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Perceived Control and Adjustment to Infertility among Women Undergoing *In Vitro* Fertilization

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Infertility is, by definition, a loss of control over one's reproductive ability. Yet very little systematic empirical research has examined how the objective facts of infertility translate into subjective experiences of personal control. On the one hand, infertile individuals are poignantly aware of their inability to control reproduction, and this perceived lack of control might increase the psychological distress of infertility. On the other hand/ infertile individuals may differ widely in how they interpret their unsuccessful efforts to conceive. Some may emphasize the available options for enhancing the probability of becoming pregnant, rather than focusing on their past failure to conceive. Particularly for those who persist in efforts to conceive, the belief that personal efforts make a difference may be essential.

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Anecdotal evidence has identified feelings of loss of control as common among involuntarily childless individuals (Mahlstedt, 1985; McCormick, 1980; Matthews & Matthews, 1986; Menning, 1977; Sandelowski & Jones, 1986; Seibel & Taymor, 1982). Valentine (1986), for example, interviewed infertile couples and found that one of the many losses they reported was loss of control over their bodies. Because adults of reproductive age are part of a generation that is unique in its ability to avoid unwanted pregnancy, the inability to control getting pregnant may be all the more distressing for today's infertile couples (McCormick, 1980; Valentine, 1986).

Platt, Ficher, and Silver (1973) also found that infertile individuals experience a loss of control. Infertile couples were compared to couples who had no difficulty conceiving, and the infertile people were more likely to perceive themselves as controlled by external forces, as assessed by Rotter's (1966) I-E Locus of Control Scale. The researchers suggested that experiences with the loss of control inherent in infertility may have altered these individuals' perceptions of the amount of control they have in their lives in general (see also Paulson, Haarmann, Salerno, & Asmar, 1988).

Treatments for infertility typically involve a significant loss of control. Diagnostic procedures and treatments for infertility are generally invasive, technically complicated, and difficult for even an educated layperson to understand. Details of a couple's sexual relationship are recorded and prescriptions for changes in the frequency and timing of intercourse are common. Such procedures can threaten the couple's sense of control over their sexual relationship and the privacy it is usually accorded (Matthews & Matthews, 1986). The stress of treatment can be compounded if the physician does not inform or involve the couple in decision-making. These are just a few of the ways in which medical treatments may substantially erode an infertile couple's sense of personal control.

In vitro fertilization (IVF) is a particularly stressful treatment that may further threaten perceptions of control (see Davajan & Israel, this volume, for procedures). IVF is expensive and invasive, and the probability of conception is low (Dennerstein & Morse, 1985), The chances of becoming parents through IVF appear to be about 16% in the U.S. (Medical Research International and American Fertility Society, 1989). For most couples, IVF is a "last chance" treatment, following years of unsuccessful attempts at conception. The inability to become pregnant through IVF usually means that women must acknowledge that they are permanently infertile (Dennerstein & Morse, 1985). Sophisticated IVF procedures require much expertise from medical personnel and little from the couple, perhaps further reducing the infertile individual's sense of control.

In this chapter, we explore the complex ways in which infertile women understand the issue of control and the impact that perceptions of control have on psychological adjustment. Relevant theory and findings from the psychology of control are presented along with the results of our study of women undergoing IVF treatment. First, we discuss theories and approaches, as well as data from our own study, highlighting the ways that infertile women perceive and experience control. Second, we review studies documenting the costs and benefits of control and, from our own data, examine the role of perceived control in predicting women's psychological adjustment to infertility. Finally, implications of our work for future research are considered.

THE PSYCHOLOGY OF CONTROL

In this section, we selectively highlight four perspectives on the study of control, as well as more recent distinctions among types of control, that are relevant to our study of involuntarily infertile women. This is not a comprehensive review of the psychological control literature; rather, we have attempted to organize previous and current thinking about control in a way relevant to the study of infertility. We also present data from our study of women in IVF treatment pertaining to these recent distinctions.

Approaches to the Study of Control

In psychology, one of the first research traditions to consider the importance of control investigated situations that deprive individuals of control over desired outcomes and thus lead to psychological reactance (Brehm, 1966) or learned helplessness (Seligman, 1975). These researchers explored the nature of individuals' reactions to an objective loss of control. Loss of control was viewed as aversive and likely to lead to depression and other negative effects (Wortman, 1976). The experience of infertility **inherently** involves such a loss of control, since all infertile individuals find themselves in a situation where they are unable to conceive. Based on control research in this tradition, one would expect infertile couples to experience considerable distress.

In a second early approach, Rotter (1966) emphasized individual differences in beliefs about control. He suggested that people tend to develop fairly stable beliefs about their ability to affect their personal outcomes. Whereas some people tend to believe that they have a high degree of personal control (an "internal" locus of control), others believe

their outcomes are largely determined by factors outside their control (an "external" locus of control). Folkman (1984) addressed the same issue in terms of individuals' generalized beliefs that they have high or low control over events in their lives. As applied to infertility, this research tradition raises two important questions. Do individuals who believe they generally have much control over their lives react differently to infertility than individuals who believe they have little control? Do IVF patients who have a long history of infertility come to believe that they have little personal control over their lives in general?

A third research tradition has emphasized the importance of subjective percepdons of control. In this conceptualization, perceived control refers to the subjecdve belief that one has the capacity to influence outcomes in a specific set of circumstances, regardless of whether one actually has this capacity (Langer, 1983). One recent example of this approach would be Bandura's (1982, 1986) concept of self-efficacy, which is a judgment or perception of one's ability to "execute courses of action required to deal with prospective situations" (1982, p. 122). This tradition does not attempt to assess the accuracy of percepdons of control, but rather considers the adapdveness of perceptions of control even when they are illusory (Taylor, 1983). In the case of infertility, the issue becomes the extent to which individuals perceive that they can affect their reproductive outcomes and the adapdveness of such percepdons. Individuals seeking treatment for inferdlity are never certain whether they will eventually conceive, and this ambiguity allows for variation in perceptions of personal control. Whereas some infertile individuals may think that there is little they can do to change their situadon, others may think that they can enhance their chances of pregnancy significantly by behaviors such as watching their diet, adhering carefully to medical regimens, maintaining a positive attitude, and so on. Research on perceived control also raises questions pertinent to inferdlity. Given the uncertainty of concepdon, to what extent and in what ways do infertile people perceive that they possess personal control over their situadon? Are levels of perceived control adaptive with respect to the psychological adjustment of infertile women?

A fourth research tradition has emphasized behaviors that individuals may use to seek or exert control (Averill, 1973; Rothbaum, Weisz, & Snyder, 1982). Folkman (1984) has suggested that individuals use both problem-focused coping that seeks to change the situation, and emotion-focused coping that seeks to influence the individual's reactions to the situation. In the case of infertility, the questions are: What do individuals do to alter their chances of concepdon? How do they attempt to control or manage their emotional reactions to inferdlity and treatment?

The Research Context

Our study of IVF patients enabled us to consider many of these questions in detail. Participants were 38 women either waiting for or receiving IVF treatment in Southern California. IVF patients were selected because control seemed particularly relevant to their experiences. In addition, because most IVF patients have been seeking treatment for an extended period, it seemed possible that at least some of the women in our sample would exhibit high levels of distress.

Participants were recruited at two sites. All participants completed a self-administered questionnaire accompanied by an introductory letter explaining the nature and purpose of the research. Most (74%) of the final sample were contacted through the UCLA In Vitro Fertilizadon Program. A total of 70 quesdonnaires were distributed to UCLA patients, either by mail or in person, and 40% were returned by mail to the researchers. The actual response rate for this group may be somewhat higher, however. Some addresses on the mailing list were not current, so it is likely that some questionnaires were never received by the potential participants. The remaining 26% of participants received a questionnaire in person at the Hoag Fertility Services Center in Newport Beach, California. Of the 19 questionnaires distributed at Hoag, 53% were returned to the Program Coordinator at the clinic.

Participants from the two infertility programs did not differ significantly on any background or demographic characteristics. The average age of the respondents was 36 years, and the average family income was between $55,000 and $70,000. This income level is high reladve to the general population but is not surprising, given the costs of IVF treatment. Those who seek IVF must either be able to pay for the treatment themselves or have jobs that provide health insurance that will reimburse costly infertility treatments. Most (76%) women in the study were white, and more than 70% were employed outside the home. They had been seeking treatment for inferdlity for one to more than 10 years, with a median of 4 years. Most (70%) were being treated for primary inferdlity; 30% had previously given birth and were being treated for secondary inferdlity.

General versus Situation-Specific Control

Folkman (1984) has explored aspects of control that have implicadons for the study of stressful life events and, in particular, inferdlity. She emphasized the importance of two conceptually distinct types of control: *generalized beliefs* about control and *situation-specific appraisals* of control.

that a generalized sense of control has implications for
ful situations, particularly when the situation is ambig-
ıch a situation, those who believe that they have a high
control are more likely to perceive opportunities for
, those individuals who generally believe they have little
e likely to assess the situation as uncontrollable (Folk-
1966). On the other hand, perceived situational control
ıal's perception of the control opportunities available in
ın. Folkman argued that this perception is developed by
nt to which personal control is possible, as well as the
ıg strategies.

h Folkman's (1984) distinction between general and
ontrol, our study assessed both general control and
he Pearlin Mastery Scale was used to measure general
lin, Menaghan, Lieberman, & Mullan, 1981). The scale
ems, each rated on a 7-point scale from "agree" to
des such items as "I have little control over the things
and "I can do just about anything I really set my mind
is computed as the average response to the 7 items.
of the scale (Cronbach's alpha) for our sample was .78.
ond control measure (adapted from Skokan, 1987) to
ific to infertility. It appears in Figure 1. Participants
which they felt they could control three specific do-
: The probability that they would become pregnant
ıeir medical treatment (item 3); and their emotional
ty (items 4 and 5). Ratings were made on 5-point scales
t at all," to 5, "completely." The infertility control score
ıe average of the five items. The internal consistency of

) argued that general and situation-specific control are
t from one another. In our study, the question is: Are
two types of control among IVF patients actually in-
al answer was provided by the low correlation between
= .25, p = .06). Women who felt a great deal of control
general did not necessarily report a high degree of
ility. Consistent with Folkman's analysis, these con-
e been fairly independent as measured, although the
rrelation may have been slightly attenuated due to low
neans on both variables.

erceptions of general control were quite high in our
score on the Mastery scale was 5.9 (S.D. = .97) com-

The Measure of Infertility Control

1. How much can you control the likelihood that you will get p
things you do or the actions you take (diet, exercise, reducin

1	2	3	4	
Not at all	A little	Somewhat	Very much	C

2. How much can you control the likelihood that you will ev
pregnant by your mental attitude and the way you look at yo

1	2	3	4	
Not at all	A little	Somewhat	Very much	Co

3. How much can you control the type of treatment and quality
services you receive by the things you do or the actions you tal

1	2	3	4	5	
Not at all	A little	Somewhat	Very much		Co

4. How much can you control the negative feelings you have
infertility by the things you do and the actions you take?

1	2	3	4	5	
Not at all	A little	Somewhat	Very much		Co

5. How much can you control the negative feelings you have
infertility by your mental attitude and the way you look at you

1	2	3	4	5	
Not at all	A little	Somewhat	Very much		Co

Note: Items 1 and 2 assess control over pregnancy, item 3 assesses
medical treatment, and items 4 and 5 assess control over emotional
infertility. In addition item 1, 3 and 4 assess behavioral control over
of infertility, and items 2 and 5 assess cognitive control.

FIGURE 1

pared to means of 3.7 and 3.8 for two community samples of men and women, aged 18 to 65 years (Pearlin *et al.,* 1981). Sixty percent of our sample scored 6.0 or higher on the 7-point scale. Further, the women we studied felt moderate control over their infertility. On our measure of perceived infertility control, the mean score was 3.1 (S.D. = .76), with a possible range of 1.0 to 5.0.

Behavioral versus Cognitive Control

A further distinction is also useful, namely, to differentiate behavioral from cognitive control. Building upon previous conceptualizations of control (e.g., Averill, 1973; Miller, 1979), Thompson (1981) defined *behavioral control* as the "belief that one has a behavioral response available that can affect the aversiveness of an event" (p. 90). She defined *cognitive control* as the "belief that one has a cognitive strategy available that can affect the aversiveness of an event" (p. 90). We investigated whether the conceptual distinction between behavioral and cognitive control is meaningful for women undergoing 1VF, and whether perceptions of behavioral and cognitive control are independent. The five items in our infertility control measure (see Figure 1) were designed to distinguish between behavioral and cognitive control. Items 1, 3, and 4 assessed behavioral control by asking the extent to which control can be achieved "by the things you do or the actions you take." Items 2 and 5 assessed cognitive control achieved "by your mental attitude and the way you look at your situation."

Subscales were created by computing separate means for the two sets of items. Indices of perceptions of behavioral and cognitive control were highly correlated *(r* = .75, p < .01). Women who perceived a high degree of behavioral control over their infertility also tended to perceive high levels of cognitive control. This may suggest that the behavioral versus cognitive distinction is not applicable in the infertility setting, or that the two concepts were not operationalized in a way that was meaningful for women in this sample.

Domains of Infertility Control

In reference to her analysis of situational control, Folkman (1984) also asked the important question, "control over what?" She argued that in any situation there is often more than one possibility for control. That is, "an individual might be expected to control one aspect of a situation but not another" (Folkman, 1984, p. 843). Based on this premise, we varied the particular domain of control in our infertility control measure. Respondents assessed the degree of perceived control they felt over the probability of their becoming pregnant (items 1 and 2), their medical treatment for infertility (item 3), and their emotional reactions to infertility (items 4 and 5).

On the average, women felt a bit more than "a little" control over the likelihood that they would get pregnant. The mean rating for control over pregnancy was 2.41 on a 5-point scale. They felt between "somewhat" and "very much" control, however, over their medical treatment and their emotional reactions to infertility. The mean ratings-for control over medical treatment and emotions were 3.74 and 3.49, respectively.

To examine whether women experienced greater control over some aspects of infertility than others, we conducted paired /-tests for the differences among the three domain means, and found a significant difference between perceived control over pregnancy and control over the other two domains. Perceptions of pregnancy control were significantly lower than perceptions of control over medical treatment [/(37) = 7.38, $p < .01$] and significantly lower than perceptions of control over emotional responses [/(36) = 5.56, $p < .01$]. The medical treatment and emotional control scores were not significantly different from each other *[t(36) = lA9,p* = .15].

The three domains were conceptualized to assess meaningfully distinct aspects of perceived control over infertility. Were perceptions of control over each of the three domains actually independent in our sample? Correlational analyses found small-to-moderate associations among the three domains of control. Perceptions of control over pregnancy and over medical treatment were weakly related *(r* = .26, $p = .06$). It would be possible to interpret "control over medical treatment" as meaning "control over treatment *as a means of becoming pregnant,"* making control over treatment a subset of control over pregnancy. However, the small correlation between the two domains indicates that perceptions of control over treatment and of control over pregnancy items were largely distinct. The other domains were moderately related. Control over treatment shared about 16% variance with control over emotional reactions (r = .42, p < .01). The correlation between perceived control over pregnancy and perceived control over emotional reactions was similar in magnitude *(r* = .36, $p < .05$). Perceptions of control over different domains of infertility were therefore related in varying degrees. This may reflect underlying general beliefs about control over infertility, but the aspects were distinguishable in general.

Examples of Control among Women Undergoing IVF

In addition to providing ratings of five types of infertility control, participants were also asked to provide examples of the ways in which they exercise the five types of control. Answers illustrated the surprising variety

of options for exercising control felt by women undergoing *in vitro* fertilization.

In response to the question about control of pregnancy by behaviors, most women reported engaging in health behaviors such as abstaining from cigarettes, drugs, and alcohol, attempting to maintain a healthy diet, beginning an exercise regimen, and reducing or managing stress. As one woman wrote, "I want to purify my body as much as possible." A few reported prayer as a means of exercising control in this domain.

When answering the item about cognitive control over pregnancy, women's views on the importance of their thoughts and attitudes for becoming pregnant ranged from wholehearted enthusiasm to skepticism, although they tended to be favorable more often than not. Many women tended to describe attempts to maintain a positive attitude and why they thought this was important. In particular, some believed that there was a link between their mental state and their body's functioning. One woman said, "Keeping positive and relaxed can help the body work to its best potential!" Not all women believed that optimism leads to pregnancy, however. Said one respondent, "I'd like to think that keeping a good attitude can only help our chances of getting pregnant, but I'm not sure it's true. We keep a good outlook anyway—it feels better." Another stated less equivocally, "I think I *have* a good mental attitude, and it hasn't gotten me pregnant."

When asked how they felt they could control their treatments through their actions, most women referred to their choice of physicians, treatment centers, and types of treatment. They also reported seeking information about treatment options and adhering to the treatment regimen. One woman wrote:

> **I have received the best medical care possible. . . I know this without a doubt because all along the way I have been active in my infertility treatment. I have read books, articles, medical journals, attended information related meetings, etc. and always asked my doctor questions when something was unclear.**

The topic of controlling negative feelings by behaviors elicited a variety of coping strategies. These included seeking information, seeking social support, and focusing on the goal of having a baby. One woman explained, "When I feel depressed... talking it out with my husband really works." Other behaviors mentioned were keeping busy, distraction, and avoiding the issues. Another said, "I bury myself in paperwork to forget."

With respect to controlling negative emotions through attitude, most respondents indicated that they tried to keep perspective or to change the way they thought about the situation. One woman wrote, "My husband

and I have been through a lot of trials, and yet I think we have controlled all negative feelings by keeping this in perspective and knowing that this is only a part of our lives." Another said, "Although I would like to have children, I do not need children to have a fulfilling life. I have a successful career." Other women mentioned that they try to "count their blessings." In general, these answers conveyed a strong desire to avoid dwelling on negative thoughts associated with infertility. Reframing the problem and keeping it in perspective seemed to be useful ways of coping for many women in our sample (see also, Stanton, this volume).

CONTROL AND ADJUSTMENT TO INFERTILITY

A further goal of this research was to explore the relationship between perceived control and psychological adjustment to infertility. As background, a brief review of previous research on the benefits and costs of continued perceptions of control is useful. Data from our own study are then presented.

Benefits and Costs of Control

Much research documents the benefits of perceived control on responses to stress (see Averill, 1973; Thompson, 1981, for reviews). Laboratory studies, using such stressors as electric shock, bursts of noise or ice-water immersion, have associated perceived control with increased tolerance of noxious or painful stimuli (Kanfer & Goldfoot, 1966; Kanfer & Seider, 1973; Staub, Tursky, & Schwartz, 1971), reduced physiological arousal (Geer, Davison, & Gatchel, 1970), decreased anxiety (Holmes & Houston, 1974; Houston, 1972), and reports of fewer physical symptoms (Pennebaker, Burnam, Schaeffer, & Harper, 1977).

Studies in field settings have also shown that greater control can reduce negative reactions to stress. For example, Langer and Rodin (1976) showed that residents of a nursing home who were experimentally provided with some degree of control over their environment reported feeling happier and more alert, and were more likely to participate in planned activities than residents for whom control opportunities were not emphasized. Hobfoll and Lerman (1988) studied a sample of Israeli mothers experiencing the stress of a child's illness. The women who perceived themselves as having a high degree of general control over their environment and their future experienced less distress and more satisfaction with their social support than did women who perceived less control.

Health psychologists have theorized about the role of control in ad-

problems (Michela & Wood, 1986; Wallston, Wallston, , 1987) and have conducted correlational studies linking over health-related outcomes to psychological adjust- htman, and Wood (1984) found that breast cancer pa- ed they could control their cancer were better adjusted orting low personal control over the disease (Taylor, own, 1988). Affleck, Tennen, Pfeiffer, and Fifield (1987) isals of control among rheumatoid arthritis patients and ved control over treatment was associated with better social adjustment. These findings, taken with the lab- studies reported above, support the contention that is adaptive.

ne researchers have considered the possibility that per- y not always be beneficial. Wortman and Brehm (1975) be maladaptive to perceive personal control in a situa- xists. They suggested that the most adaptive response to able situation may be acceptance. Consistent with this 1976) argued that attempts to gain or restore control achieved may only postpone acceptance, coping, and though perceived control can sometimes be beneficial, it ental to well-being.

nsidered the benefits and costs of control for infertile lly, we studied how perceptions of control of various to psychological adjustment among women undergoing

ıstment

l adjustment is a multidimensional concept, including as emotion, morale, and self-esteem (see Stanton & this volume). Two dimensions of adjustment that are nct and appropriate to the problem of infertility were udy. These were depression and perceived quality of life. er levels of depression and lower quality of life ratings o be indicators of poor psychological adjustment.

ıs been well documented as a response to infertility (Bell, 3; McGrade & Tolor, 1981; Menning, 1977; *PlattetaL,* 79). We used the Center for Epidemiologic Studies De- S-D) (RadloffF, 1977). The 20-item scale asks respondents cy of symptoms associated with depression. A rating of ymptom was not experienced during the past week, and tes that a symptom was experienced from five to seven

days in the last week. Sample items are: "I felt that I could the blues even with help from my family and friends," and spells." Scores for the CES-D are summed over the 20 iten from 0.0 (indicating that all depressive symptoms were exp than one day) to 60.0 (indicating that all symptoms were exp five to seven days in the last week).

For our sample, the mean depression score was 12.7 wi deviation of 10.85, and scores ranged from 1.0 to 37.0. The m sample (76%) had a score of 15.0 or less. In previous research, on the CES-D for three community samples of white men ranged from 8.0 to 9.3, and the mean score for a sample o patients was 24.4 (Radloff, 1977). Thus, women in our sample depressive symptoms more frequently than community samp frequently than the psychiatric sample.

The second adjustment measure, quality of life, was inc amine general feelings of life satisfaction. We used a 20-item v Quality of Life Index (QOL) (Andrews & Withey, 1974,1976) t a woman felt in the past week about various areas of her life, i job, marriage, friends, and income. Variations of the QOL hav in other infertility studies (Callan, 1987; Callan & Hennessey version used a 7-point response scale, from 1, having felt "te having felt "delighted." Scores for our sample ranged from 3.2 a mean score of 5.2 and a standard deviation of .79. Women i were "mostly satisfied" with their lives.

General versus Situation-Specific Control and Adjustment

How might situation-specific and general control affect ps adjustment to infertility? Low control over fertility choices s adverse consequences for adjustment, particularly if parenting valued goal. Generalized control beliefs may also be importan loss of infertility control, infertile women with a strong beli control their lives in general (i.e., who are high in mastery) m adjusted than infertile women with weaker generalized contro other words, feeling effective in work, avocational activities, sonal relationships might buffer an infertile woman from t effects of loss of infertility control. It is possible, however, tha level of adjustment also affects her perceptions of control. Th adjusted women may find it less difficult to perceive control circumstances. In either case, both situation-specific and gene trol ratings should be significantly related to indices of adjustr

To examine this issue in our sample, separate regressio

were performed using the two control variables to predict depression and quality of life. Two additional issues were addressed in the regression models. First, income was also included in all analyses. Although women in our sample tended to be comfortable financially, family incomes ranged from less than $25,000 to more than $85,000; more than 70% of the sample had family incomes over $55,000. Given the high cost of IVF treatment and the general link between low income and stress, we expected that higher income would be associated with better psychological adjustment. Income was correlated with both depression *(r* = —.24, *p* = .08) and quality of life *(r = Al,p* < .01). Second, we explored the possibility of an interaction between the effects of situation-specific and generalized control to test the possibility that low perceived control of infertility is only detrimental to women high in general control. An interaction term was entered in all inidal regression analyses. However, because the interaction term was not a significant predictor in any equation, it was dropped from further analyses.

Results of regression analyses for depression and quality of life are presented in Table 1. Opposite patterns emerged for depression and quality of life. Depression was significantly predicted by lower perceived infertility control and lower income, but not by general control. In contrast, quality of life was significantly predicted by general control and income, but not by infertility control. The data are consistent with the following conclusions. Infertility-specific perceptions of control are beneficial with respect to depression, but not with respect to life quality.

Table 1. Results of General/Infertility Control Multiple Regression Analyses with Depression and Quality of Life as Dependent Variables

Predictor	Standardized coefficient	Standard error	Total/?	squared	*F* value
Dependent variable = Depression					
				.32	6.27
General control Infertility	**-.12**	(.10)	**-1.23**		
control Income	**-.36**	(.10)	**-3.47"**		
	-.10	(.05)	-2.17"		
Dependent variable = Quality of life					
				.34	6.82*
General control Infertility	.40	(.14)	2.77**		
control Income	.25	(.15)	1.66		
	.21	(.07)	3.03**		

*p < -05. ** p< .01.

General beliefs about control, on the other hand, are beneficial with respect to life quality, but not with respect to depression. Thus, the more specific control measure is predictive of the more specific outcome, and the more general measure of control predicts the more global outcome. A "match" in the level of conceptualization may be important in understanding the relationship between various types of control and aspects of adjustment (Dunkel-Schetter, Folkman, *8c* Lazarus, 1987). Reverse causality is also possible such that depression leads to lower perceptions of infertility control, and lower life satisfaction reduces general control beliefs. Longitudinal studies would be necessary to address these issues of causal inference adequately.

Domains of Infertility Control and Adjustment

As discussed earlier, the women in our sample perceived substantially less control over becoming pregnant than over their treatment or emotional reactions. Do assessments of these three facets of infertility control have differential effects on psychological adjustment? Our data suggest that they do. The results of multiple regression analyses, with depression and quality of life as the dependent variables, are presented in Table 2. Income and control over medical treatment were significant predictors of both depression and quality of life. Control over emotional reactions pre-

Tablc 2. Results of Domain of Infertility Control Multiple Regression Analyses with Depression and Quality of Life as Dependent Variables

Predictor		Standard error	Total R squared		
Dependent variable = Depression					
				.37	**5 . 5.74****
Pregnancy Medical	-.82	(1.43)	-0.57		
treatment Emotional	-3,73	(1.74)	-2.33*		
responses Income	-3.29	(1.43)	-2.30*		
	-2.12	(0.91)	-2.33*		
Dependent variable = Quality of life					
Pregnancy	-.13	(.10)	-1.30		
Medical treatment	.53	(.13)	4.26**		
Emotional responses	.14	(-10)	1.39		
Income	.15	(.06)	2.33*		

*p < -05. ** p< .01.

dieted depression but not quality of life, and control over pregnancy did not significantly predict either measure of adjustment.

In summary, perceptions of control over "the type of treatment and quality of medical services" were very important in our sample. Women who felt they could make a difference in their treatment were less likely to be depressed and dissatisfied than women who felt relatively less control over their treatment. For women undergoing a complex, invasive, and cosdy form of medical intervention, this result makes sense.

We also found that perceived control over negative emotional reactions was predictive of depression, but not of life satisfaction. Women who felt they could effectively manage the negative feelings they had about their infertility were significantly less likely to report depressive symptoms, indicating that their perceptions of emotional control were not merely illusory. In contrast, women who experienced less control over their emotions were more depressed. The lack of association between perceived control of emotions and quality of life is consistent with the view that life satisfaction reflects a fairly stable assessment of several aspects of one's life that may be unaffected by negative experiences in one particular life domain.

IMPLICATIONS

The results of our study have implications both for understanding the nature of perceived control and for understanding reactions to infertility.

Types of Control

Our results provide strong support for Folkman's (1984) distinction between general and situation-specific control. General control and infertility control were for the most part unrelated to each other, and each predicted difFerent aspects of psychological adjustment in our sample. Although generalized beliefs about control were related to quality of life, perceptions of control over infertility were related to depression.

Distinctions among the three specific domains of infertility control proved to be meaningful for the women in our sample. Women's ratings of perceived control over pregnancy were lower than perceived control over either medical treatment or emotional reactions, suggesting that individuals do distinguish between control over specific domains of infertility. For the women in our sample, becoming pregnant is truly uncontrollable, whereas treatment and emotions are at least somewhat amenable to control. In addition, these three domains were differentially

predictive of psychological adjustment, providing further evidence for the usefulness of the distinction.

Our research also addressed the distinction between behavioral and cognitive control, but these results were less clear-cut. Perceptions of behavioral and cognitive control over infertility were highly intercorrelated, and the mean ratings of the two concepts were not significantly different. Quantitative data did not verify the differentiability of cognitive and behavioral control perceptions. In contrast, qualitative data suggested that the behavioral/cognitive distinction may be useful. For example, women reported maintaining a healthy diet, reading about treatment options, and increasing involvement with work as ways of asserting behavioral control, whereas they reported cognitive control strategies such as maintaining a positive attitude and keeping fertility problems in perspective.

Degree of Perceived Control

Despite the objective loss of control inherent in infertility and repeated anecdotal observations that infertile individuals feel a substantial loss of control (see review in Dunkel-Schetter & Lobel, this volume), participants in our study generally felt a great deal of control. Women felt at least moderate control over various aspects of their infertility, and their ratings of generalized life control were quite high relative to published norms. Thus, extended treatment for infertility was not associated with perceptions of low control. Although systematic studies have not been published to date on infertility-specific control, three studies on locus of control in infertile individuals do exist. Our results on general control are consistent with those of Dennerstein & Morse (1985) who found women awaiting IVF treatment to be toward the internal end of a locus of control measure. However, our results are inconsistent with the results of Paulson *et al.* (1988) and Platt *et al.* (1973), both of whom found that infertile women tended to be more external than control groups (although the difference between infertile and control women in the former and most rigorous study was not significant). A possible explanation for the divergence of findings involves the nature of the samples studied. Paulson *et al.* (1988) and Platt *et al.* (1973), who found greater external locus of control, studied general infertility patients and their spouses. On the other hand, both our study and that of Dennerstein & Morse (1985) sampled IVF patients and found more internal locus of control scores.

This suggests the possibility that women undergoing IVF are a select subset of infertile women who have higher perceptions of control. Women who pursue treatment for extended periods of time in general may be unusual in their ability to find opportunities for perceiving and exercising

control. Because they are so adept at finding and exercising control, the treatment process may be less stressful, and they may therefore find it easier to continue treatment. Those who discontinue treatment early in the process or pursue other options, such as adoption or childlessness, may have much lower perceptions of control over infertility and their lives in general.

Individuals undergoing IVF may also be unique in their powerful desire for biological parenthood. IVF patients are likely to be a subset of infertile individuals whose motivation for parenthood is so strong that it overrides the financial and psychological costs of extended treatment (Callan, 1987; Callan & Hennessey, 1988). Their persistence in pursuing treatment is testimony to their willingness to go to great lengths to achieve their desired goal. Their substantial personal investments in infertility treatment and their strong desire for parenthood may motivate them to seek control in treatment situations that do little to encourage perceptions of control.

Our sample may also be atypical because of the income levels of women undergoing IVF treatment. On average, the participants in this research were financially quite secure. Over 70% of our sample had a family income greater than $55,000 per year. Perceptions of control may be enhanced by a comfortable income (see also Pearlin *et al.,* 1981; Ross & Mirowsky, 1989). Income was not correlated with either infertility control or general control in our study, but our sample had a restricted range of family incomes, which may not have been adequate to demonstrate a relationship between income and control. Although it is not clear whether financial well-being plays a role in the elevated perceptions of control in our sample, future studies might usefully explore this issue.

Thus, there are a number of important ways in which couples who undergo IVF treatment may be different from other infertile individuals prior to treatment. On the other hand, strong perceptions of control may develop during the process of extended treatment for infertility. An enhanced sense of control over infertility specifically would be an adaptive method of coping with the chronic difficulties of this treatment. Taylor's (1983) cognitive adaptation theory argues that enhanced perceptions of control are adaptive in cancer patients and victims generally. Such perceptions enable them to maintain stability in the face of threat and loss experiences. The women in our sample who are in IVF treatment may have responded to infertility with this form of adaptive coping that enables them to persist in the face of what seem to others to be overwhelming challenges.

It is not clear, however, which of the foregoing explanations for the relatively high levels of control is most accurate. Are women in IVF treatment self-selected strong believers in control, or do they develop strong

feelings of control as a result of a strong desire for parenthood and prolonged infertility experiences? Future research with representative samples of IVF patients, non-IVF infertile patients at different stages of diagnosis and treatment, and fertile women is needed to clarify this result.

A different possibility is that the high degree of control reported by the women in our sample could be a function of self presentational concerns, as with all self-report measures. This seems unlikely, however, given that questionnaires were anonymous and were completed in the privacy of participants' homes. In addition, participants provided many specific examples of the ways in which they exercise control over their infertility in open-ended descriptions. Their responses illustrated a wide variety of tactics used to enhance control over their treatment, their ability to become pregnant through life-style changes, and their emotional responses to infertility.

Finally, it is possible that the women who completed and returned our questionnaire had higher control perceptions and beliefs than women who were nonresponders. Although such a difference between responders and nonresponders is a valid concern, there are no data to evaluate this possibility.

Control and Adjustment

Just as the women in our sample perceived more control than we expected, they were also better adjusted psychologically than expected. Ratings of depression were somewhat higher than those of community samples but were much lower than the levels of depression reported by psychiatric samples. Assessments of general life quality indicated that the women in our sample were "mostly satisfied" with their lives. Why are these women who have undergone years of stressful treatment and uncertainty regarding their fertility not more distressed? Many researchers have suggested that responses to uncontrollable events depend on the meaning assigned to them (e.g., Silver & Wortman, 1980; Taylor, 1983). Thompson (1981) argued that the meaning assigned to uncontrollable events may vary along three dimensions. According to Thompson, "one important dimension of meaning [is] an assurance that one will not face an event that is beyond the limits of endurance" (p. 98). If the event is perceived as endurable, it will be much easier for the individual to cope. Clearly, women undergoing IVF have decided that virtually anything is endurable in the pursuit of pregnancy. The second dimension of meaning is the extent to which the uncontrollable event is a means to a desirable end. Although IVF treatment is a negative experience, it is aimed to produce a much-desired pregnancy. The third dimension involves the

degree to which an event is perceived as planned rather than random; an event that results from an individual's plans or goals will be experienced as less stressful. Certainly a woman's inability to conceive is not part of her life plan. IVF treatment, however, is part of the larger plan for having children, and the stress associated with the treatment process may therefore be somewhat easier to cope with. By Thompson's three criteria, women undergoing IVF treatment could be expected to cope with the stress of treatment relatively well, and our data indicate that they do.

In addition to the stress of the treatment itself, women in IVF must also cope with the possibility that treatment will fail and that they will be permanently infertile. How can we explain their ability to remain psychologically well-adjusted in the face of this ambiguity? Administrators of IVF programs often report that couples seeking treatment are convinced that their own 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 all but one of 70 participants overestimated the likelihood of success of the procedures (Johnston, Shaw, & Bird, 1987). Perhaps IVF patients have not yet contemplated the possibility of permanent infertility because exaggerated optimism leads them to believe that this treatment option will provide them with the baby they desire.

Unfortunately, the success rates for IVF programs are low. Most couples will not become pregnant, and ultimately, their strong sense of perceived control will be disconfirmed. Such disconfirmation is one of the potentially negative consequences of high perceived control, and it is a major psychological risk for IVF patients. Although IVF patients may currently feel that they can influence their situation, how will they respond when they must ultimately accept a permanent loss of control over childbearing? Will they remain psychologically well-adjusted? Will their perceptions of control over other aspects of their life be altered? The ramifications of this disconfirmation of control should be of interest to both control and infertility researchers.

In addition to a possible disconfirmation of control, there may be other costs of perceived control for women undergoing IVF treatment which were not explored in our research. Psychologists have highlighted a number of ways in which control may be a mixed blessing (Folkman, 1984; Langer, 1983; Wortman, 1976). Pursuing control over one's fertility requires accepting the many negative aspects of treatment. Exercising certain kinds of control may be costly to the extent that it is inconsistent with one's personal style. For example, individuals who feel uncomfortable asking physicians questions or expressing their personal concerns may

have difficulty exercising control over medical treatment. There are also potentially negative social consequences of exercising control such as the stress of infertility treatment for the marital relationship (Lasker *&c* Borg, 1987). Finally, exercising control may require the expenditure of resources that might be needed elsewhere. The value of the time, money, and energy invested by infertile couples in the pursuit of pregnancy cannot be underestimated.

For infertile individuals, and particularly for those individuals undergoing IVF treatment, issues of control are complex and multifaceted. Perceptions of some types of control were surprisingly high and were associated with better psychological adjustment for the women in our sample. Other aspects of control, however, had little bearing on women's adjustment. Contrary to a wealth of anecdotal evidence, IVF patients did not exhibit a complete lack of perceived control or extreme levels of distress. However, the potentially negative consequences of perceived control over infertility, as well as the possible costs of infertility treatment, should not be ignored. Both control and infertility researchers, as well as health care professionals who treat infertile individuals, should recognize and explore this complexity in their efforts to understand the experience of infertility.

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