.

Better adaptation in terms of fewer symptoms of distress and less hostility was evidenced by younger men and women, who reported positive self-evaluations and higher levels of lifestyle security and economic comfort. Undifferentiated sex role identification, low self-esteem, and advanced age characterized those who appeared to be at the greatest risk of experiencing more intense psychological distress and anxiety in response to infertility. In interpreting this finding, the researchers proposed that the loss of fertility may represent the loss of an opportunity for self-definition through a socially sanctioned role.

Men and women in the Koropatnick et al. (1993) study who had been infertile for longer periods of time and who perceived their infertility to be permanent reported fewer symptoms of distress than those who were in earlier stages of the fertility treatment and who perceived the duration of their infertility to be temporary or uncertain. This finding appears to be in direct contrast to that of Litt et al. (1992), who found dispositional optimism to be the most powerful predictor of low post-IVF failure distress. This discrepancy may be related to different patient perceptions of the consequences of treatment failure associated with the differences in sampling between the two studies. Subjects in the Litt et al. (1992) study were all IVF participants facing their "last chance" at biological conception, unlike those in the Koropatnick et al. (1993) sample. Additionally, subjects in the latter sample had no previous parenting experience, whereas
35% of the subjects in the Litt et al. (1992) study had a previous child via delivery or adoption. These sample differences may be associated with the discrepant findings.

The influence of coping effectiveness may be helpful in interpreting findings that show distress to be correlated with situational factors indirectly related to control and appraisal. For example, Abbey et al. (1992) found that stress was positively correlated with treatment costs and number of tests and treatments received for both men and women in a sample of 185 couples with primary infertility. In addition they found stress for both men and women to be significantly negatively correlated with confidence that they would have a child and high perceived control. For women only, attitudes about infertility treatments, importance of children, self-attributions of responsibility, and social support also significantly related to perceived stress. For men only, income, number of physicians seen, and self-attributions of responsibility also significantly related to perceived distress. Comparisons of this study's results with others is difficult since this study utilized as its sole outcome measure a customized 9-item Likert scale.

The loss of global control, such as the ability to fulfill a highly valued life role, constitutes another risk to patients in fertility treatment. Global factors such as pursuit of the biological parent role are likely constituents of an infertile couple's motivation for treatment. Identifying the nature of a couple's motivation for treatment may reveal particular aspects of control that could be threatened by unsuccessful treatment. Such knowledge could be utilized in both the prediction of treatment adjustment and intervention planning. In 1992, Newton et al. investigated the relationship among identified motives to seek treatment, pretreatment emotional adjustment, and reaction to
treatment failure in 1,007 women and 967 male partners seeking IVF treatment. Women as a group placed greatest motivational emphasis on fulfilling gender role requirements. Those women who strongly endorsed such motives showed the poorest adjustment before IVF and the most negative reaction to first cycle failure. In this study, men experiencing social pressures to have children were at greater risk when treatment failed. Men and women identified highly similar motives for having children and seeking treatment. The four factors identified by both sexes included needs for gender-role fulfillment, marital completion, desire to alleviate social pressure, and a fourth factor that appeared to reflect a kind of parental role-longing. Gender-role fulfillment proved to be the best predictor of emotional adjustment to infertility before IVF in both sexes. Those with high scores on gender-role fulfillment and poor self-image appear to be in greatest difficulty. This group also reported greater situational anxiety, more negative appraisal of life circumstances, and higher depression risks. Couples who emphasized role-longing as a primary motive for parenthood reacted less negatively to treatment failure. Responses loading on this factor, including "thinking one would be a good parent" and "strong desire to have a child," were endorsed as important reasons to have a child. Women in the study with high scores on this factor experienced the smallest increases in anxiety. Newton et al. (1992) suggested that men and women who frame their motives for children in a primarily positive context may possess more adaptive coping abilities. Alternatively, such an attitude may reflect an emotionally detached or highly intellectualized coping style and a tendency to minimize the processing of emotionally distressing material.
For emotions to be processed, they have to be experienced. Emotional processing takes place when the experience is absorbed and so loses its disruptive effect on behavior. The emotional processing of infertility patients was studied by Reading and Kerin in 1989. Reading and Kerin suggested that infertile women may suppress emotional processing by clinging to the conviction that treatments may work or by focusing on signs of progress such as the number of oocytes retrieved or fertilized. They also suggested that having an opportunity in the early stages of treatment to work through the implications of failure may facilitate emotional processing.

The effects of coping on the well-being of infertile women after IVF failure was investigated in a controlled study by Hynes et al. in 1992. These researchers studied the coping strategies of a group of 100 infertile women in IVF treatment and a group of 73 control women who were not in any form of fertility treatment and correlated the results with post-IVF well-being as indicated by the levels of depression, self-esteem, and self-confidence. After a failed IVF attempt, IVF women in this study were found to be more depressed and had lower levels of self-esteem and self-confidence than they did during the treatment cycle. Women in the control group showed no such signs of impaired coping over the same length of time. In terms of the effects of coping on the post-treatment well-being of the IVF women, the use of problem-focused coping was associated with high levels of well-being for all three measures, while the use of avoidance coping and seeking social support appeared maladaptive.

Hynes et al. (1992) explained that the reason for the successful use of problem-focused coping in the seemingly low-control situation of fertility treatment was a
reflection of the fact that the measures of problem-focused coping used in the present research are comprised mainly of items that assess cognitive rather than behavioral strategies. It is possible that cognitive attempts to deal with the problem are adaptive, irrespective of the controllability of the event, while it is the effects of active behavioral strategies that will be dependent upon the controllability of the situation. While their explanation seems reasonable, it is unclear, given the findings of Campbell et al. (1991), that the fertility treatment situation can be characterized as being low on all dimensions of control. In their discussion Hynes et al. (1992) recognized the future need for the collection of multiple waves of data to measure the process of adaptation to a failed IVF attempt, as well as the process involved in adjusting to a successful attempt to become pregnant.

In 1991, Stanton published an investigation of 52 infertile couples which focused on cognitive appraisals and coping processes and their relationship to adjustment to infertility treatment. The appraisal variables studied were threat, challenge, and perceived control. The coping processes variables, derived from factor analysis of the results of the Revised Ways of Coping Questionnaire (Folkman, Lazarus, Gruen, & Delongis, 1986; Lazarus & Folkman, 1984), included: confrontive coping, distancing, self-controlling, seeking of social support, acceptance of responsibility, escape/avoidance, planful problem solving, and positive reappraisal. Post-treatment distress was measured by the SCL-90-R, the POMS, and a measure of infertility-specific distress constructed by the authors. Well-being was also assessed via measures of general and infertility well-being constructed by the authors. It was found that couples coped in many ways, with 83% of
males and 93% of females using at least seven of the eight coping strategies, which is consistent with research on coping with other stressful encounters (Folkman & Lazarus, 1980, 1985).

In general, Stanton (1991) found that coping mechanisms were related differentially to distress and well-being. Both males and females who coped through avoidance evidenced more distress. In addition, males who used confrontive and self-controlling coping were more distressed, as were females who accepted responsibility for their fertility problem. The relationship of fertility problem responsibility to distress in females is the opposite of that found by Litt et al. (1992), whose study indicated that women discriminated between their responsibility for the infertility problem and fertility treatment failure. It is unclear from Stanton's report whether women in that study made such a discrimination. Both females and males in Stanton's study who used positive reappraisal reported greater well-being. Additionally, planful problem solving and the seeking of social support were positively related to well-being for females, and self-controlling coping was associated negatively with well-being for males.

The combination of the three appraisal variables and the set of four coping variables accounted for 45% of the variance in distress for males and 52% for females. Confrontive coping was the most powerful predictor of distress for males, whereas low appraisal of control and coping through accepting responsibility were the unique predictors of distress for females. Husband and wife correlations indicated that the only variable of one spouse found to be related to the other's adjustment was coping through seeking social support. As wives sought more social support, their husbands reported less
distress. Well-being was best predicted by low perceived threat from infertility for males and coping through positive reappraisal for females. This study, containing measures of control, appraisal, and coping, represents one of the most comprehensive descriptive studies to date.

Some identifiable group coping tendencies attributable to infertility patients were reported by Callan and Hennessey, in a review of the infertility literature in 1989. Using a cognitive framework to organize findings related to the experience of coping with infertility, they identified three coping categories and nine major coping strategies that can be employed by couples in infertility treatment. These researchers examined appraisal, problem, and emotion-focused forms of coping, as well as the interpersonal and intrapersonal resources available to infertile couples.

Callan and Hennessey's (1989) first group of strategies, the appraisal-focused category, involved the infertile person or couple attempting to understand and find a pattern of meaning in the crisis. The couple enters into a process of appraisal and reappraisal of their infertility and its treatment. The three coping strategies in this group include (a) being mentally prepared, (b) accepting and redefining, and (c) keeping busy, avoiding, and denying.

Central to the problem-focused coping strategies in the second category is the person or couple confronting the reality of the crisis and its consequences with the belief that something can be done to help. The strategies here include (a) seeking information and support, (b) taking action to be a problem-solver, and (c) looking to alternative rewards.
The emotion-focused coping strategies in the third category involve dealing with the feelings of loss and emotions generated by the crisis of failed treatment. The goal behind these efforts at coping is to maintain the individual's psychological well-being once it is clear that nothing else can be done to deal with continued infertility. The cognitive basis of this type of coping involves changing the meaning of the situation or crisis to maintain hope and optimism (Pearlin & Schooler, 1978). The emotion-focused strategies include (a) calm acceptance of emotions, (b) emotional discharge, and (c) resigned acceptance.

These emotion-focused strategies may characterize a couple's relatively durable response to the end of treatment, but they might also be utilized in a temporary fashion. Emotion-focused strategies may be utilized as a means rather than an end during earlier stages of treatment until other strategies become dominate as another cycle of treatment approaches. The adequacy of these coping strategies for any given couple may be different when they are applied to either the transient disappointment over the failure of one in a series of treatment cycles, as opposed to the final acceptance of and adaptation to infertility that accompanies a couple's decision to permanently discontinue fertility treatment.

Callan and Hennessey (1989) included internal/external locus of control, pretreatment level of adjustment and stable personality as the patient's intrapersonal resources. Their interpersonal patient resources include supportive marital relationships, formal support groups (e.g., Concern, Resolve), counselors, other infertile individuals, nursing staff, and doctors. The level of support the patient perceives from these sources
has been shown to discriminate between women who continue IVF treatment and those who stop treatment (Callan, Kloske, Kashima, & Hennessey, 1988). This finding suggests that women or couples who continue fertility treatments without adequate and well-organized support may be at increased risk of poor adjustment. In addition, couples who overestimate the level of support or organization in their social network, or those who underestimate their need for support may also constitute a high risk group. Callan and Hennessey (1989) pointed out the need to collect more empirical data on the coping strategies used by couples in fertility treatment. These researchers also called for the study of the combination or sequence of coping skills and the mix of interpersonal and intrapersonal resources which best assist them.

Timing of the Infertility Assessment

Fertility is an unfolding process rather than discrete event. The beginning of the process is marked in a variety of ways and may be either gradual or abrupt. The acknowledgment of a fertility problem may slowly develop as a couple experiences failure to conceive naturally over the course of 12 months, or the diagnosis of an infertility-related condition may occur abruptly and unexpectedly during a medical checkup. Often, through the course of treatment, it is the possibility and not the reality of infertility that is the issue (Dunkel-Schetter & Lobel, 1991). Over the course of time, beginning with their first attempts at conception and on through the diagnosis, the ups and downs of treatment, the repeated decisions to continue trying, and finally to the birth of a child or, as is more often the case, the decision to terminate treatment, couples experience the uncertainty about their ability to conceive. Because there is ambiguity about the
outcome, the infertility treatment situation initially involves a threat rather than a loss (Lazarus, 1966; Lazarus & Folkman, 1984).

The treatment of infertility occurs in stages. It has been proposed that the psychological experience of couples in infertility treatment is also characterized by stages (Berg & Wilson, 1991). However, Dunkel-Schetter and Lobel (1991) point out that stage theories of the sequence of emotional reactions to infertility have yet to be supported by the appropriate longitudinal studies and are probably too simple to offer generalizable utility. Studies of other undesirable life events indicate that, in general, people do not experience similar reactions at the same time or in the same sequence in response to loss (Silver & Wortman, 1980). Infertility involves many different medical conditions, and the psychological experience of infertility often changes over time and is viewed differently by individuals with different circumstances (Dunkel-Schetter & Lobel, 1991).

Of critical importance in the investigation of the infertile couple's adjustment to treatment stress is the timing of the assessment. Two issues are germane to the timing of infertility assessments. The first has to do with what stage of infertility treatment the couple is in, and the second concerns the positioning of the assessment within the treatment protocol. Reading and Kerin (1989) suggested that the stage at which the psychological assessments are obtained might affect results for two reasons. First, anticipated IVF or other fertility treatment may be associated with an upsurge in patient optimism, hope, and sense of well-being. Additionally, a second selection process may be operating, so that only the most psychologically hardy individuals or couples are surveyed, with more vulnerable couples not proceeding with treatment.
Once treatment has begun, the roller-coaster ride reportedly intensifies as hopes rise after each trial of treatment and fall with each failure of treatment, which is signaled by the onset of another menstrual cycle, only to rise again with the expectation that the next trial of treatment will be the one that results in conception. When an infertile couple receives news from the clinic that they have successfully conceived, their roller-coaster ride is not yet over since many such pregnancies terminate in spontaneous abortion or miscarriage early in the term of the pregnancy. To adequately assess adjustment to this sort of treatment experience, much thought must be given to when the assessment is administered relative to the treatment cycle. Assessments undertaken after the end of one failed treatments cycle and at the beginning of the next would tap both the response of the patients to the treatment failure and their attitudes and expectations for the upcoming treatment cycle. Since different situations may elicit anticipation or grieving, it follows that different coping strategies may be utilized by patients at various points across the stages of treatment (Folkman & Lazarus, 1985). The measurement of the adequacy of a patient's coping and the level of her adjustment to the demands of treatment would likely be confounded by the particular emotions that accompany hormonal fluctuations and treatment transitions inherent to infertility treatment. In consideration of this likelihood the timing of the assessment in this study took place on Day 3, 4, or 5 of injection cycles (which correspond biologically to the mid-point of a natural female cycle) for Treatment group women. Pregnant Control group women, who are experiencing no menstrual cycle, will be instructed to complete the battery of questionnaires at their earliest convenience. Thus the timing of the assessment measures was temporally removed from the bias of
transitory emotional states associated with major hormonal fluctuations and those that may be present only during treatment transition periods.

Folkman and Lazarus (1985) pointed out that coping with events that are marked by clear stages may be characterized by the use of different coping strategies at various stages of the unfolding event. In anticipation of an event, problem-focused coping and optimism may predominate, whereas the use of distancing oneself from the situation may be the major strategy during a waiting period (Folkman & Lazarus, 1985). This method of assessing coping styles strategically during the course of treatment may represent the most ecologically valid approach to the fertility assessment enterprise. Moreover, this more realistic approach may be the most valuable in terms of predicting emotional fallout from fertility treatment outcomes. Folkman and Lazarus (1985) found that 40 to 60% of the variance in measures of emotion after the outcome of an anticipated event was predicted by appraisal and coping variables. Events that were appraised as more valuable were found to produce more negative anticipatory emotions, suggesting that, in terms of situational appraisals, the stakes associated with anticipation of the event strongly affect the emotional reaction to the event outcome (Folkman & Lazarus, 1985). This finding suggests that, due to the value placed on the conception and birth of a child, any emotions associated with the anticipation of treatment failure may be extremely negative and therefore potentially damaging.

Furthermore, the work of Folkman and Lazarus (1985) on the relationship of emotions and differential use of coping strategies in relation to anticipating an ambiguous or unambiguous outcome may be germane to the timing of assessments in fertility
programs. Infertile couples' perceptions of the ambiguity of their treatment situations have been shown to predict distress (Koropatnick et al., 1993). Reliable measures of emotion taken prior to a cycle of treatment may be used to help understand the level of ambiguity an infertile couple perceives in their situation. This information, in combination with other data, could be used to identify at-risk couples and to develop intervention plans to clarify the treatment situation as much as possible.

The most useful assessment would include psychological measures taken during the course of treatment. Pretreatment measures of coping strategies are reflections of past or intended coping responses. These are the components that produce variance among individuals, and there is no compelling basis for their use as predictors of coping behavior similarities relative to a specific event (Folkman & Lazarus, 1985). Pretreatment measures of coping styles provide a valuable baseline from which to compare subsequent coping efforts, but only when they are interpreted in light of the patients' psychosocial context. For example, interpretations of psychological pre-screenings of IVF patients should be tempered with the knowledge that IVF patients are at the final stage of treatment and have probably experienced 2 to 6 years of other failed treatments to arrive at this point. By default, these are likely to be the patients who are the most willing to subject themselves to repeated stress and failure and therefore the ones most experienced at managing stress and most depleted of emotional resources. IVF patients are also finally facing their last chance at biological conception. In contrast, an infertile couple just beginning treatment may be anxious but optimistic and overly confident, and they are possibly underestimating the potential stress and length of their fertility treatment.
A common approach taken by fertility clinics is repetition of a treatment protocol for three to four consecutive biological cycles. Administration of a psychological assessment at a point in the treatment cycle that is relatively uncontaminated by transient emotional states would provide clinicians with the most valuable index of the patient's level of adjustment and ability to cope with treatment.

**Infertility Assessment Strategies**

The evaluations of fertility patients are becoming increasingly comprehensive, but unfortunately these evaluations are limited by a number of factors, such as the lack of standardized measures. The pretreatment, one-time-only nature of most psychological assessment protocols for fertility patients ignores the healthcare team's need for information concerning the patient's psychological response to treatment demands and the effectiveness of coping strategies implemented during treatment. As discussed earlier, the couple's response to the demands of infertility treatment and their coping efficiency are primary concerns of infertility researchers due to the probable influence of these factors on the health of the patients and their success in fertility treatment, as well as the quality of life they enjoy once treatment outcomes are known.

Historically, researchers have focused on women in fertility treatment. After reviewing the empirical and descriptive psychological studies of infertility from 1963 to 1988, Dunkel-Schetter and Lobel (1991) found that a significant number studied only women. This can be explained in part by the fact that the most stressful, high-tech fertility treatments primarily involve only the woman and that women tend to volunteer
and cooperate in research projects more frequently than men. Newton et al. (1992) found that women appear to require the most assistance, especially when treatment fails. They found that women linked achievement of parenthood with the establishment or restoration of positive self-worth and that with men parenthood goals and self-esteem issues may be more weakly related to their adjustment. Just how men react to the process of infertility treatment is less well understood because, as some authors point out (e.g., Abbey et al., 1991; Domar et al., 1990), infertile men have been understudied relative to infertile women.

The involvement of both members of the couple is essential to any comprehensive infertility assessment procedure. The notion that infertility should be seen by doctors and counselors as a problem of the couple was recognized by even the earliest researchers (Menning, 1980). Seibel and Taymor (1982) also recommended treating infertility as a problem of the couple rather than the individual as this allows more partners to be actively involved in their plan of care. Because infertility is a couple's dilemma, it is important to point out that the members of the couple may not be coping in the same way or reaching the same sense of adjustment (Clark, Henry, & Taylor, 1991). In a study of 97 IVF/ET couples, Mazure, Greenfeld, Del'Aune, and Haseltine (1985) found a high instance of discrepancy between the responses of spouses in independent interviews. They found only a 25-35% agreement rate between partners on the degree of optimism that IVF/ET treatment would produce a child. Considering that pretreatment optimism has been shown to correlate with positive adjustment to a failed treatment (Litt et al., 1992), pretreatment discrepancy in expectations within couples may be a useful criterion
in identifying couples at high risk for negative post-treatment adjustment (including marital
difficulties). Findings such as these underscore the importance of assessing the couple and
understanding their implementation of coping strategies during the treatment process.

The inclusion of males will be increasingly critical to the comprehensiveness of
psychological assessment programs due to developments in the treatment of male factor
infertility. The advent of Direct Egg Sperm Injection (DESI), a newly developed
technique to circumvent male-factor fertility problems such as low sperm count or poor
sperm motility, will draw more men into the fertility treatment process. Many more men,
who had been shielded from treatment pressures by the emphasis on female-factor
treatments, will increasingly become the focus of treatment and may thus be exposed to
more of the emotional rigors of fertility treatment that appear to have impacted women
somewhat preferentially in the past. How men will respond to such focused medical
involvement and what effects these responses will have on their adjustment are questions
that have not yet begun to be addressed by research. There are indications that although
husbands may have been understudied in the past they may be the prime targets for future
intervention concerning decisions about fertility treatment. Ulbrich, Coyle, and Llabre
(1990) found that in most cases in which there is a difference of opinion between spouses
about childlessness and fertility treatment, it is the husband's wishes that prevail.
Comprehensive inclusion of husbands in the ongoing assessment process will provide a
more realistic conceptualization of the infertile couples adjustment to the stress of
infertility treatment and to the transitions involved in adapting to treatment outcomes.
Issues Regarding Instrument Selection

A weakness of many assessment protocols is their reliance on self-report assessment instruments that do not include an index of reporting bias. Results from these instruments are vulnerable to manipulation in the form of impression management by individuals who are highly motivated to engage in treatment. Considering this assessment deficiency, it is possible that undetected impression management may be masking significant levels of distress or dysfunction present in these patients.

Reading and Kerin (1989) suggested that patients might have a conscious or unconscious drive to present themselves in the best possible light for fear of being excluded from fertility treatment on psychological grounds. Mazure, Del'Aune, and DeCherney (1988) found evidence of this motive in the form of socially desirable response sets in a group of 60 IVF/ET couples whom they investigated using the Taylor Manifest Anxiety Scale (TMAS) and the Marlowe-Crowne Social Desirability Scale. The Marlowe-Crowne Social Desirability Scale, in combination with scores on the Taylor Manifest Anxiety Scale, provided a method of discriminating truly low-anxious individuals in their study from high-anxious persons by taking into account affect-inhibition and defensiveness in responding (Mazure et al., 1988). This combined measure also allows for identification of those with a "defensive" high-anxious style from others called "repressors." The individuals that Mazure and her colleagues referred to as defensive high-anxious display affect-inhibition but, on questioning, will admit to anxiety. Subjects with the Repressors pattern tend to maintain a defensive style that avoids awareness of anxiety, which consequently interferes with effective coping, and
paradoxically promotes behavioral and physiological responses indicative of high anxiety (Mazure et al., 1988). They found that 38% of the subjects in their study reported low anxiety in combination with high social desirability scores. This suggests that anxiety scores for this group may underestimate the true levels.

Further support for the presence of socially desirable response sets among infertility patients comes from Hearn et al. (1987), who surveyed 300 couples waiting to enter an IVF program. Utilizing a battery of nine psychological instruments, including one that contained validity scales, Hearn et al. (1987) found that all respondents in their study evidenced some bias toward socially acceptable responding and suggested that the interpretation of their results was limited by this finding.

Other researchers have also questioned the validity of self-report data that may be skewed by the effects of a socially desirable response set. In a study of couples diagnosed with idiopathic infertility, controls and infertile patients were found to have significantly different scores ($p < .01$ to $p < .001$) on the Lie scale of the Eysenck Personality Questionnaire and on 16PF motivational distortion scores (O'Moore, O'Moore, Harrison, Murphy, & Carruthers, 1983). In interpreting these findings, along with the lower anxiety and elevated extroversion scores reported by infertile males, O'Moore and his colleagues (1983) suggested that male infertility patients, in particular, responded in a more "socially desirable" manner than did their controls. It is possible, therefore, that these and other self-report results for male patients do not reflect the true strength or depth of their feelings (O'Moore et al., 1983). The small sample size ($N = 15$ couples) employed in this study is a major factor limiting the generalizability of the results.
Few of the assessment instruments utilized in earlier studies contained validity scales to detect impression management by the patient. Some of the instruments with validity scales which have been employed in the assessment of fertility patients are primarily normed on psychiatric populations (e.g., MMPI), making interpretation of the results suspect with regard to fertility patients. Researchers cannot afford to ignore the need to address the validity of self-report information in their selection of assessment instruments.

Only a limited number of early empirical studies are available that address the psychological assessment of infertile couples. In their review of the infertility literature through 1990, Dunkel-Schetter and Lobel (1991) found 7 studies with designs that utilized both standard measures and control groups, 11 studies whose designs included standard measures and no control groups, 5 studies using control groups and no standard measures, and 2 studies that utilized neither a control group nor standard measures. A representative example from the largest of the aforementioned groups is the study of a large sample of IVF couples conducted by Hearn et al. (1987).

Hearn et al. (1987) investigated the psychological characteristics of 300 IVF couples, using a battery of nine instruments. The battery included the Beck Depression Inventory, the Ways of Coping Checklist (Revised), the State Trait Anxiety Inventory, the Personality Research Form-E, the Family Environment Scale, the Quality of Life Questionnaire, the Life Satisfaction Questionnaire, the Life Appraisal Inventory, and the Inventory of Socially Supportive Behaviors. Such a battery provides an example of a comprehensive approach to descriptive research. However, it is also an example of
why comparison of descriptive results is so difficult in this literature. Hearn et al. (1987) did not utilize a relevant control group in their study. Additionally, the timing of their assessment (3 months before the subjects' treatment began) makes their findings useful only as a baseline measure of the subjects' pretreatment psychological state and one that is relatively unrelated to the actual demands of their upcoming IVF program. The Personality Research Form-E contains two validity scales, which did reveal some subject bias toward socially acceptable responding. The Ways of Coping Checklist (Revised) is a well-known instrument and its use implies a comprehensive approach to description; however, it lacks normative data for coping.

The importance of coping styles in the study of infertile patients' response to treatment has recently begun to be recognized. The following review of three studies in the early 1990s provides evidence of both recent progress and lingering problems in infertility research.

Hynes et al. (1992) studied psychological adjustment in 100 IVF women and 73 controls. Depression, coping styles, self-esteem, and self-confidence measures were obtained at the beginning and end of a failed treatment cycle. The women in the Control group were an age and maritally matched group of students going through exams. The Control group generally showed signs of a higher sense of well-being than did the IVF group. Analysis of the IVF group differences in post-treatment well-being found that Coping Style accounted for 12% of the variance in post-treatment Self-Confidence, 19% of the variance in post-treatment Self-Esteem, and 23% of the variance in post-treatment Depression. The assessment instruments used by Hynes et al. (1992) included
nonstandardized Likert scale measures of depression, self-confidence, and self-esteem. The choice of nonstandardized instruments represents a weakness of this study. The coping measure used was a revised version of the coping assessment procedures developed by Billings and Moos in 1981. The researchers found successful use of problem-focused coping in the seemingly low-control situation of fertility treatment and explained it as a reflection of the fact that the measures of problem-focused coping used were comprised mainly of items assessing cognitive rather than behavioral strategies. None of the measures used contained a validity scale. All IVF group members were involved in a course of treatment, but the differential stages of treatment across subjects were not reported. This complicates the interpretation of their results since changes in self-confidence, for instance, may be lower in subjects who have experienced a number of failed cycles and higher in subjects who are in their first cycle of IVF.

A battery including the State Trait Anxiety Inventory, the Beck Depression Inventory, the Family Environment Scale, a life-appraisal inventory as well a life-satisfaction questionnaire was utilized by Newton et al. (1990) in assessing the immediate impact of IVF failure and predicting subjects' reactions to IVF failure from pre-IVF psychological and medical information in a sample of approximately 900 couples. No measure of coping style was employed, which constitutes a major limitation of the study. All subjects were assessed approximately 3 months before and 3 weeks after a first IVF attempt failure. The subjects' predisposition towards anxiety, pretreatment depressive symptoms, and presence of a biological child in the home were the most important
predictors of emotional response. The reporting of the timing of assessments in this study is helpful. However, the assessment of IVF impact on emotional functioning 3 weeks after a treatment failure can scarcely be considered immediate. Additionally, Newton et al. (1990) did not report whether the couples were in another cycle of treatment by the time of the second assessment, and so the extent of possible confounding in the self-report measures as a result of the subjects' being distracted from a past failure by a fresh cycle of treatment cannot be estimated.

In 1992, Litt et al. employed a battery of both standardized and nonstandardized instruments in studying a sample of 41 couples in an IVF program and identified patient factors that predict adaptation to an unsuccessful attempt at IVF fertilization. Litt et al. (1992) used a 7-item Likert scale measurement to indicate women's perceptions of the effects of infertility on different aspects of their lives. A questionnaire was used to obtain demographics and obstetrical history, and the Brief Symptom Inventory was used as a pre-IVF screening tool. Marital satisfaction was assessed through the Dyadic Adjustment Scale. General appraisals were measured via the Life Orientation Test, and the Ways of Coping Scale-Revised Version was used to assess specific coping strategies. The measurement of adaptational outcome was achieved via the Depression Adjective Checklist which was administered 3 to 4 weeks post-IVF/embryo transfer and served, along with a 20-minute telephone interview, as a parametric and subjective indication of post-IVF distress. Stepwise multiple regression analysis was used in analysis, with the combined distress score as the dependent variable. The dispositional optimism variable, three situational appraisal measures, and use of avoidant coping were found to be
predictive of post-treatment distress. The optimism score was the most powerful
predictor accounting for 16% of the total of 67% of the variance in post-IVF distress.
Pre-IVF distress, on the other hand, contributed substantially and uniquely to the
prediction of post-IVF distress.

The inclusion of validity measures in the pretreatment evaluation of fertility
patients and the expansion of the assessment beyond the pretreatment phase could
provide more accurate information on the impact of treatment demands on patients'
psychological well-being. Treatment teams using this type of approach may be able to
identify patients who are most likely to have inadequate adjustment to the stress of
fertility treatment and provide a decision-making basis from which to prescribe
preventative rather than palliative interventions for couples in that subgroup.

Standardization of such a coping assessment battery would allow for more
valuable comparisons of results between clinics. Infertility researchers have utilized a
variety of both standardized and custom-made instruments in the assessment of infertility
patients. In a recent review of the literature, it was found that over 50 different
standardized assessment instruments were used in the assessment of infertility patients
(Dunkel-Schetter & Lobel, 1991). The use of this variety of assessment instruments in
various combinations with subjects at various points prior to and during treatment reduces
the value of comparisons of results across studies. Standardization of an infertility patient
assessment battery would increase the value of comparisons made between studies and
also help bring to light any regional, clinical, or patient factors that influence adjustment to
treatment as well as providing a basis for individual case management.
The Millon Behavioral Health Inventory (MBHI) is an assessment instrument that appears to be particularly appropriate to the assessment of infertile patients. The MBHI was constructed and validated to provide a wide range of measures found relevant to psychological assessment and decision making in a variety of medical settings. The MBHI scoring includes an adjustment score providing a measure of the extent to which a patient may engage in socially acceptable responding or impression management associated with psychological defensiveness. The MBHI adjustment score for socially desirable responding is of particular relevance to the assessment of the infertile population since the issue of childlessness carries with it such a powerful social stigma and because the motivation to engage in treatment is linked to the fulfillment of a highly prized social role. The MBHI requires a slightly higher level of reading ability than some other comprehensive personality assessments such as the MMPI, which should pose no problem with this highly educated population. The MBHI also provides norms on a large nonclinical population whose demographics are more comparable to the infertile population than are those of other instruments.

The first two sections of the MBHI (coping styles, psychogenic attitude) were normed on nonmedical, nonpsychiatric populations, and the other sections (psychosomatic correlates, prognostic indices) were normed on a mixed medical population (Millon, Green, & Meagher, 1982). The MBHI was designed to assess a person's characteristic response to healthcare professionals and medical interventions. It was designed to identify personality and psychosocial factors that relate to either the development or the exacerbation of various types of physical illness (Millon, Green, & Meagher, 1979). The
MBHI also provides healthcare personnel with information about the psychological makeup of patients relative to their physical illness, which may serve as a guideline to modifying the impact of identified negative psychological influences on the success of the medical treatment and the health of the patient. Experience with the MBHI suggests that it is a convenient, easy to administer tool, well tolerated by patients, and of appreciable value in providing relevant and useful information to the members of the medical-psychological team (Millon et al., 1979).

Sexual disorders are one area in which there is strong agreement about the impact of emotional components in both the development and treatment of dysfunction (Millon et al., 1979). The MBHI has been employed in extensive studies of sexual dysfunction treatment and has proved to be a discriminating predictor of treatment outcome (Green, 1978). Green determined that the MBHI is valuable as a basis for appropriate therapeutic referrals, such as advising patients with a lower probability of success to seek therapy that would address marital problems prior to engaging them in more focused treatment for sexual dysfunction.

Lantinga, Krauss, Clark, and Schell (1988) also found the MBHI to be useful in assessing male sexual dysfunction. These researchers reported that the MBHI was more effective than the MMPI, the CPI, and the Derogatis Sexual Functioning Inventory in differentiating organic from psychogenic etiology of erectile dysfunction.

MBHI scales have also been used successfully in assessing the influence of patient psychological factors on disease. Antoni and Goodkin (1989) used the MBHI in a study of 75 female patients awaiting results of colposcopy biopsy for cervical neoplasia and
found that specific interpersonal coping styles appeared to moderate the association between patient reports of controllability and the promotion of their disease, which was determined from the biopsies.

In 1988, Alberts, Lyons, and Anderson published a study using the MBHI in exploring the relationships between specific coping styles and illness variables as a preliminary step towards enabling clinicians to predict an individual's reaction to illness. They investigated the relations of illness variables (including lifestyle and interpersonal) in 38 adult patients with ulcerative colitis to the eight coping styles as measured by the MBHI to identify coping styles important in managing this condition. Alberts and his colleagues concluded that coping styles may well predict how certain parts of the illness experience will be perceived by a patient.

The MBHI has been utilized previously for the purposes of analyzing and predicting patient response to behavioral health interventions. Working with a population of patients with chronic headache pain, Gatchel, Deckel, Weinberg, and Smith (1985) evaluated the use of the MBHI in predicting response to a behavioral treatment program and assessed whether the MBHI could significantly differentiate between headache patients, patients with other types of chronic pain, and normal subjects. Their results demonstrated that a number of MBHI scale significantly predicted response to treatment. Also, it was found that the MBHI significantly differentiated the chronic headache patients from the normal controls and patients with other forms of chronic pain.

Unlike instruments such as the MMPI, which was designed for a psychiatric population, the MBHI was developed and standardized on an actual medical population.
Information is provided concerning factors such as the patient's style of relating to healthcare personnel and major psychosocial stressors, as well as probable response to illness and treatment interventions. The MBHI may therefore provide more useful and meaningful information concerning response to treatment in a medical environment than a psychiatrically-oriented instrument such as the MMPI.

Legal and Ethical Considerations in Assessment

Another evolving issue in infertility assessment that is of interest to researchers and practitioners concerns the changing social context in which the assessment enterprise occurs. Healthcare providers in the field of infertility treatment should be aware of the potential liabilities that may be incurred through delivery of their services and look carefully at the judgments that they make, which are based partly on the results of their assessment instruments. In regard to fertility treatment, the current social context is a legal and ethical maze which includes many complex issues surrounding advanced reproductive techniques, surrogate motherhood, the sale and donation of ova, misuse of spare embryos and eggs, use of embryos and eggs for experimental research, and custody battles over frozen eggs.

Ethical dilemmas are abundant in the field of advanced assisted reproduction. Even the handling of human embryos causes obvious ethical problems (Campagnoli et al., 1985). Mettler, Riedel, Bonhoff, and Michelmann (1985) reported that changes in laboratory conditions that are as subtle as exposure to a particular type of lighting during the process of documenting the embryos photographically may preclude cell cleavage.

The opportunities to encounter ethical and moral dilemmas in a single study may be
many. Mettler et al. (1985) reported that in a study of 313 women in advanced fertility treatment, 1,005 eggs were retrieved and 28 pregnancies resulted. Of the 28 resulting pregnancies, 50% were multiple pregnancies, 10 of which were completed, including a set of twins delivered in the 29th week of gestation and raised with difficulty owing to their premature delivery. Results such as these may evoke radically different responses depending on whether a strictly moral or scientific perspective is taken. For example, some authors (Muller, 1985; Wasser & Isenberg, 1986) pointed out that even in nature the rate of mammalian embryonic and fetal wastage is high and that, in terms of the percentage of viable zygotes brought to term, most "humans" are naturally disposed of before birth. As the technology for preserving embryos and zygotes for increasingly longer periods of time develops, medical, legal, ethical, and moral arguments are likely to continue to develop and expand (Muller, 1985).

Steps to avoid some of the entanglements presented by the enterprise of assisted human reproduction have been undertaken by some facilities. The Berlin Model, as reported by Stauber et al. (1985), includes a set of conditions adopted by the Women's Hospital Berlin-Charlotenberg that guide and restrict the delivery of IVF treatment. The Berlin Model conditions for IVF treatment are as follows: (a) treatment participants are only from within the family—no donor ova, sperm, or surrogate mother; (b) IVF is carried out only without manipulation involving altering of the embryo—no wasting experiments; (c) IVF is carried out only with moderate ovarian stimulation—no cryoconservation of embryos and every retrieved embryo is transferred to the mother; and (d) IVF is
undertaken only when clearly indicated from a psychosomatic as well as a medical viewpoint.

Program restrictions of the nature described above are less likely to be instituted in the United States. Apart from restricting the application of ARTs, steps can be taken to avoid the negative effects on couples of the emotional fallout of failed treatments. Many authors have called for the early testing of infertile couples (e.g., Koropatnick et al., 1993; Reading & Kerin, 1989), which affords the opportunity to address psychological issues before they exact a toll.

In the case of couples seeking IVF treatment, Stauber et al. (1985) listed the following as psychosomatic contraindicators for IVF for some patients: (a) psychosis in one or both partner; (b) severe neurotic depression in one of the partners; (c) one partner shows ambivalence about desire for a child; (d) hope that the desire for child will sustain the partnership; and (e) functional (idiopathic, psychogenic) sterility. These criteria provide a useful but gross screening for those persons who probably should not be included in an IVF program on the basis of psychological disorder, improper motivation to treatment, or inappropriate diagnosis. These types of exclusionary criteria should be accompanied by an appropriate protocol of psychological referral and additional criteria for the reinstitution of treatment candidacy for couples initially assessed as unacceptable treatment risks. Psychological criteria should also be developed for identifying the more subtle predictors of unhealthy adjustment to a failed course of treatment. The adoption of increasingly restrictive treatment criteria for IVF programs, possibly motivated by the
unpredictable legal climate, would likely serve as the testing ground for inclusion of similar criteria in other forms of fertility treatment.

Novel legal questions are finally decided in courts of law. Individuals involved in the assessment of fertility patients are likely to begin selecting the types of assessment instruments that are most defensible in such settings. The logic used in the selection of an assessment instrument should be clear, as should the theoretical basis on which the instrument is founded. Furthermore, the results of an assessment of this kind should provide information for all healthcare professionals that may be involved in treatment and support of the patients, as well as for the patients themselves.

Summary

Evidence from the infertility literature has been presented, outlining the scope of the infertility problem in this country. Information from the stress and coping literature as well as the infertility literature regarding the personal experience of being diagnosed and treated for infertility has been reviewed at length. The high levels of psychological functioning exhibited by infertility patients prior to participating in infertility treatment and the significant psychological distress reported for a subgroup of these patients during and following treatment suggest that the psychological demands of infertility treatment may be the source of post-treatment distress for some individuals.

Evidence of the potential benefit of psychological interventions to patients in infertility treatment has been presented, thereby completing the rationale for the accurate identification of infertility patients who are in need of those interventions. Problems with previous assessment strategies have also been reviewed. These include the following: the
failure of previous test batteries to account for socially-desirable reporting bias; the inconsistent use of standardized instruments; the difficulties in the comparison of results between studies due to the absence of a standardized battery; the inconsistent inclusion of appropriate measures of perceived controllability in infertility assessment batteries; the inappropriate use of psychological assessment instruments with infertility patients that were developed and normed on psychiatric populations; the failure to include the assessment of males in many of the previous infertility studies; the failure to recognize the importance of the timing of the psychological assessment that is particular to this population of patients; and the emphasis on detecting signs of psychopathology among infertility patients rather than focusing on personality and coping styles.

The assessment strategy described in the next chapter effectively addresses all of the above-mentioned problem areas and represents an improvement over previous approaches to the assessment of infertility patients. The battery of psychological assessment instruments in this proposed study includes the Millon Behavioral Health Inventory (MBHI), the Beck Depression Inventory (BDI), the Health Attribution Test (HAT), and the Marlowe-Crowne Social Desirability Scale (MCSDS). This battery of tests features standardized psychological instruments normed on nonpsychiatric and medical patients, two methods of accounting for social-desirable responding, measures of personality and coping styles which are derived from an accepted theory of personality, and a measure of the control that patients perceive over their health. The strategy by which this battery of tests was administered included the assessment of males and accounted for the potential confounding influence of hormonal fluctuations and treatment.
transitions, which allows for the meaningful comparison of treatment and control subjects.

The following hypotheses were tested in this study:

Hypothesis 1. Mean SDS scores will be significantly higher ($p < .05$) for the Treatment group compared to the Control group.

Hypothesis 2. Mean SDS scores will be significantly higher ($p < .05$) for the males in the Treatment group compared to the females in the Treatment group.

Hypothesis 3. When controlled for socially desirable responding, the mean Treatment group BDI scores will be significantly higher ($p < .05$) compared with the Control group.
CHAPTER II

METHOD

Subjects

Subjects for this study were recruited for two groups, which were termed the Treatment group and the Control group. Subjects for the Treatment group were couples engaged in IVF fertility treatment, with a diagnosis of female-factor infertility. Criteria for inclusion in advanced fertility treatment was highly similar across clinics, and these criteria served to restrict the range of a number of patient variables, including physical health, diagnosis, and age. The demographic characteristics of couples seeking treatment for fertility at fertility clinics are well documented in the literature (Hearn et al., 1987; Litt et al., 1992; Mazure & Greenfeld, 1989). These subjects were primarily Caucasian couples in the 30-to-40 year age range, who had 13 or more years of education, and were in the middle to upper socioeconomic class.

Subjects for the Control group were couples in childbirth education classes who were engaged in standard treatment for a viable pregnancy. Subjects recruited for the Control group were those who generally matched the demographic characteristics of the Treatment group. The inclusion of pregnant couples provided a basis on which to discriminate the influence of fertility treatment demands versus those of pregnancy, as well as a method of testing the utility of the MBHI in differentiating the groups on the basis of its scale scores.
Instruments

The battery of instruments in this study included the Millon Behavioral Health Inventory (MBHI), the Health Attribution Test (HAT), the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), and the Marlowe-Crowne Social Desirability Scale (SDS). A demographic information sheet was also completed by all the subjects.

This study marked the initial use of the MBHI in assessing fertility patients. The Millon Behavioral Health Inventory is a 150-item true or false assessment instrument constructed and validated to provide a wide range of measures found relevant to psychological assessment and decision making in a variety of medical settings. The MBHI contains 20 subscales (see Appendix C) that include estimates of eight different coping styles or personality scales derived from a theory of personality, six psychogenic attitudes scales developed to reflect psychosocial stressors found in the resource literature to be significant and to have the influence of precipitators or exacerbaters of physical illness, and six scales empirically derived from the MBHI to appraise the extent to which emotional factors complicate particular psychosomatic ailments or to predict psychological complications associated with a number of diseases. Only the eight MBHI coping style scales and the 6 psychogenic attitude scales were analyzed for this study.

The eight MBHI Coping Style scales are Introversive, Inhibited, Cooperative, Sociable, Confident, Forceful, Respectful, and Sensitive. The six Psychogenic Attitudes scales address three major patient characteristics. The first two scales (Chronic Tension and Recent Stress) pertain to relatively objective events which have been experienced as either chronically or recently stressful. The next two scales (Premorbid Pessimism and
Future Despair) relate to attitudes that intensify the subjective impact of past or future stressful events. The final two scales attempt to gauge the status of two significant sources of potential stress, Social Alienation and Somatic Anxiety. The six empirically derived MBHI scales are designed for use with patients diagnosed with specific disease syndromes other than infertility and were excluded from analysis on that basis.

The convergent validity of the MBHI attitude scales has been demonstrated through correlations with the MMPI, SCL-90, Beck Depression Inventory, and the California Personality Inventory. The average test-retest reliability of the Personality Style scales is .82 (Cochran's Alpha coefficient), and the average coefficient for the Psychogenic Attitude scales is .85, indicating adequate temporal consistency for these scales. The combined average Kuder-Richardson Formula 20 (KR20) internal consistency coefficients for the psychogenic scales is .83. Item overlap among the eight personality style scales produces slightly lower estimates of internal consistency. The KR20 coefficients for the personality style scales range from .66 to .90 with an average of .75.

The MBHI provides for correction scores on the basis of the scores on the Sociable and Respectful scales, and the Inhibited and Sensitive scales. This Sociable-Respectful adjustment score provides a measure of the extent to which the patient may engage in socially acceptable responding or impression management associated with psychological defensiveness, which can then be applied to a number of the other scales, thus providing an adjustment of the self-report information and increasing the accuracy of other MBHI scales. The "Inhibited-Sensitive" adjustment increases the
accuracy of other MBHI scales by correcting for a tendency of high scorers on these scales to overreport symptoms and problems (Millon et al., 1979).

Raw scores of the 14 MBHI scales to be analyzed were converted to their BR equivalents, and the appropriate adjustment scores were applied. MBHI corrected BR scores of 75 or above indicate the "presence" of a personality tendency. Corrected BR scores of 85 and above correspond with the estimated prevalence rate for the individual's "most salient" coping style (Millon et al., 1979).

The Health Attribution Test (HAT) was used as an index of patients' attributions of control regarding health-related issues. The HAT is a self-report questionnaire designed to measure respondents' attitudes toward health control, the results of which are intended to be used to aid in health management, health maintenance, or health treatment (Achterberg & Lawlis, 1990). The HAT consists of 22 statements describing causes of ill health, treatment and prevention measures, and the individual's role in those activities. These statements reflect Rotter and Levenson's theories of locus of control and provide individual measures of forces affecting or causing ill health and its treatment. Twenty-one of the items reflect content related to health; the last is a direct reflection of overall control by powerful others. Although the reading level of this instrument is reportedly high, it posed no problems for the subjects in this study. This instrument produces three subscores labeled Internal (which assesses the degree to which people believe they control their physical health), Powerful Others (which measures the degree to which individuals believe doctors, nurses, and other medical professionals are responsible for their health), and Chance (reflecting perceptions of chance and the belief that chance,
fate, or other external, uncontrollable factors affect health). The test-retest reliability correlations for the scales are .83 for the Internal scale, .75 for the Powerful Others scale, and .85 for the Chance scale. Internal consistency coefficients are .82 for the Internal scale, .81 for the Powerful Others scale, and .90 for the Chance scale.

The Beck Depression Inventory (BDI) was utilized to provide a more direct index of depression than either the MBHS Somatic Anxiety or Future Despair scales, with which the BDI correlates .50 and .47, respectively (Millon et al., 1982). The BDI consists of 21 items, or sets of statements, answered on a 0 to 3 scale of severity of depressive problems. Respondents were instructed to consider their feelings in the last week. Each of the 21 items has four sentences, ranging from no complaint to a severe complaint. The first 13 items cover the cognitive-affective subscale (on such topics as pessimism, guilt, self-accusations, crying, and indecisiveness), and the next 8 items form the somatic-performance subscale (on topics such as body image, work and sleep difficulties, and loss of interest in sex). Test-retest reliability correlation for nonpsychiatric patients and nonpatients range from .64 to .90.

The BDI can be answered in 5 to 10 minutes. Total scores of 0 to 9 are within the normal range. Scores of 10 to 18 indicate mild to moderate depression. BDI scores in the 19 to 29 range indicate moderate to severe depression, while scores of 30 and above are indicative of extremely severe depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). These interpretive guidelines were based on the clinical ratings of patients. Over the years the usage of the BDI has expanded from clinical settings to screening operations and research on many non-clinical samples. In clinical populations a
score of 9 or above is indicative of depressive symptomatology, while with normals, scores greater than 15 suggest depression.

The Marlowe-Crowne Social Desirability Scale (MCSDS) is a 33-item, true/false scale designed to measure the test-taker's tendency to respond in socially sanctioned or socially desirable ways (Crowne & Marlowe, 1960). The MCSDS has been shown to have good test-retest reliability (.89) and internal consistency (KR-20 = .88). A strong tendency to give socially desirable responses by infertility patients may indicate an effort on the part of the patients to ensure their inclusion in the treatment program by underreporting symptoms of distress, which the patient may feel makes them appear undesirable or unworthy (Boivin et al., 1995; Boivin & Takefman, 1995). The addition of the MCSDS provided an index of self-report response bias that was lacking in many previous assessment batteries.

Procedures

Subjects were recruited from three fertility clinics in the Dallas/Fort Worth, Texas, metroplex area and from the childbirth education classes provided by the obstetrics unit of one large Dallas hospital. A total of 85 subjects was recruited. Subject confidentiality was maintained by assigning each couple a number and each individual a letter code. This code list was copied and kept by the various clinics and by the researcher so as to facilitate researcher communication with the subjects through clinic office staff. Voluntary subject participation in this study was solicited via a written invitation (see Appendixes D and E) handed out by office personnel in the fertility clinics and instructors of the childbirth education classes. All subjects were advised that the study was being conducted for the
purpose of doctoral research investigating patient adjustment to the treatment of fertility. Subjects were also informed that their participation was strictly voluntary and that their decision would be in no way related to the ongoing status of their treatment. A complete explanation of the nature and extent of the confidentiality extended to study participants was also communicated in written form. Subjects were informed that follow-up inquiries might be made of them by mail. All subjects were also advised of how to obtain access to the overall findings of the study.

Subjects received a packet of materials from fertility clinic personnel or their childbirth education class instructor. Each packet contained instructions for the completion and return of the assessment instruments. Each packet included two MBHI protocols, two BDI protocols, two BAI protocols, two HAT protocols, two MCSDS protocols, and one demographic information sheet, which included questions about age, family income, employment status, years of marriage, parenthood status, and length of time attempting to conceive, as well as the length of time in fertility treatment. The infertility diagnosis and the type of fertility treatment each couple was undergoing were provided by their fertility clinic staff. Assessment packet instructions required all of the assessment instruments to be completed on Days 3-5 after the beginning of the first treatment cycle of injections following receipt of the packet. In advanced infertility treatments such as IVF, Days 3 to 5 of the injection series are equivalent to the midpoint of a natural cycle. Childbirth education control subjects were instructed to complete the assessment instruments as soon as possible after they received the packet.
Group mean differences on the MBHI scale scores and test scores from the BDI, BAI, HAT, and SDS, were determined by a series of t-tests for independent sample means. Comparison of the groups on catagorical data was accomplished by the Mann-Whitney U-Wicoxson Rank Sum nonparametric analysis. Exploratory pair-wise comparisons were made using the Bonferroni ($t_b$) adjustment for multiple comparisons. The relationships among group test score means were analyzed by Pearson product moment correlation matrices. All statistical analysis of the data in the study were conducted on SPSS for Windows, version 6.0.
CHAPTER III

RESULTS

Sample Demographics

The Treatment group was comprised of 22 couples undergoing IVF treatment at one of three area fertility clinics. Each of the 22 couples in the Treatment group was diagnosed with female-factor infertility. The Control group was comprised of 21 couples involved in Childbirth Education Classes offered through the obstetrics department of a large Dallas area hospital. Test packets were completed by all males and females in the Treatment group. In the Control group, test packets were completed by 21 females and 20 males. One couple in the Control group was unmarried. Table 1 contains demographic percentages for the sample.

The average age of males in the Treatment group was 35.0 years, while the average age of females in the Treatment group was 33.9 years. The average ages of males and females in the Control group were 34.4 and 31.3, respectively. Couples in the Treatment group had been married an average 5.08 years, while those in the Control group had been married an average of 4.71 years. One Control group couple was unmarried. Of the 22 women in the Treatment group, 16 (72.7%) had primary infertility, and 6 had secondary infertility. The average length of treatment for couples in the
Treatment group was 1.85 years. Nineteen of the 21 Control group females had no previous biological children.

The Treatment and Control groups did not differ significantly in terms of ethnicity, religion, number of dual income couples, females with previous children, or the number of biological children related to the males or females. A significant mean difference (alpha < .05) between Treatment and Control group subjects was found in terms of annual income ($113,473 and $76,333, respectively). The mean income for the Treatment subjects was adjusted to reduce the effect of one extreme outlier in that group. As a group the Treatment subjects had a higher frequency of couples with children living in their homes (z = -3.66, p < .01). In the Treatment group, 18 men and 18 women were Caucasian, 3 men and 2 women were of Asian descent, 1 man reported Native American ethnicity and 2 females were Hispanic. The Control group was comprised of 19 male and female Caucasians, 1 male and 1 female Hispanic, and 1 male and female Asian. In terms of religious preference, there were 19 male and 15 female Protestants and 2 male and 5 female Catholic subjects in the Treatment group. One male and 2 females in the Treatment group reported their religious preference as Moslem. Among the Control group couples, 18 males and 14 females were Protestant; 1 male and 5 females were Catholic; and 2 males and 2 females reported no religious preference. Fifteen of the couples in the Treatment group reported that both members of the couple were currently working; 5 couples reported that only the man was currently working; and in 1 couple, only the woman was working. Among the Control group couples, 17 reported
that both members of the couple worked, while 4 couples reported that only the male member was currently working.

Table 1

Sample Subjects Demographic Data

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Mean age</th>
<th>Mean years married</th>
<th>Previous biological children</th>
<th>Protestant %</th>
<th>Catholic %</th>
<th>Caucasian % of sample</th>
<th>Dual Income %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment females</td>
<td>33.9</td>
<td>5.08</td>
<td>27.2%</td>
<td>68.2</td>
<td>22.7</td>
<td>81.8</td>
<td>68.2</td>
</tr>
<tr>
<td>Treatment males</td>
<td>35.0</td>
<td>5.08</td>
<td>45.4%</td>
<td>86.3</td>
<td>9.0</td>
<td>81.8</td>
<td>68.2</td>
</tr>
<tr>
<td>Control females</td>
<td>31.3</td>
<td>4.71</td>
<td>9.5%</td>
<td>90.0</td>
<td>5.0</td>
<td>95.0</td>
<td>80.9</td>
</tr>
<tr>
<td>Control males</td>
<td>34.4</td>
<td>4.71</td>
<td>15.0%</td>
<td>66.6</td>
<td>23.8</td>
<td>90.4</td>
<td>80.9</td>
</tr>
</tbody>
</table>

Hypotheses

The first hypothesis predicted that mean Marlowe-Crowne Social Desirability Scale (MCSDS) scores would be higher for the infertility Treatment group than for the childbirth Control group. A t-test for independent sample means was performed with Treatment-Control as the between-groups factor. Treatment group MCSDS scores were significantly higher (t_b(81.78) = 3.39, p < .01). T-tests for independent sample means were also performed independently on MCSDS scores of males and females in the two groups. A significant difference was found between Treatment and Control group females (t_b(39.03) = 2.79, p < .05). Treatment group males' mean MCSDS scores were higher than those of the Control group; however, the difference was not significant (t_b(38.16) =
Therefore, Hypothesis 1 is supported. The results of analysis for Hypothesis 1 are summarized in Table 2.

Table 2

<table>
<thead>
<tr>
<th></th>
<th>Treatment group*</th>
<th>Control group*</th>
<th>df</th>
<th>Significance level</th>
</tr>
</thead>
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<tr>
<td>Group mean</td>
<td>17.09 +/- 4.47</td>
<td>13.85 +/- 4.28</td>
<td>81.78</td>
<td>&lt; .01</td>
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<tr>
<td>Male mean</td>
<td>15.90 +/- 4.53</td>
<td>13.31 +/- 3.35</td>
<td>38.16</td>
<td>&gt; .05</td>
</tr>
<tr>
<td>Female mean</td>
<td>18.27 +/- 4.18</td>
<td>14.33 +/- 5.01</td>
<td>39.03</td>
<td>&lt; .05</td>
</tr>
</tbody>
</table>

*Values are means and standard deviations.

The mean from the MCSDS normative sample is 13.72 (SD = +/- 5.78). Separate norms are not available for men and women. The mean score for Treatment group males was 15.90, while the Control group males had a mean of 13.31. Females in the Treatment group scored an average of 18.27, while Control group females had a mean score of 14.33.

The second hypothesis predicted that MCSDS scores would be higher for males in the Treatment group than for females in the Treatment group. Mean MCSDS scores for Treatment group females were in fact higher (18.27) than the males (15.90). Therefore, Hypothesis 2 is rejected.
Hypothesis 3 predicted that, when controlled for socially desirable responding, the mean Treatment group Beck Depression Scale (BDI) scores will be higher than the obstetric Control group subjects. An ANCOVA was performed on the BDI scores with MCSDS as a covariate and Treatment-Control as the between-groups factor. A significant main effect was found for the between-groups factor ($F(1,81) = 11.357, p = .001$). Therefore, Hypothesis 3 is supported.

Subsequent t-tests for independent sample means verified a significant difference between Treatment and Control group females BDI scores ($t_{39.04} = 3.30, p < .01$). No significant difference was found between Treatment and Control group male BDI scores. The results of hypothesis 5 analysis are summarized in Table 3.

Table 3

<table>
<thead>
<tr>
<th>BDI Means and T-Test Result</th>
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<tr>
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<tr>
<td>Treatment group*</td>
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<tr>
<td>Control group*</td>
</tr>
<tr>
<td>Two-tailed significance</td>
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<tr>
<td>Male means</td>
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<td>4.50 +/- 4.02</td>
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<tr>
<td>2.78 +/- 2.22</td>
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<td>&gt;.05</td>
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<tr>
<td>Female means</td>
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<tr>
<td>9.45 +/- 5.05</td>
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<td>4.95 +/- 3.82</td>
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<td>&lt;.01</td>
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<tr>
<td>Group means</td>
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<tr>
<td>6.97 +/- 5.16</td>
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<tr>
<td>3.92 +/- 3.31</td>
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<tr>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Note: The Bonferroni adjustment for multiple comparisons was applied to all t-values. *Values are means with standard deviations.
Post Hoc Analysis

In order to further examine the data pertaining to Hypothesis 3, the group differences in BDI scores were analyzed without the use of the MCSDS score as a covariate. A t-test for independent sample means on group mean BDI scores was found to yield a comparably significant result \( t_{74.08} = 3.25, p < .05 \). The MCSDS covariate produced negligible improvement in the main effects size.

To examine the effects that previous motherhood may have had on the scores of Treatment group females, previous childbirth was used as the between-groups factor and sample means were analyzed by t-tests using the Bonferroni adjustment. No significant differences were found between the groups (females with or without biological offspring) on the basis of their BDI, MCSDS, BAI, HAT, or MBHI Sensitive scale scores.

The effect of Treatment group female subjects' religion on their depression scores was examined. A Mann-Whitney U-Wilcoxon Rank Sums analysis for categorical data, with religious preferences as categories, was performed among Treatment group females with BDI scores of 9 or above. The analysis found no significant effect for religion.

To facilitate exploration of the remaining data, t-tests of independent sample means, using the Bonferroni adjustment for multiple comparisons, were performed on all group mean MBHI scale scores. No significant differences between-groups were found.

To explore gender differences within the Treatment groups, t-tests for independent sample means of all MBHI scales were performed on the Treatment group subjects with sex as the between-groups factor. This analysis yielded no significant
difference for males and females in the Treatment group on the basis of their MBHI scale scores. An identical analysis was carried out for subjects in the Control group. No significant gender differences on MBHI scale scores were found for subjects in the Control group.

Exploration of the effects of gender on scores between the Treatment and Control groups was accomplished by ANOVA with Treatment-Control and sex as between-group factors. This analysis found no significant MBHI scale score differences between gender subgroups. One indication of the comparability of the infertile and pregnant women did emerge. MBHI Recent Stress scores were virtually identical for women in the Treatment and Control groups (41.63 and 41.33, respectively).

In accessing the general utility and sensitivity of the MBHI for use with the populations tested in this study, the frequencies of Psychogenic Attitude scale elevations above the 75 ("presence" of psychogenic scale attribute) and 85 ("prominence" of scale attribute) BR score level were tabulated. The Psychogenic Attitude scales include Chronic Tension, Recent Stress, Premorbid Pessimism, Future Despair, Social Alienation, and Somatic Anxiety.

Among Treatment group females, 8 (36.36%) had at least one Psychogenic Attitude scale elevation at or above the 75-point level, compared with 3 (14.3%) among females in the Control group. Three (13.6%) of the Treatment group females had a Psychogenic Attitude scale score at or above the 85-point level. No scale scores among females in the Control group reached the 85-point mark.
For male subjects in the Treatment group, 31.3% had at least one Psychogenic scale score at or above the 75-point level. Forty percent of Control group males had one scale score at or above the 75-point level. The 85 or above single scale score elevation occurred in 22.7% of the Treatment group males and in 15.0% of the males in the Control group.

Male and female score correlations within all four gender subgroups, on all assessment instruments, were computed to investigate the interrelationships of the assessment measures. Pearson product moment correlations (r) were computed across all test variables within groups. Among Treatment group females, the BDI scores and the Health Attribution Test (HAT) Powerful Others score were found to be significantly correlated (r = .54, p < .01). The Treatment group females BDI scores were also significantly correlated with scores on a number of MBHI Coping Style scales, and Psychogenic Attitude scales (see Table 4).

The BDI scores for the male Treatment group members also correlated significantly with a number of the MBHI scales. Significant correlations between the various assessment measures were far less prevalent among Control group subjects. The gender subgroup score correlations among all assessment measures are summarized in Tables 4 to 7.

Among Treatment group females, BDI and HAT Powerful Others scores were significantly correlated (r = .54, p < .01). The BDI scores of Control group women were relatively unrelated to HAT Powerful Others scores (r = .08, p = .731). Upon finding a
significant correlation between females BDI and Powerful Others scores only for the Treatment group, the utility of using Powerful Others scores as a covariate to improve between group variance was addressed.

To explore the influence of locus of control (Powerful Others) on female BDI scores between groups, an Analysis of Covariance (ANCOVA) was performed on the females BDI scores, with Treatment-Control as the between-groups factor and with the HAT Powerful Others score entered as a covariant. This analysis yielded an F-statistic, which was marginally less significant than that derived from the previous t-test for independent sample means performed on BDI Treatment women scores.

Among Control group women, BDI scores correlated significantly with only one other test variable score (MBHI Recent Stress, \( r = .49, p < .05 \)). Among Control group males, BDI scores also correlated significantly with one test variable score (MBHI Confident, \( r = -.62, p < .01 \)). For Control group males significant correlations were found between HAT Powerful Others scale scores and MBHI Respectful (\( r = -.53, p < .05 \)) and Chronic Tension (\( r = -.55, p < .05 \)) scale scores. Among Control group females, significant correlations were found only for HAT Chance scores, which correlated to MBHI Recent Stress (\( r = .47, p = .05 \)), Premorbid Pessimism (\( r = .46, p < .05 \)), and Somatic Anxiety (\( r = .50, p < .05 \)). No significant correlations were found between the BAI scores of Control group men or women and any other test measure.
Table 4

Significant Test Score Correlations for Treatment Group Females

<table>
<thead>
<tr>
<th>Instruments</th>
<th>BDI</th>
<th>BAI</th>
<th>MCSDS</th>
<th>HAT-In</th>
<th>HAT-Po</th>
<th>HAT-Ch</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDS</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HAT-Internal</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>HAT-Powerful Others</td>
<td>.54*</td>
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<tr>
<td>HAT-Chance</td>
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</tr>
<tr>
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<td></td>
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<td>Inhibited</td>
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<td></td>
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<tr>
<td>Recent Stress</td>
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<td>Premorbid Pessimism</td>
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<td>.66*</td>
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<tr>
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</table>

Note. Significance levels for Pearson product moment correlations are $p < .05$ and $p < .01$. Correlations with significance $p < .01$ are noted by an asterisk. Nonsignificant correlations ($p > .05$) are omitted.
Table 5

**Significant Test Score Correlations for Treatment Group Males**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>BDI</th>
<th>BAI</th>
<th>MCSDS</th>
<th>HAT-In</th>
<th>HAT-Po</th>
<th>HAT-Ch</th>
</tr>
</thead>
<tbody>
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<td>HAT-Powerful Others</td>
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</tbody>
</table>

**Note.** Significance levels for Pearson product moment correlations are $p < .05$ and $p < .01$. Correlations with significance $p < .01$ are noted by an asterisk. Nonsignificant correlations ($p > .05$) are omitted.
Table 6

**Significant Test Score Correlations for Control Group Females**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>BDI</th>
<th>BAI</th>
<th>MCSDS</th>
<th>HAT-In</th>
<th>HAT-Po</th>
<th>HAT-Ch</th>
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**Note.** Significance levels for Pearson product moment correlations are $p < .05$ and $p < .01$. Correlations with significance $p < .01$ are noted by an asterisk. Nonsignificant correlations ($p > .05$) are omitted.
### Table 7

**Significant Test Score Correlations for Control Group Males**

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<tr>
<th>Instruments</th>
<th>BDI</th>
<th>BAI</th>
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</table>

**Note.** Significance levels for Pearson product moment correlations are $p < .05$ and $p < .01$. Correlations with significance $p < .01$ are noted by an asterisk. Nonsignificant correlations ($p > .05$) are omitted.
The Internal, Powerful Others, and Chance scores on the Health Attribution Test are combined to form a health attribution profile, which is interpretable as an indication of the individual's locus of control. Twelve of the Treatment group females (54.5%) were found to have the "Average Joe" profile, which indicates a balanced set of attributions or beliefs about personal control regarding health. Five of the women (22.7%) had either the "High Internal," or "Super High Internal" profiles. Individuals with these profiles tend to be self-sufficient and assume a high degree of responsibility for their own health. Profiles that indicate a high internal locus of control may also reflect a socially desirable response pattern (Achterberg & Lawlis, 1990). A significant difference ($t_{9.6} = 3.03, p < .05$) was found between the "Average Joe" group and the "High-Super High Internal" group on the basis of their mean MBHI Chronic Tension scale scores. The average Chronic Tension score for the "High-Super High Internal" group was 75.6, suggesting the presence of a stable psychogenic attitude, which may predispose these females to psychosomatic and physical problems particularly in their cardiovascular and digestive systems (Millon et al., 1982). The mean score for Treatment females with the "Average Joe" profile was 41.0.

In order to explore the relationship between overall health attributions and increased depressive symptomatology, a subgroup of Treatment group females was analyzed. Women in the Treatment group with BDI scores greater than or equal to 9 were compared as to their health attribution profile by means of a frequency computation. The results of that analysis indicate that 6 (42.9%) had an "Average Joe" profile. Four of the women (28.6%) had a "High Internal" or "Super High Internal" profile suggestive of
individuals who may believe that only they know how to treat their own body and/or individuals demonstrating a socially desirable response pattern. The full results of this analysis are summarized in Table 8. Additionally, of the 14 Treatment group women with BDI scores greater than or equal to 9, 3 (21.4%) were found to have Powerful Others scale scores, which indicated a strong external of locus of control.

Table 8

**Health Attribution Test Scores and Profiles for Treatment Group Females**

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<th>Chance</th>
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(table continues)
### Cases Internal Powerful Others Chance HAT Profile Code

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<td>3</td>
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<td>Low I</td>
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**Note.** Profile codes indications: Super High I: Highly self-sufficient or socially desirable response pattern; High I: Assumes responsibility for their health; Low I: Lacking in self-esteem and assertiveness; P: Psychologically dependent, and uncertain, but compliant.; IPC: Hoping that help will come from a number of sources, anxious; Average Joe: A balanced set of beliefs. Able to both help themselves and trust others.
CHAPTER IV

SUMMARY AND DISCUSSION

There were four goals for the accomplishment of this study. The first goal involved testing directional hypotheses regarding Treatment and Control group differences on measures of depression and socially desirable responding. The second goal was to provide a descriptive analysis of the subjects in infertility treatment with standardized instruments (BDI, BAI, HAT, MBHI, MCSDS), which would address depression, anxiety, control, coping and socially desirable response bias, administered by a strategy that accounted for the possibility of mood changes accompanying hormone therapy for women, and thereby provide a meaningful comparison of their scores with a control group. The third goal was to investigate the utility of the MBHI, BDI, BAI, HAT, and the MCSDS as assessment instruments with the infertile population. This was accomplished by comparison of infertile couples' test scores with those of a control group to evaluate the discriminatory sensitivity of the individual instruments as well as through the intercorrelations of the scores among the various test measures. The final goal of this study was to offer suggestions for a psychological assessment battery to be used with couples in infertile treatment.

Review of the infertility research literature suggests that depression, coping styles, and control issues were of particular importance in the assessment of subjects in
infertility treatment. Anxiety and impression management, through the adoption of a socially desirable response bias, was determined by the author to be an additionally important area for assessment. These ideas provided the basis for selection of the measures in this study. The following discussion addresses the timing of the assessment, the demographic comparability of the groups, hypotheses and descriptive analysis, utility of the measures in the battery, and suggestions for the assessment of infertility patients.

In order to standardize the administration of the measures and to reduce the confounding effects of medication-related mood changes, special instructions for test completion were employed. Test packet instructions for the timing of test completion were received by all subjects. All female members of the Treatment group were involved in IVF treatment and subject to injection series during the course of data collection. Treatment group females and their husbands were instructed to complete questionnaires on Day 3, 4, or 5 of the woman's injection cycle. This time frame corresponds to the mid-point of a natural cycle. Determination of this timing strategy for administration was arrived at after interviews with infertility clinic staff revealed a consensus that, based on clinic observations, the 3rd to 5th day of the injection cycle was the period of time at which their female patients appeared most even-tempered and emotionally stable. Restricting the timing of the assessment to this period provided an additional source of standardization to the assessment procedure and a safeguard against the transient confounding effects on the data of hormone-induced mood changes in female subjects. A weakness in the application of this methodology was that the injection cycle time-tables of individual female Treatment group subjects were not obtained and so could not be used to
cross-check dates on the completed test instruments as a means of validating compliance with the test packet instructions. Essentially, this sampling strategy is designed to collect data from Treatment group females when they are "at their best" and should be viewed as a representation of their highest level of functioning while in treatment. Couples in the Control group were allowed to complete the test materials at their earliest convenience after receiving the assessment packet; however, both members of the couple were instructed to complete the assessment instruments on the same day.

Treatment and Control groups were comparable on most demographic variables. In terms of religious preference, ethnicity, years of marriage, education, age, frequency of dual incomes, and overall health, no significant differences were found. A significant mean difference (alpha < .05) between Treatment and Control group subjects was found in terms of income ($113,473 and $76,333, respectively). The difference in group mean income is a possible confounding factor in this study. Each couple received a small monetary compensation ($20 per couple) for participation in the study; however, it is unlikely that this small compensation significantly influenced the sampling procedure with this group of subjects. More Treatment group members had previous biological children (45% of the males and 27% of the females) than the Control group members (15% and 9.5%, respectively). Nine of the Treatment group couples had a child living in their homes, while a child resided in the home of only one Control group couple. MBHI Recent Stress mean scores for females in the Treatment and Control groups, 41.63 and 41.33, respectively, suggest that all female subjects appeared to be experiencing similar levels of subjective stress.
The hypotheses in this study predicted that indications of depression and socially desirable responding would be more prevalent among the infertility patients. Hypotheses also predicted that Treatment group males would exhibit the highest rates of socially desirable responding and that reports of depression when controlled for socially desirable response sets would be different in the two groups.

Treatment group male and female subjects social desirability scores were significantly high than those of Control group subjects. This finding supports the early work of O'Moore et al. (1983), which suggested that infertile patients respond in more social desirable ways compared to controls. This finding also lends support to the recent findings of Boivin et al. (1995) which found high MCSDS scores for IVF patients. The mean MCSDS scores reported by Boivin were slightly higher than those found for Treatment group females in this study. Boivin et al. (1995) found a trend for MCSDS scores to increase with length of treatment. The subjects in that study had been undergoing infertility treatment for over twice as long on average as the subjects in this study, which may explain the difference in MCSDS mean scores, as well as the absence of a treatment-length-related trend in this study.

The expected relationship between MCSDS scores and depression scores was not found in this study. Socially desirable responding was practiced to a greater degree by females in the Treatment group than in any other gender subgroup in the study. Higher depression scores for Treatment group females may reflect a sense of loss or a sense of helplessness in attaining a highly valued gender identity role, as suggested by the work of Newton et al. (1992). All Treatment group females were diagnosed with female-factor
infertility, and 72.9% had primary infertility, while 45.4% of Treatment group males had previous biological children. Higher MCSDS scores for Treatment group females may, therefore, be interpreted as an overcompensation for the unfulfilled gender identity role of "pregnant female." Males, having no such interim social role between that of husband and father, may experience no loss (or deficit) of gender identity. It is also interesting to note that both Treatment and Control group females in this study are diagnosed with medical conditions (not diseases) which are inherent to the attainment of, or preclusion from, a highly valued social role. The Control group females in this sample have assumed a new social role, and Control group males can be considered to be preparing for an impending role change.

The Marlowe-Crowne Social Desirability Scale (MCSDS) scores did not correlate significantly with the Beck Anxiety Index (BAI) scores or the BDI scores for either the men or women in the Treatment group. The MCSDS covariate produced negligible improvement in the main-effects size and appears unnecessary in discriminating the groups on the basis of BDI scores. MCSDS scores correlated significantly with MBHI Coping Style scales in only one gender subgroup. Treatment group males' MCSDS mean scores were correlated positively with scores on the Sociable and Confident scales and negatively with the Inhibited and Sensitive scale scores. This socially desirable presentation may reflect a tendency to employ impression management as a method of coping in a low-control situation.

Only one gender subgroup, infertile females, reported a significant degree of depression-related symptoms. The treatment group mean BDI score for females was 9.45.
The Mean BDI mean scores for males in the Treatment group (4.5), as well as Control group males (2.7) and females (4.95), indicate minimal depressive symptomatology. One of the MBHI Coping Style scales was found to discriminate between levels of depressive symptomatology in the Treatment group females. Those subjects with MBHI Sensitive scale scores greater than or equal to 75 also had six of the seven highest BDI scores, ranging from 11 to 22. One Treatment group female, with a BDI score of 13, did not score above 75 on the MBHI Sensitive scale; however, this subject did have an MBHI Inhibited scale score of 81, which is indicative of repressive coping. The relatedness of high MBHI Sensitive scale scores and high BDI scores for Treatment group females suggests a relationship between depression and a sensitive or emotion-focused coping style, which may be useful in signifying a risk factor for these women. Those with high scores on the MBHI Sensitive scale are characterized as unpredictable and moody, erratic in following a treatment plan, dissatisfied with their physical and psychological state, and prone to expressions of guilt (Millon et al., 1979).

Based on the BAI mean scores, no group or gender subgroup reported experiencing significant anxiety. This finding may be considered questionable when considered along with the previous findings of Mazure et al. (1988), which suggest that high social desirability is related to a repressive coping style that can serve to suppress reports of anxiety. In this study, MCSDS and BAI mean scores were shown to be largely unrelated, although weak negative correlations were found. Additionally, there were no significant differences in BAI mean scores between groups or between genders in either group. However, the BAI score correlations with some of the other measures were
noteworthy. The BAI and BDI scores were highly correlated in two gender subgroups: Treatment group males and Control group females ($r = .76$, $p < .01$; and $r = .70$, $p < .01$ respectively). By comparison, the BAI and BDI scores of Control group males as well as those of Treatment females were relatively unrelated ($r = .11$, $p = .63$; and $r = .32$, $p = .14$, respectively). Significant correlations of BAI and the BDI scores are to be expected (Beck & Steer, 1993). However, both Treatment group females and Control group males appear to separate the subjective experience of depression and anxiety to a much greater degree than do females in the Control group or males in the Treatment group.

Considering that only the Treatment females reported significant depression and anxiety, this finding suggests a more acute discriminating awareness of depression and anxiety among females in the Treatment group.

In terms of the relationship of BAI and MBHI scale scores, significant correlations were found only for Treatment group subjects. The males' BDI scores were related to the more passive coping styles indicated by the MBHI Inhibited and Sensitive scales. Females' BAI scores were significantly correlated with none of the MBHI coping style scales. Not surprisingly, females' BAI (and BDI) scores correlated highly with the MBHI Psychogenic attitude scales of Premorbid Pessimism and Future Despair, as well as Social Alienation (BAI only) and Somatic Anxiety (BDI only). High BAI and BDI score correlations with MBHI scales for the male subjects were somewhat inflated by the restricted range of their BAI and BDI scores.

The MBHI scale scores did not prove to be particularly useful in discriminating the two subject groups. When broken into gender subgroups, Treatment group females had
significantly higher MBHI Respectful scale scores than did their Control group counterparts. Additionally, Treatment group female subjects had more overall MBHI scale elevations than the other gender subgroups. In terms of revealing differences between the genders within groups, the utility of the MBHI scale scores was limited. In the Control group a significant difference was found between lower male and higher female mean score on the Introversive scale. There were no significant MBHI score differences for gender among the Treatment group.

Although there were no significant group or gender subgroup differences associated with the three scores obtained from the HAT, the issue of control did appear more salient to one gender subgroup. Among Treatment group females the Powerful Others score (an index of external locus of control) was highly correlated with measures of depression, passive coping styles, low self confidence, negative world view, insufficient social support, and fear concerning bodily functions (see Table 4). HAT Powerful Others scores were not significantly correlated to any assessment measure among Control group females or Treatment group males (see Tables 5-7). Among Control group males there was a negative correlation between Powerful Others scores and the MBHI Respectful and Chronic Tension scales.

Campbell et al. (1991) suggested that depression is most closely related to loss of situational, as opposed to global, control. All of the experiences underlying assessment measures correlated with Treatment group females Powerful Others scores are potentially influenced by the experience of infertility treatment and can be interpreted as impacting situational control. For Treatment group females the issue of control appears to
be uniquely important, and it may serve as an underlying influence on their emotional state, coping, and attributions of health. To the extent that such an influence is related to situational factors, it lends itself to therapeutic intervention through the development of coping techniques which are empowering to the client.

Whether one appraises a situation as threatening or challenging depends on how one appraises one's own ability to cope with the perceived situation. Although feelings of threat and challenge can be experienced simultaneously (Folkman & Lazarus, 1985), threat appraisals are generally associated with negative emotions, and challenge appraisals are generally associated with positive ones. Campbell et al. (1991) suggested that a lack of behavioral (as opposed to cognitive) coping strategies is closely associated with distress in women undergoing fertility treatment. Domar et al. (1990) found that participation in a 10-week Mind-Body program resulted in improved reports of well-being in female infertility patients. The findings of this study, together with those just mentioned, strongly suggest that psychological interventions which teach behavioral techniques of coping (such as relaxation and assertiveness training), as well as those which provide opportunity for social contact (such as support groups), positively impact the infertility patient's sense of situational control and thereby provide a mediating influence to the situational stress of treatment.

Conclusions

Significant group differences were found between infertile couples and childbirth education class controls on measures of depression and socially desirable responding. Although socially desirable responding was a distinguishing characteristic of the Treatment
group, the social desirability scores were found to be generally unrelated to other measures within that group, which were negative indicators of well-being. In terms of the infertility Treatment couples, social desirability may be best interpreted as a form of coping which serves a protective function with respect to the preservation of the individual's self-esteem. The presence of such a coping style, along with elevated depression scores, may indicate a failed coping strategy. The lack of significant MCSDS score correlations with other measures (e.g. BDI, BAI, MBHI Recent Stress, and Somatic Anxiety scales) among Treatment group females is interesting. It should be noted that Treatment group female MCSDS score correlations did approach significance with HAT Chance and Powerful Others scales (negative correlations), and MBHI Confident Coping Style scale (positive correlation). There may be a nonlinear relationship between the use of social desirability as a coping mechanism and negative indices of well-being.

Infertile females reported signs of depression far more prevalently than either their spouses or the Control group subjects. The factors that were found to be associated with the signs of depression in infertile females were emotion-focused coping styles and an external locus of control.

The findings of this study indicate a higher prevalence of depressive symptomatology in females undergoing IVF than is reported in much of the literature. This finding suggests that psychological support during the fertility treatment process may indeed be necessary for many patients. The fact that spouses of infertile females in this study appeared to experience far less distress is a result predicted by previous studies (e.g., Freeman et al., 1985). The ability of the male to recognize the emotional needs of
females during the course of fertility treatment may determine the degree of marital
strain the couple experiences. Again, professional intervention in the form of supportive
counseling and education about the emotional process of the infertility experience would
likely be of benefit to couples in fertility treatment.

The utility of the MBHI appears to be limited in terms of this patient population. Although a number of fertility patients had a single significant elevation on one of the
MBHI scales, these high scores tended to be correlated very highly with the subjects' BDI
scores. The MBHI provided interesting information, but little that appeared independent
of that provided by the BDI. The MBHI correction scores derived from the Sociable and
Respectful Coping Style scales may not be adequate to account for a socially desirable
response bias in more sophisticated patients.

The results of this study suggest that an assessment approach including measures
of depression, emotion-focused coping, and locus of control would be of value in
understanding the patients' experience of treatment and the risk factors likely to be
associated with poor post-treatment psychological adjustment. These assessment tools
together with a semistructured interview addressing the couples' available social support,
psychiatric history, and level of marital distress would provide the basis on which to
identify the subgroup of infertility patients who can benefit from psychological support
and intervention.

The Beck Depression Inventory appears to be valuable in the assessment of
depression in this population. Repeated administrations of the BDI before, during, and
after the infertility treatment program would appear to be valuable in examining patients'
psychological adjustment process. A measure of coping behaviors such as the Ways of Coping Questionnaire, despite its lack of norms, may provide a useful means of identifying emotion-focused coping in infertility patients. The Health Attribution Test has proven to be useful in identifying health-related control attributions in females undergoing infertility treatment. Use of the HAT with the addition of a brief measure of the subjects' control attributions specifically regarding their fertility treatment success may be preferable with this population, because this assessment strategy would provide a more direct measure of the loss of situational control. Inclusion of a relatively objective index of stress, such as the Social Readjustment Rating Scale (Holmes & Rahe, 1967), may also be useful to clinicians involved in the assessment of fertility treatment patients.

The inclusion of professional psychological support as a standard element of the treatment protocols of fertility clinics, along with the development of reliable and valid coping and control measures (by repeated-measures follow-up throughout the treatment and outcome-adjustment process) is essential to the improvement of treatment of the infertile population. Psychological assessment of depressive symptoms and locus of control concerning their infertility and its treatment, as well as interventions that encourage the development of behavioral coping strategies and/or provide a venue for the application of such strategies, could be of particular value to these couples.
APPENDIX A

ASSISTED REPRODUCTIVE TECHNOLOGIES
Assisted Reproduction Technologies

1) Gametocyte Intrafallopian Transfer (GIFT) involves the retrieval of the woman's own oocytes, combining them with the husband's sperm in vitro and immediate placement of this preparation into the woman's fallopian tube.

2) Zygotocyte Intrafallopian Transfer (ZIFT) involves the same procedure as GIFT except that the oocytes and sperm are combined in vitro for 24 hours.

3) In Vitro Fertilization (IVF) involves a 48-hour combination of oocytes and sperm to allow for complete fertilization to occur followed by introduction of a zygote into the woman's uterus.

4) Therapeutic Donor Insemination (TDI) involves combination of donated sperm with an oocyte in the woman's fallopian tube.

5) Direct Egg Sperm Injection (DESI) is a process by which low-count, or non-vigorous, insufficiently motile sperm can be collected and injected directly into an ovum in vitro, thus greatly increasing the probability of fertilization in cases of male-factor infertility.
APPENDIX B

OBSERVED PSYCHOLOGICAL EFFECTS OF INFERTILITY
Observed Psychological Effects of Infertility

A. Emotional Effects

1. Grieving/Depression
2. Anger/Frustration
3. Guilt
4. Shock/Denial
5. Anxiety

B. Loss of Control

1. Loss of control over activities, body, and emotions
2. Inability to predict and plan future according to life goals

C. Effects on Self-esteem, Identity, Beliefs

1. Loss of self-esteem, feelings of inadequacy
2. Identity problems or shifts
3. Changes in world views

D. Social Effects

1. Effects on Marital Interactions and Satisfaction (positive and negative)
2. Effects on Sexual Functioning
3. Difficult Social Network Interactions, changes in relationships with network members, loneliness, embarrassment.

Note. The listing of reactions in Table 1 reflect their prevalence as observed in clinical settings according to a review of empirical and descriptive infertility research literature conducted by Dunkel-Schetter and Lobel and published in 1991. For example, grief and depression are the most frequently cited emotional responses, reported in 77% of articles in the descriptive literature, whereas anxiety reported in 40% of the articles, is mentioned least often.
APPENDIX C

MBHI SUBSCALES
Basic Coping Styles (Scales 1 - 8)

Scale 1 - Introversive Style: High scorers are rather colorless and emotionally flat tending to be quiet and untalkative. Healthcare professionals should give clear directions and not expect these patients to take the initiative in following a treatment plan.

Scale 2 - Inhibited Style: High scorers tend to be hesitant with others and are often shy and ill at ease. However, they do seek understanding and attention; with a sympathetic attitude, one should be able to get them to cooperate.

Scale 3 - Cooperative Style: High scorers tend to be eager to attach themselves to a supportive professional and will follow advice closely. These patients become very dependent and may resist when suggestions are made for referral to other doctors or clinic.

Scale 4 - Sociable Style: High scorers tend to be outgoing, talkative, and charming. However, dependability is likely to be low.

Scale 5 - Confidence Style: High scorers act in a calm and confident manner. If these patients are impressed with the critical importance on their health of following the medical regimen, they will do so carefully.

Scale 6 - Forceful Style: High scorers tend to be somewhat domineering and tough-minded. It will be necessary for the team to work hard to get these patients to follow the prescribed treatment course.

Scale 7 - Respectful Style: High scorers are likely to be responsible, conforming, and cooperative. They do not like being sick since it signifies weakness and inefficiency.

Scale 8 - Sensitive Style: High scorers tend to be unpredictable and moody. Rapport may be on some days but may be difficult on others.

Psychogenic Attitude Scales (Scales A - F)

Scale A - Chronic tension: High scorers on this scale are disposed to suffer various psychosomatic and physical ailments notably in the cardiovascular and digestive system. Where feasible, the thought of reducing tensions and slowing down the rapid pace of life these patients pursue should be discussed.

Scale B - Recent Stress: High scorers on this scale have an increased susceptibility to serious illness for the year following test administration. Regular and frequent contact
with medical personnel would be advisable during this period so as to anticipate and avert the possibility of serious illness.

Scale C - Premorbid Pessimism: High scorers on this scale are disposed to interpret life as a series of troubles and misfortunes and are likely to intensify the discomforts that they experience with real physical and psychological difficulties.

Scale D - Future Despair: High scorers do not look forward to a productive future life and view medical difficulties as seriously distressing and potentially life-threatening.

Scale E - Social Alienation: High scorers are prone to physical and psychological ailments and a poor adjustment to hospitalization is common.

Scale F - Somatic Anxiety: High scorers tend to be hypochondriacal and susceptible to various minor illnesses. They experience an abnormal amount of fear concerning bodily functions and are likely to overreact to the discomfort of surgery and hospitalization.
APPENDIX D

TREATMENT GROUP DISCLOSURE LETTER
Treatment Group Disclosure Letter

Study: The Psychological Impact of Fertility Treatment

Purpose
You are being asked to participate in an investigation of the psychological aspects of fertility treatment. This study is strictly for research purposes only, to further our understanding of how individuals and couples experience the process of fertility treatment.

What you will be asked to do if you participate in this study
You will be asked to fill out a group of four questionnaires. The questionnaires ask for information on coping, health, emotional state, and relationships with others. The time needed to fill out the group of four questionnaires is approximately 1 hour.

Possible risks & discomforts
Participating in this study poses no physical or psychological risk to you.

Potential benefits
You may gain helpful insight into your experience of fertility treatment by completing the questionnaires. Otherwise there is no immediate, direct benefit to you from the study, however, the study will contribute to our knowledge of how fertility treatment is experienced by couples undergoing it. This type of knowledge may be used to improve the ways in which fertility treatment programs are administered in the future.

Confidentiality
Any information that is obtained in this study will be recorded with a code number, rather than your name, as an assurance of confidentiality.

Voluntary participation
You are free to discontinue participation in this study at any time without negative consequences.

Further information
If you have any questions or concerns connected with your participation in this study, you should contact the principal investigator, Kenneth A. McKenna, at (214) 436-4104, or the office of Dr. Eugenia Bodenhamer-Davis at the University of North Texas (817) 565-2488.
APPENDIX E

CONTROL GROUP DISCLOSURE LETTER
Control Group Disclosure Letter

Study: The Psychological Impact of Fertility Treatment

Purpose
You are being asked to participate, as a member of a control or comparison group, in an investigation of the psychological aspects of fertility treatment. This study is strictly for research purposes only, to further our understanding of how individuals and couples experience the process of fertility treatment.

What you will be asked to do if you participate in this study
You will be asked to fill out a group of four questionnaires. The questionnaires ask for information on coping, health, emotional state, and relationships with others. The total time needed to fill out the group of four questionnaires is approximately 1 hour. You will also have the opportunity to indicate whether you would be available for follow-up research upon the completion of your treatment.

Possible risks & discomforts
Participating in this study poses no physical or psychological risk to you.

Potential benefits
You may gain some insight into yourself by completing the questionnaires. Otherwise there is no direct benefit to you from the study, but the study will contribute to our knowledge of how fertility treatment is experienced by couples undergoing it. This type of knowledge may be used to improve the ways in which fertility treatment programs are administered in the future.

Confidentiality
Any information that is obtained in this study will be recorded with a code number, rather than your name, as an assurance of confidentiality.

Voluntary participation
You are free to discontinue participation in this study at any time without negative consequences.

Further information
If you have any questions or concerns connected with your participation in this study, you should contact the principal investigator, Kenneth A. McKenna, at (214) 436-4104, or the office of Dr. Eugenia Bodenhamer-Davis at the University of North Texas (817) 565-2488.
APPENDIX F

SUBJECT DEMOGRAPHIC INFORMATION FORM
Subject Demographic Information Form

Code #  F A22   M A22   Age F ____ M____

1. Number of Years Married______

2. Length of time in infertility treatment (include all kinds)________

3. Members of the Couple who are working (circle):  Wife  Husband

4. Education   Wife___________ Husband____________

5. Combined Annual Income:____________

6. Have either of you had any children previously? (yes or no)______

(If you answered #6 "no", then go on to question #10)

7. Number of biological children related to Wife______ Husband______

8. Number of Adopted Children Wife______ Husband______

9. Number of children living at your home now______

10. Religious Affiliation (circle one)
     Wife - Protestant Catholic Jewish Other__________________
     Husband - Protestant Catholic Jewish Other______________

11. Ethnic background (circle one)
     Wife - White Black Hispanic Asian Native American
     Husband - White Black Hispanic Asian Native American

12. Does your insurance cover any of the costs of your infertility treatment?
     (circle one)  <10%  >10%  25%  >50%  >75%

13. Are either of you currently being treated by a psychiatrist, psychologist or
counselor outside of the infertility treatment clinic? (yes or no)
     Wife______ Husband______

14. Are you being treated for any of the following: (check if yes)
     Wife  Husband
     Allergies   ________   ________
     Anxiety    ________   ________
<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Asthma</td>
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<tr>
<td>Back Pain</td>
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<td>Depression</td>
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<td>Diabetes</td>
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<td>Drug or Alcohol problems</td>
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<td>Fatigue</td>
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<td>Headaches</td>
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<td>Heart problems</td>
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<td>Insomnia</td>
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<td>Stomach problems</td>
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<tr>
<td>Skin Problems</td>
<td></td>
<td></td>
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<tr>
<td>Thyroid condition</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Are you taking any of the following medications:  

antidepressants: Yes No

sleep aids: __________

16. How would you describe your overall health in the past year (circle one):

Wife - Excellent Very Good Good Fair Poor Very Poor

Husband - Excellent Very Good Good Fair Poor Very Poor


