Resilience and Fertility Problems

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Thank you.
Abstract

There is some evidence that individuals with fertility problems report lower levels of resilience. However, with only one other empirical study examining the relationship between resilience and fertility problems, the investigators of this study were interested in whether a similar relationship would be found when a non-clinical population was surveyed. A total of 322 participants (208 with a history of fertility problems and 114 with no history of fertility problems) completed a brief online questionnaire comprised of demographic items, a resilience measure (Brief Resilience Scale), a coping strategies measure (Brief COPE), and a measure of general distress (General Health Questionnaire). The investigators found that individuals in the history of fertility problems group had significantly lower levels of resilience ($t(320) = -5.863, p = .000$) and higher levels of general distress ($t(314) = 5.001, p = .000$) compared with the no history of fertility problems group. These findings emphasize the need for health professionals to consider whether individuals with fertility problems are sufficiently supported through the process. Suggestions for future research are included.

Keywords: infertility, resilience, coping, psychological distress
Introduction

Ten percent of women in the United States are reported to currently suffer from infertility, a condition commonly defined as being unable to get pregnant after 12 months of having unprotected sex (Center for Disease Control, 2008), and roughly 30% of women report having experienced infertility at some point in their lives (McQuillan, Greil, White, & Jacob, 2003). As one might expect, the stress of infertility is associated with increased rates of depression and anxiety (Greil, 1997). Though a majority of people coping with infertility does not meet criteria for these disorders, studies have found the increased level of distress associated with infertility to be significant (Brkovich & Fisher, 1998). Though a number of factors likely contribute to how someone responds to infertility stress, one proposed variable is a person’s level of resilience. The relationship between infertility and psychological distress, the challenge of defining the complex construct of “resilience,” current research related to resilience and its role in adjustment to illness, as well as current gaps in the literature related to infertility and resilience will be discussed.

Infertility and Stress

To begin, it is important to understand what is currently known about the relationship between infertility and psychological distress. Brkovich and Fisher (1998) conducted a critical review of the literature regarding this topic. The authors reported that there was a lot of scientific support showing that patients being treated in infertility clinics were more psychosocially distressed, but there had not been conclusive evidence indicating which factor caused the other. The authors reviewed 24 articles concerning psychological distress and infertility published between 1960 and 1998. After 40 years of
research, no cause or effect conclusions could be made regarding the relationship
between psychological distress and infertility. The authors attribute the inconclusive
findings largely to the fact that the investigators have studied patients who have already
been diagnosed with infertility, making it impossible to determine whether psychological
distress is a cause or an effect of infertility.

Despite such inconclusive findings, it seems logical to hypothesize that three
types of relationships between psychological factors and infertility are possible. The
authors of one review define these as “(1) psychological factors are risk factors of
subsequent infertility; (2) the experience of the diagnosis and treatment for infertility
causes subsequent psychological distress; (3) a reciprocal relationship exists between
psychological factors and infertility” (Cwikel, Gidron, & Sheiner, 2004; p. 127).
Regarding the first hypothesis, the authors conclude that there is some evidence
suggesting that psychological variables such as job-strain, distress, and psychosomatic
symptoms may predict fertility/infertility. Regarding the second hypothesis, the authors
report that there is some evidence to suggest that psychological distress is caused by the
experience of infertility, though there are inconsistencies related to when the distress is
most severe and how long it lasts, with one study finding a U-shape pattern (with the
distress decreasing after 6 years) and another study finding a dose-response pattern (with
distress getting worse over time). Possible explanations for this were attributed to the use
of different instruments to assess depression or cultural differences. Regarding the third
hypothesis, the authors indicate that support for a reciprocal relationship does exist. One
cited study supporting this hypothesis (Thiering, Beaurepaire, Jones, Saunders, &
Tennant, 1993) found that depressed women in their first cycle of IVF were less likely to
achieve pregnancy than non-depressed women. Thiering et al. (1993) also found that depression was most prevalent among repeat cycle women (25%) and relatively prevalent among first cycle women (15%), compared to community norms (12%), clearly showing the reciprocal relationship between the psychological distress of infertility and IVF outcome. Another reviewed study (Newton, Sherrard, & Glavac, 1999) found that the prevalence of mild-moderate depression increased substantially following failure of an IVF treatment and that those with a predisposition toward anxiety, pre-IVF levels of depression, and no prior history of pregnancy were all predictive of poor psychological reactions to IVF-failure, again supporting a reciprocal relationship.

Offering further support to this is a study that examined couples' reasons for discontinuation of in vitro fertilization treatment (IVF; Olivius, Friden, Borg, & Bergh, 2004). The authors found it surprising that, of patients who did not achieve a live birth, 54% chose to discontinue treatment even though subsequent IVF treatments were free in Sweden. Participants were 192 couples whose reasons for treatment discontinuation were obtained either by review of the medical record or by mailed questionnaire. Results indicated that "psychological burden" was the most common reason for discontinuing treatment (26%), followed closely by poor prognosis (25%). The authors found it noteworthy that spontaneous pregnancy (19%) and divorce or marital problems (15%) were also listed as reasons for discontinuation. Many patients reported the need for psychological counseling during treatment. While the relationship between stress and poor fertility treatment outcome has not yet been determined, Olivius et al. (2004) note that this study's findings suggest that psychological distress is one of the major reasons that couples end treatment. So, while the exact nature of how infertility interacts with
distress has not fully been discovered, it is clear that an important relationship exists.

Domar (2004) reported further on the stress-infertility-treatment dropout connection, indicating that “of the 15 studies located in the literature from around the world in the past 10 years that examined the relationship between stress and IVF outcome, 10 provided statistically significant results to support the theory that distress is associated with lower pregnancy rates” (p. 272). Several of these studies reportedly controlled for medical variables that impact pregnancy rates, indicating that the relationship is not merely a reflection of poor-prognosis patients who are experiencing more distress. The author described the results of one of these 15 studies (Terzioglu, 2001), which found that subjects who received counseling and support through their IVF cycle reported lower anxiety and depression scores and significantly higher pregnancy rates than those subjects who received treatment as usual. These studies make it evident that the experience of fertility problems is significantly associated with elevated levels of distress.

Berg and Wilson (1995) examined patterns of psychological distress among couples faced with infertility. The authors noted that prior research had focused primarily on women with infertility and on gender differences between men's and women's psychological reactions to infertility; however, little was known about how relational dynamics between the couple impact distress levels. To examine this, the authors used a sample of 104 married couples with primary infertility, a majority of whom were White and college-educated. Study measures included the SCL-90-R to assess psychological functioning and the Locke-Wallace Marital Adjustment Test (MAT), as well as a questionnaire that assessed variables such as diagnosis, treatment
length, sexual satisfaction and frequency, satisfaction with marital communication, and attribution of responsibility. Based on these results, couples were grouped into four categories: Both non-distressed (33%), Male distressed (18%), Female distressed (22%), or Both distressed (22%). Sixty percent of the couples showed similar, or parallel, distress levels, either Both distressed or Both non-distressed, while 40% of the couples showed a complementary pattern, either Female distressed or Male distressed. The authors indicated that the establishment of a complementary versus parallel pattern may be related to the level of severity of distress. For example, with mild to moderate distress, it may be that both spouses are able to admit and share their distress (Both distressed). However, with moderate to severe distress, one spouse may ignore their own distress so that the marital dyad can maintain its basic functioning. Additionally, the authors indicate that the severity and chronicity of the stressor may also influence the distress pattern. For example, a complementary pattern may serve the couple well when the stressor is short-term. If long-term, it may be more difficult for the spouse to continue to ignore his or her own distress (if this is in fact what is occurring). The authors propose that the crisis of infertility may destabilize the dyadic pattern and cause fluctuations over time. The location of recruitment also appeared to have an influence on distress pattern, with the couples in the Both non-distressed and Male distressed groups predominately coming from medical centers and the Female distressed and Both distressed couples coming from RESOLVE, a national non-profit organization for infertile people. The authors report that this finding suggests that women may be the driving force in utilizing services when distress is present. Discrepancies were also found between spouses in their recounting of medical diagnosis and length of time in treatment.
The authors suggest that this shows the importance of getting information from both members so as to avoid bias. For example, a study sampling only women may find longer treatment lengths than one sampling only men. Couples in the Male distressed group had been in the infertility investigation the least amount of time. The authors suggest this may reflect the male fear of pursuing treatment as this may reveal a diagnosis of sterility and cause a blow to his perceptions of masculinity and virility. This finding also may be reflective of the fact that seeking treatment goes against the typically male coping strategy of avoiding. Interestingly, distress level was lower for men with solitary stress, which may be related to the length of treatment (which was longer for the Both Distressed group). Couples in the Female distressed group showed the most discrepant ratings in the importance of having children, which the authors suggest may be what is responsible for this dyadic pattern (i.e. the woman feels unsupported by her spouse through treatment). Couples in the Both distressed group had been pursuing treatment for the longest period of time; this pattern could be most concerning due to the fact that both spouses are less able to provide support to the other. The authors note that this dyadic model should only be applied to primary infertile couples pursuing medical investigation in the U.S. (Berg & Wilson, 1995).

In a previous study by the same authors (Berg & Wilson, 1991), a stage theory for distress reactions during infertility treatment was developed. The authors also interpreted the results of the above-mentioned study (Berg & Wilson, 1995) in the context of their stage theory. It is proposed that stressors in the initial diagnostic and treatment process might lead to a mild to moderate distress response, which may subside quickly; it is suggested that couples in the Male distressed group are in this stage. In the middle stage,
the couple adjusts to treatment and functioning returns to normal as they remain hopeful that they have many options to pursue with good success rates. Couples in the Both non-distress group are proposed to reflect this stage. In the later stage, repeated treatment procedures have presumably failed and fewer options are available, with those that are available having lower success rates, costing more, and being time-intensive. The authors propose that the chronic stress affects marital resources and the distress reaction increases. Additionally, the authors think it is at this point that couples begin to grieve the inability to have a child. Contributing to the distress, many couples have a hard time deciding when to terminate treatment given the multitude of options. The authors suggest that couples in the Both distressed group fit this model of chronic distress. Additionally, when the female is more invested in having a child, the Female distressed pattern may emerge. This article provides insight into both the distress associated with adjusting to the diagnosis and treatment of infertility, but also the variability in responses found among couples (Berg & Wilson, 1995).

McQuillan et al. (2003) draw attention to the fact that, while a relationship does exist between infertility and psychological distress, there is evidence that long-term distress is not the norm. For this study, the authors used a random sample of women and a lifetime measure of infertility in an effort to address the fact that previous studies of infertility and psychological distress largely used clinic-based samples. The authors indicated that over one third of their sample reported having experienced medically defined infertility at some time during their lives, a percentage they noted to be larger than the 10% rate of current infertility found by a national sample of American women ages 15-44 (Chandra & Stephen, 1998) but similar to other estimates of lifetime measures.
of prevalence (Greenhill & Vessey, 1990; Page, 1989). The authors report that it may take longer or require medical interventions for these women to conceive, or they may not be able to conceive at all. However, a large majority of the women in the study who had an episode of infertility now have biological children and results indicated that infertility is associated with "substantial and significant long-term psychological distress" only when the infertility has resulted in childlessness. It is noted that childless women without fertility problems are not distressed by the absence of children; given this, it is concluded that it is not the childlessness or infertility alone that causes the distress, but the combined involuntary childlessness. Among those with fertility problems, 37% had sought medical treatment. The investigators found that none of the treatment variables were significantly associated with psychological distress, suggesting that distress in infertility is not limited to those pursuing treatment.

As these authors have demonstrated, there is a clear relationship linking the experience of infertility with psychological distress. As such, studies examining the experience of infertility should include a measure of psychological distress as a means of comparing data to previous literature. While data regarding the cause-effect nature of the relationship between infertility and distress remains inconclusive, there is some evidence to suggest a bi-directional relationship. There is also data indicating that most people faced with infertility do not, in fact, respond with a severe emotional distress response. What is it that accounts for this variability is stress response? One school of thought proposes that an individual’s level of resilience mediates this relationship, contributing to whether he or she adjusts to the experience of infertility adaptively. While that may
sound simple enough, the task of settling on one definition to encompass the concept of “resilience” has proven to be quite a challenge.

**Resilience**

Resilience as a construct has been difficult to define and study. The authors of one study (Karoly & Ruehlman, 2006) indicate that previous attempts to study resilience have been criticized for “a lack of consistency in basic definitions (of stress, resilience, and vulnerability), non-comparability of populations across research settings, an absence of normative anchors in appraising resilience, the non-systematic or ad hoc nature of proposed psychological risk and protective factors, and divergence as to whether resilience is best viewed as an outcome, a personal attribute, or a transactional process” (p. 91).

Much of resilience research has focused on the process of bereavement and people’s reactions to loss. For many years, bereavement theorists believed that the absence of distress following the death of a loved one was rare and a reflection of some sort of pathological response or emotional avoidance (Bonanno, 2004). However, empirical evidence suggests that resilience to adverse life events is not rare and actually reflects healthy adjustment rather than a delayed grief reaction. In studies reporting aggregate data, typically 50% of bereaved individuals exhibited low levels of depression or distress. Additionally, there is prospective evidence that associates resilience to loss with the experience and expression of positive emotion. One study, using data gathered on average three years prior to the death of a spouse, found that 46% of the sample had low levels of depression, both prior to the loss and 18 months following the death, and showed relatively few grief symptoms during bereavement (Bonanno et al., 2002). The
prebereavement data for these individuals did not reveal any signs of maladjustment (e.g. they were not rated as emotionally cold or distant by interviewers, no marriage difficulties were reported, and dismissive attachment was not shown). However, the low-distress individuals did score high on several prebereavement measures indicating the ability to adapt well to loss (e.g. acceptance of death, belief in a just world, instrumental support). While these individuals did report experiencing at least some emotional distress and intrusive cognition early after the loss, the difference between the resilient individuals and other participants seemed to be that these experiences were transient and did not interfere with daily functioning. In this study, resilience was assessed using several indicators determined to reflect an ability to adapt well to loss and, as noted above, was defined as the presence (pre-loss) of a combination of adaptive cognitions and beliefs, as well as external resources (Bonanno, 2002).

In their study of life satisfaction in women across the lifespan, Beutel, Glaesmer, Decker, Fischbeck, and Brähler (2009) found that resilience was strongly associated with general life satisfaction (r=.42) and self esteem (.59) and negatively correlated with depression (-0.32) and anxiety (-0.27). Resilience, defined in this study as “the ability to use internal and external resources successfully to adapt to developmental tasks,” was found to be a stronger predictor of life satisfaction and distress than was the factor of age. Resilience was measured by the 11-item short form of Wagnild & Young’s Resilience Scale and seems to be defined as the combined use of personality factors (i.e. internal resources) and environmental factors (i.e. external resources).

Other authors have emphasized the relationship between resilience and positive emotions. Cohn, Fredrickson, Brown, Mikels, and Conway (2009) describe the Broaden-
and-Build theory of positive emotions, which proposes that positive emotions are predictive of valued outcomes such as health, wealth, and longevity, because they help build resources to get there. Their study examines the relationship between positive emotions and ego resilience, defined as “a fairly stable personality trait that reflects an individual’s ability to adapt to changing environments” (p. 362). The authors indicated that previous research found that people with high levels of resilience report experiencing more positive emotions when facing a stressor than do individuals with lower ego resilience (while experiencing comparable levels of negative emotions), which accounts for their better outcomes (i.e. rebounding from stress, avoiding depression, and continuing to grow). The researchers found that daily positive emotions predicted growth in ego resilience. Also, growth in ego resilience accounted for the relationship between daily positive emotions and increased life satisfaction. Therefore, it is proposed that ego resilience is one trait that helps people generate positive emotions, which leads to a more open outlook and new resources. This is in contrast to improvements in life circumstances and wealth, which increase life satisfaction but lead to few positive emotions, and thus do not lead to the beneficial outcome of building resources. Life satisfaction was found to be correlated with positive emotions but ultimately depended on growth in ego resilience, which is a skill that involves emotion regulation, problem solving, and the ability to change perspectives. It seems that positive emotions at moderately-high levels can buffer against the effects of negative emotions. However, Cohen et al. (2009) that it is unknown whether chronic stress or psychopathology may deplete the effects of positive emotions as resources are used up to cope with the stress and negative emotions increase. This may be particularly relevant when examining the
relationship between infertility distress and resilience given that the experience of infertility can be long-term. This relationship between resilience and chronic stress has also been discussed by other authors, who propose that resilience may play a more prominent role as illness becomes more severe (Farber et al., 2000). Ego resilience was measured with the Ego-Resiliency 89, a measure that conceptualizes resilience as a personality characteristic (Cohn et al., 2009).

Butler, Koopman, Azarow, Blasey, Magdalene, DiMiceli, Seagraves, Hastings, Chen, Garlan, Kraemer, and Spiegel (2009) examined predictors of resilience (defined as “the process of, capacity for, and outcome of successful adaptation despite challenging or threatening circumstances”) in Americans who were indirectly exposed to the September 11, 2001 terrorist attacks (p. 266). The authors found that resilience was more likely in individuals who were open to his or her own emotional reactions, had a social environment that did not constrain the expression of those reactions, and did not suffer a damaged world view. The way the individual thought about the event seemed to be the most critical in that negative changes in world view were the strongest predictor of well-being and distress in both the short-term and long-term. In this sense, it might be important to examine whether distress in infertile individuals would be predicted by how much the infertility experience negatively changed their view of the world (i.e. their assumptions about the world and the self). For this study, resilience was defined as a combination of individual characteristics (i.e. openness to emotional reactions, intact world view) and external factors (i.e. social environment that supports emotional expression).
Resilience and Medical Conditions

Despite these variations in definition, it is evident that resilience is something that positively influences those who possess it or can achieve it and, as such, it is important to expand further on how researchers have studied this construct. One area of study that is particularly salient, especially in the context of exploring the relationship between resilience and infertility, is related to research regarding resilience levels and participants’ abilities to adjust to their medical conditions.

To examine the relationship between resilience and chronic pain, Karoly & Ruehlman (2006) surveyed a community sample. For the purposes of this study, the authors defined resilience as “a response pattern consisting of high pain severity in the context of low interference and low emotional burden” (p. 91). Results indicated that the resilient sample tended to report less guarding, more positive self-talk, and greater task persistence compared to their non-resilient peers, and higher levels of perceived control. The authors argue that these findings clearly show that resilience covaries with positive attitudes regarding one’s present and future status. Results also indicate that the resilient group was less likely to catastrophize, a finding consistent with previous literature in that catastrophizing in response to chronic pain has been reported to be a strong predictor of negative outcomes.

Farber et al. (2000) investigated how resilience factors relate to adaptation among people with symptomatic HIV disease and AIDS. The authors hypothesized that higher levels of resilience (or hardiness) would be associated with (a) lower psychological distress, (b) higher perceived quality of life, and (c) more positive core personal beliefs. Participants consisted of 200 adults (73% male, 27% female; ages 23-71 years; 68%
African American) receiving treatment at an urban community outpatient HIV clinic. The participants filled out four scales that measured dispositional resilience, HIV health status, psychological distress, and world assumptions. Results supported the authors’ hypotheses and also indicated that high resilience was strongly related to a lowered belief in the controllability of life events. Because previous research with an asymptomatic HIV sample did not reveal this same association between resilience and psychological distress, Farber et al. (2000) concluded that the results of their study might suggest that severity of HIV disease is an important variable. That is, as the disease progresses and patients become more symptomatic, resilience levels become more relevant in terms of their ability to adapt. One implication of this is that a person’s adaptation to HIV could be enhanced by psychotherapies that focus on identifying the value, purposefulness, and meaningfulness of life activities. It could be that individual goals and expectations for life need to be modified as the person’s disease progresses and functioning is impaired. This is further supported by the findings of Butler et al. (2009), which indicated that resilient individuals were less likely to have suffered a damaged world view. The authors (Farber et al., 2000) concluded that screening for resilience during mental health evaluations of HIV/AIDS patients could be useful in predicting which individuals were more likely to adapt positively and which individuals may be more susceptible to high psychological distress.

In another study examining the influence of resilience in a medical population, Yi-Frazier et al. (2010) investigated whether varying resilience resource levels were associated with particular coping patterns in patients with diabetes. The authors hypothesized that higher levels of resilience would be positively associated with adaptive
coping patterns and negatively associated with maladaptive coping patterns. A total of 145 male and female patients aged 18-75 years, with at least a 1-year history of diabetes, were selected from a convenience sample. Participants completed a questionnaire packet of personal resources and coping scales and had their glycosylated haemoglobin (HbA1c) assessed. A “resilience factor” score was derived from four scales, each measuring variables commonly used to define resilience: optimism, self-esteem, self-efficacy, and self-mastery. Two scales were used to measure coping styles and patterns. Yi-Frazier et al.’s (2010) results were supportive of the hypothesis that participants in the low-resilience group were more likely to engage in maladaptive coping patterns than those in the high-resilience group. Although participants in the high-resilience group were not shown to use adaptive coping strategies significantly more frequently than those in the lower-resilience groups, the authors believed this may reflect the fact that use of coping strategies becomes less critical when patients have ample resilience resources. Neither resilience level nor coping style was found to be associated with varying HbA1c levels. The results were said to support the use of resilience screening with diabetic patients so that those with low resources could be identified and interventions designed to decrease maladaptive coping patterns could be offered.

Sexton, Byrd, and von Kluge (2010) conducted a study to investigate similar concepts: associations between resilience, distress level, and coping styles among women experiencing infertility. The authors posited that resilience would be (a) lower in infertility patients than in women in the general population (b) negatively related to both infertility-specific and general distress, (c) positively associated with engagement in adaptive coping strategies, and (d) negatively associated with engagement in maladaptive
coping. A total of 40 women completed a set of questionnaires regarding demographics, resilience, depression, general distress, infertility-specific distress, and utilization of coping strategies. Resilience was assessed using the Connor-Davidson Resilience Scale (CD-RISC). As predicted, resilience was lower in the sample of women with fertility problems than in the general population. Resilience was negatively associated with both infertility-specific and general distress and positively correlated with increased engagement in adaptive coping skills. No significant relationship was found between resilience and maladaptive coping skills. The authors concluded that these results have implications for clinicians in that resilience levels could be assessed as a means of identifying patients who may be protected against some of the negative psychological sequelae associated with infertility as well as less resilient individuals who may benefit from learning adaptive coping skills.

Overall, although the correlational findings from these studies cannot support causal relationships, they do support the authors’ hypotheses that resilience is associated with how well patients are able to adapt to their illness and/or treatment. Though the findings are somewhat inconsistent with one another (e.g., high resilience is positively correlated with adaptive coping methods in the Sexton et al. (2010) article but not in the Yi-Frazier (2010) article; low resilience was correlated with maladaptive coping strategies in the Yi-Frazier et al. (2010) but not in the Sexton et al. (2010) article; resilience was associated with higher perceived control in the Karoly and Ruehlman (2006) article but with a lowered belief in the controllability of life events in the Farber et al. (2000) article) – possibly due to the varying definitions of resilience – it is clear that resilience is linked to levels of psychological distress and engagement in certain patterns
of coping. Based on these findings, the researchers all suggest that assessment of resilience can be used as a way to identify those patients who may have more resources for adapting positively to their illness and those who could benefit from interventions targeted at reduction of the use of maladaptive coping strategies.

**Resilience Assessment Instruments**

Several psychometric measures have been developed in an effort to measure the construct of resilience. One of the earliest measures developed was the Resilience Scale, published in 1993, which has since been used in several studies (Wagnild, 2009). The Resilience Scale is a 25-item measure of five characteristics of resilience: perseverance – “the ability to keep going despite setbacks,” equanimity – “a balanced perspective of life and experiences,” meaningfulness – “the realization that life has a purpose,” self-reliance – believing in oneself, and existential aloneness – “the realization that each person is unique” (p. 106). Reliability of the measure has been demonstrated to be acceptable and moderately high (.73 to .91) and validity was supported with statistically significant associations with morale, self-esteem, life satisfaction, depression, and perceived distress. Studies have supported its use with male and female adults across the lifespan (undergraduates to older adults). A factor analysis revealed two factors, which the authors named “acceptance of self and life” and “individual competence” (Wagnild, 2009).

Connor and Davidson (2003) developed the Connor-Davidson Resilience Scale (CD-RISC), a brief self-rated assessment, to help quantify resilience and as a clinical treatment outcome measure. The authors hoped to develop a valid and reliable measure of resilience and to establish norms for resilience in the general and clinical populations.
The CD-RISC contains 25 items assessing how the subject has felt over the past month and total scores can range from 0-100, with higher scores indicating greater resilience. Subjects (n = 806) were drawn from five populations: (a) general population, (b) primary care outpatients, (c) psychiatric outpatients in private practice, (d) subjects in a study of generalized anxiety disorder, and (e) subjects in two clinical trials of PTSD. Available demographic information indicated that 65% of the subjects were female, 77% were white, and the mean age was 43.8 (sd = 15.3). The authors evaluated test-retest reliability, convergent validity, and discriminant validity to establish the reliability and validity of the measure. They also conducted a factor analysis test. Test-retest reliability, assessed in 24 subjects from the GAD and PTSD clinical samples, demonstrated a high level of agreement with an intraclass correlation coefficient of 0.87. Convergent validity was confirmed by correlating the CD-RISC with the Kobasa hardiness measure ($r = 0.83; P<.0001$), the Perceived Stress Scale ($r = -.76; P<.0001$), the Sheehan Stress Vulnerability Scale ($r = -.32; P<.0001$), the Sheehan Disability Scale ($r = -.62; P<.0001$), and the Sheehan Social Support Scale ($r = .36; P<.0001$). The authors conclude that these results show that resilience, as expected, is associated with less disability and greater social support. Divergent validity was assessed by correlating CD-RISC scores with the Arizona Sexual Experience Scale (ASEX) in the GAD group. Results showed that these measures were not significantly correlated at baseline ($r = -.34; P=.11$) or at endpoint ($r = -.30; P=.21$). The authors conclude that their analyses demonstrate that resilience is quantifiable and influenced by health status.

Authors of the Brief Resilience Scale (BRS; Smith, Dalen, Wiggins, Tooley, Christopher, & Bernard, 2008) argued that most resilience measures (including the
Resilience Scale and the CD-RISC) are actually assessing “resilience resources,” or characteristics that may increase the likelihood of resilience, rather than assessing it as the ability to bounce back. The authors argued that “the ability to bounce back or recover from stress” is closest to the original meaning of resilience (p. 194). The reliability and validity of the BRS, a six-item measure, was tested using four samples – two groups of undergraduates (n = 128; n = 64), one group of cardiac rehabilitation patients (n = 112), and one group of 50 women who were either fibromyalgia patients (n = 20) or healthy controls (n = 30). The authors hypothesized that the BRS would represent one factor, would be related to resilience resources (assessed using the Connor-Davidson Resilience Scale and the Ego Resiliency Scale) and health-related outcomes, and would predict health outcomes when controlling for resilience resources. Results showed support for the measure’s internal consistency and test-retest reliability. The hypotheses listed above were also all supported. As this is the only measure the specifically assesses the ability to bounce back or recover from stress, the authors indicate that the BRS may be particularly useful with medical populations since the ability to recover may be more important than the ability to resist illness.

For the purposes of this study, resilience will be defined as the ability to bounce back or recover from stress and will be measured by the Brief Resilience Scale. This definition and measure were chosen both for practical purposes (i.e. the BRS’ brief length) and because we are interested in assessing resilience in individuals with current or past fertility problems, rather than examining resilience as a preventive factor.
Resilience and Coping

Given that an important relationship has been shown to exist between resilience and various coping strategies (Karoly & Ruehlman, 2006; Yi-Frazier et al., 2010; Sexton et al., 2010), this study will include a measure to assess participants’ coping strategies. For this purpose, the Brief COPE scale will be used (Carver, 1997). The 28-item scale assesses 14 types of coping: self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. Reliability estimates for this measure were found to be adequate (alpha = .50-.90). Though the developer of the Brief COPE has not suggested methods for summing the items into a total score or into adaptive or maladaptive categories, for the purposes of this study the items were grouped post-hoc into one of three categories – Active-Toward, Active-Away, and Negative (see Method section for details).

Resilience and Infertility

Up to this point, only two articles have been published regarding the relationship between infertility distress and resilience. One is the Sexton et al. (2010) article described above, which examined resilience levels in a small sample of women currently pursuing infertility treatment. The other article outlines a theoretical model that brings together many of the themes mentioned above.

Ridenour, Yorgason, and Peterson (2009) developed the Infertility Resilience Model to help therapists assess coping strategies in infertile couples. The model incorporates individual, relational, and environmental influences together, something few other models have done. The authors propose that the stress of infertility interacts with
perceptions, resources and coping strategies, which then lead to adaptation and/or resilience outcomes. In this model, resilience can be viewed both as a process (e.g. relationship cohesion, positive communication) and an outcome (e.g. interconnections between external factors, individual influences, and collective interactions and perceptions). The authors state that, “resilience depends on the individual’s and couple’s ability to effectively modify previous views, resulting in acceptance of infertility regardless of existent external influences or infertility treatment outcomes” (p. 37).

The IRM proposes that external influences are associated with how individuals and couples adapt to infertility (Ridenour et al., 2009). Researchers have shown that socially-based factors, such as family and community support, culture and socioeconomic issues, and religion, impact the experience of infertility. For example, it has been found that social support can be both positive and negative; it can be a source of emotional, financial, or spiritual support, but can also be a source of strain given that families and communities help define the infertility experience. Cultural and socioeconomic issues have been linked to rates of infertility and treatment-seeking behavior. Religion is another external factor found to have the potential to be either a protective factor (providing hope and comfort) or a source of strain (creating self-doubt and lowered self-esteem). For example, one study showed that less reliance on religion was associated with fewer depressive symptoms. One suggestion for this relationship is that, due to the value and importance that religion places on family and children, infertility leads to feelings of inadequacy and worthlessness. Medically-based external influences are also included in the IRM. These include diagnosis (e.g. male-factor vs. female-factor), duration of infertility, quality of interactions with doctors and nurses, and availability and
proximity of infertility treatment.

In addition to external factors, the IRM considers the influence of individual perceptions, interpretations, and coping strategies in resilience processes/outcomes (Ridenour et al., 2009). The authors define individual perceptions as being comprised of several factors, including the meaning given to a stressor, the ways stressors lead an individual to change his or her identity, the flexibility of the individual to accommodate instability, and ways that previously conceived perceptions are reevaluated.

The authors also discuss the importance of individual coping methods (Ridenour et al., 2009). In terms of a person’s flexibility in adapting to the instability of infertility, individuals can employ both adaptive and maladaptive coping strategies. Some people increase resilience by learning more about infertility, through medical examination, and by considering the consequences for their lives. The authors indicate that previous literature has shown that positive reinterpretation, emotional processing, and emotional expression are linked with decreased depressive symptoms, whereas both partners taking responsibility for the infertility has been shown to be less adaptive. The authors also review what is present in the literature regarding gender differences in coping. For women, initial reactions tend to be more acute than for men, perhaps because women view childbearing as a fundamental part of life. Despite the expression of several depressive symptoms, women also tend to utilize more positive coping strategies, such as positive reappraisal and seeking social support. Interestingly, the use of meaning-based coping increased marital distress when utilized by men but decreased marital distress when utilized by women. One explanation for this difference is that men might move more quickly to find meaning when the wife still needs more time. However, when the
woman has reached this level of coping, the husband may be ready to move forward as well. Women are reported to cope using confrontive coping, seeking social support, and acceptance of responsibility, whereas men tend to cope using more self-controlling coping, distancing, and planful problem solving.

In addition to external and individual factors, the IRM also incorporates couple interactions and congruent couple perceptions as integral factors related to resilience in facing infertility. The authors report that communication is crucial for couples in decreasing depressive symptoms and infertility-related stress. It is noted that the use of maladaptive coping strategies at the individual level leads to maladaptive interactions between partners.

The Infertility Resilience Model emphasizes the importance of taking several factors into consideration when assessing the relationship between resilience and infertility distress – for example, social support, culture and socioeconomic issues, religion, medically-based influences (e.g. diagnosis, duration of infertility, availability of treatment), coping strategies, gender, and relationship status.

**Gaps in Current Infertility and Resilience Research**

Sexton et al. (2010) examined the relationship between resilience and infertility distress in a small sample of women currently experiencing infertility and pursuing treatment. Their study did not sample a non-clinical population and did not include men. It also did not include participants with a history of infertility (i.e. not current) or individuals with no history of infertility.

McQuillan et al. (2003) examined the rates of long-term distress in a community sample of women with a history of infertility. However, they did not examine resilience
levels after the experience of infertility, did not include men in their sample, and did not include participants without a history of fertility problems for comparison of group differences.

**Hypotheses**

Based on the literature review and current gaps in research identified above, there were four primary hypotheses for this study: 1) Resilience levels would be lower for the *history of fertility problems* group compared to the *no history of fertility problems* group. Significantly different mean scores on the Brief Resilience Scale (BRS) would evidence this. 2) Psychological distress would be higher for the *history of fertility problems* group compared to the *no history of fertility problems* group. Significantly different mean scores on the General Health Questionnaire (GHQ-12) would evidence this. 3) Those with lower levels of psychological distress would have higher levels of resilience. This would be evidenced by a significant negative relationship between these two variables. 4) Those participants utilizing positive coping strategies (i.e. Active-Toward and Active-Away) would report higher levels of resilience on average and those participants utilizing negative coping strategies would report lower levels of resilience on average. These would be evidenced by significant positive relationships.
Method

Participants

A community sample of adult men and women were asked to participate primarily via online recruitment methods (N=322 (303 women, 19 men), $M_{age} = 32.14$ years, age range = 20-70 years; original sample consisted of 338 participants, but 16 were eliminated from the final analysis due to incomplete data). Individuals over the age of 18, with or without a history of fertility problems, were eligible to complete the survey so as to create two groups: history of fertility problems (N=208) and no history of fertility problems (N=114). Participants endorsing no history of fertility problems were still eligible regardless of whether they had ever attempted to get pregnant (i.e. status of fertility unknown). For the purposes of this study, “fertility problems” was said to include medically defined infertility (at least 12 months of having unprotected sex without achieving pregnancy) as well as other fertility problems, such as miscarriages or an extended period of difficulty getting pregnant (but less than 12 months), as one study did (McQuillan et al., 2003).

Measure(s)

The survey measure completed by participants was created by the primary investigator based upon findings of previous literature (see Appendix A). Each participant completed a 56-66 item self-administered questionnaire (depending on whether or not they endorsed current or past experience with fertility problems). Demographic items assessed the participants’ age, zip code, sex, sexual orientation, race, gross household yearly income, education level, relationship status, and level of social support.
Fertility status items were created by the primary investigator to gather information related to the type and duration of fertility problems, treatments pursued, and current family status. Every participant answered the first of these items (indicating their fertility status) but only those who endorsed experiencing fertility problems completed the other items. The first of these items – which asks, “Have you and/or your partner ever experienced fertility problems (i.e., extended period of difficulty achieving and/or sustaining pregnancy, including miscarriages)?” – allowed us to group participants by fertility status for use in the analysis phase (i.e., the independent variable).

In addition to the demographic and fertility status items, participants completed 45 questionnaire items that were based upon themes pulled from previous research studies. There are three major content areas, including 1) resilience, 2) coping strategies, and 3) psychological distress. These three content areas served as the dependent variables for this study.

Six items measured resilience using the Brief Resilience Scale (BRS; Smith, Dalen, Wiggins, Tooley, Christopher, & Bernard, 2008). Twenty-eight items measured participants’ primary coping strategies using the Brief COPE (Carver, 1997). Finally, current psychological functioning was assessed using the 12-item General Health Questionnaire (Goldberg, Gater, Sartorius, Ustun, Piccinelli, Gureje, & Rutter, 1997).

The Brief Resilience Scale (BRS) is a 6-item measurement tool that assesses the ability to bounce back or recover from stress (Smith et al., 2008). This measure has been found to have good internal consistency (Cronbach’s alpha = .80-.91) and test-retest reliability (.62-.69), as well as adequate convergent and discriminant validity. The BRS was also found to represent one factor, to be related to resilience resources and health-
outcomes, and to predict health outcomes beyond resilience resources.

The Brief COPE was used to assess participants’ primary coping strategies (Carver, 1997). Reliability estimates for this measure were found to be adequate (alpha = .50-.90). This is a 28-item measure that includes 14 subscales. Because the test developer did not label individual items as positive or negative, the investigators grouped items into broader categories for the purposes of analysis. Active-Toward coping strategies included the positive reframing (see Appendix A, items 38 & 43), planning (items 40 & 51), active coping (items 28 & 33), and instrumental support items (items 36 & 49). Active-Away coping strategies included the acceptance (items 46 & 50), humor (items 44 & 54), self-distraction (items 27 & 45), religion (items 48 & 53), and emotional support items (31 & 41). Finally, Negative coping strategies included venting (items 35 & 47), self-blame (items 39 & 52), substance use (items 30 & 37), denial (items 29 & 34), and behavioral disengagement (items 32 & 42). The categories were created so that comparisons could be made during the analysis; specifically, the investigators were interested in examining whether there were correlations between these coping categories and the other measures of resilience and psychological distress.

The General Health Questionnaire (GHQ-12), a 12-item measure of psychological distress, was used to assess participants’ current level of general distress (Goldberg et al., 1997). Items are comprised of a four-point Likert scale (0-1-2-3). A total psychological distress score is obtained by summing all 12 items, resulting in a possible score range of 0-36. Validity data for the GHQ-12 has been reported to be good and was reported to be as good as the longer 28-item version.
Procedure

Participants were primarily recruited using online advertising on social networking sites (e.g., Facebook.com), infertility support blogs and websites (e.g., RESOLVE.org), and via email. Online advertisements provided a brief description of the study and the eligibility criteria, as well as a link to the study questionnaire. Recruitment flyers were also posted locally in community businesses (e.g., coffee shops, health clinics). Flyers had tear-away tabs that provided participants with the study’s website, allowing them to complete the survey when they had the opportunity. The online advertisements and flyers informed participants that the survey is confidential and the investigators of the study would not collect information regarding the computer being used, or any identifying information that may be available on the computer. Further, participants were informed that completion of the study was completely voluntary and investigators would not have any access to names or other identifying information connected to any of the participants’ responses. Upon visiting the website, participants were provided a brief description of the purpose of the study and the recommendation that the survey be completed in a private and quiet place of their choosing. Participants were informed that the survey would take approximately 10 minutes to complete. Upon giving their informed consent to participate in the study, the participants were asked non-identifying basic demographic questions (Appendix A, Questions 1-9) which took approximately 1-2 minutes. If participants reported a history of fertility problems (item 10), they were directed to an additional set of items (questions 11-19) regarding this experience and then continued with the remainder of the questionnaire (items 20-66). If participants did endorse no history of fertility problems, they automatically skipped the
fertility questions and continued with the rest of the questionnaire (items 20-66); item 20 asked if participants have children and items 21-66 focused on questions related to resilience (items 21-26), coping strategies (items 27-54), and psychological distress (items 55-66). The entire survey took approximately 10 minutes for those endorsing current or past experience with fertility problems and approximately 8 minutes for those not endorsing current or past experience with fertility problems. Upon completion of the survey, if participants wished to receive the results of the study, they were able to cut-and-paste a link that directed them to a separate survey where they could provide their contact information.

When data collection was completed, the data was downloaded into Excel and checked. At this point, any incomplete data was examined for patterns and removed. The data was then imported into SPSS 17 for statistical analysis. T tests were used to determine whether relationships between the variables (i.e., fertility status, resilience, coping strategies, psychological distress) support the hypotheses. The goal of this is to help clarify relationships identified in past research.
Results

Participants (N = 322) ranged in age from 20 to 70, with a mean age of 32.14. Respondents lived primarily in the United States and on the West Coast, as well as other U.S. regions (see Figure 1). Though the male response rate was low (5.9%), it was decided not to exclude these participants’ responses from the analysis given that it was the original intention to include males and females in the sample. The sample was also fairly homogenous in terms of sexual orientation, race, socio-economic status, and education level. A majority of participants were married and endorsed having an adequate level of social support (see Table 1 for demographic data).

Figure 1. Regional representation of participants. West Coast states included Washington, Oregon and California. Southern states included VA, NC, SC, GA, FL, AL, TN, MS, KY, LA, OK, and TX. Midwestern states included OH, IN, MI, IA, WI, MN, IL, MO, and KS. Other Western States included MT, CO, WY, UT, AZ, NV, and AK. Northeastern states included NY, PA, and DC.
Table 1

*Participant Demographics (by percentage of total sample)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>97.2</td>
<td></td>
</tr>
<tr>
<td>Homosexual</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>90.4</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Latino or Hispanic</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Asian &amp; White</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Other Mixed Race</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td><strong>Gross Annual Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; $70,000</td>
<td>54.1</td>
<td></td>
</tr>
<tr>
<td>$30-70,000</td>
<td>32.2</td>
<td></td>
</tr>
<tr>
<td>&lt; $30,000</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td>High School Diploma</td>
<td>2.8</td>
</tr>
<tr>
<td>Some College</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>42.5</td>
<td></td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td><strong>Relationship Status</strong></td>
<td>Married</td>
<td>74.0</td>
</tr>
<tr>
<td>Single</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td>Partnered</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td><strong>Social Support</strong></td>
<td>Strongly Agree</td>
<td>42.5</td>
</tr>
<tr>
<td>Agree</td>
<td>30.7</td>
<td></td>
</tr>
<tr>
<td>Somewhat Agree</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>Somewhat Disagree/</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Disagree/ Strongly Disagree</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The sample included a higher proportion of individuals with fertility problems than without fertility problems. For those participants who endorsed a *history of fertility problems*, the nature/origin of the problems varied, as did duration of the problem and type of treatment pursued. A large majority of those with a *history of fertility problems* indicated these were current problems, that they had lasted for more than 12 months, and that they had pursued treatment (see Table 2). The primary treatment types included fertility hormones (FH), in-vitro fertilization (IVF), and intrauterine insemination (IUI). Twenty percent of those who endorsed pursuing treatment endorsed either being in the diagnostic phase or using a combination of treatments. In addition to the treatments already mentioned, other endorsed treatments included intracytoplasmic sperm injection (ICSI), diet, testicular sperm extraction (TSE), endometriosis treatment, embryo adoption, homeopathic methods, acupuncture, Chinese herbs, donated egg/sperm, surrogate, polycystic ovarian syndrome (PCOS) treatment, micro epididymal sperm aspiration (MESA), and surgical removal of uterine scar tissue. Of those who endorsed pursuing treatment, a majority had not achieved pregnancy. Among all participants (those with and without fertility problems), a majority reported not currently having children, though a larger percentage in the *history of fertility problems* group had children than in the *no history of fertility problems* group (see Table 2).
Table 2  
*Participant Fertility Statistics (by percentage)*

<table>
<thead>
<tr>
<th>Fertility Status*</th>
<th>History of Fertility Problems</th>
<th>64.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No History of Fertility Problems</td>
<td>35.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family Status*</th>
<th>No children</th>
<th>63.9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One or more biological children</td>
<td>28.0</td>
</tr>
<tr>
<td></td>
<td>One or more step-children</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>One or more adopted children</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>One or more children through use of donor eggs and/or sperm</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Combination of these</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature of Fertility Problems**</th>
<th>Attributed to male partner</th>
<th>8.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attributed to female partner</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Attributed to both partners</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>Attributed to unknown cause</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td>Attributed to an unknown cause in the female partner</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Attributed to miscarriages</td>
<td>20.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration of Fertility Problems**</th>
<th>Less than 12 months</th>
<th>18.7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12-24 months</td>
<td>14.6</td>
</tr>
<tr>
<td></td>
<td>2-3 years</td>
<td>13.6</td>
</tr>
<tr>
<td></td>
<td>3-5 years</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>5-7 years</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Definitive (i.e. unresolved)</td>
<td>59.1</td>
</tr>
<tr>
<td></td>
<td>Problems are current</td>
<td>75.0</td>
</tr>
</tbody>
</table>
### Participant Fertility Statistics (by percentage) - continued

<table>
<thead>
<tr>
<th>Fertility Treatment</th>
<th>Treatment Pursued**</th>
<th>Type of Treatment***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>88.5</td>
<td>Fertility Hormones (FH) 29.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FH &amp; In-vitro fertilization (IVF) 23.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IVF 12.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FH &amp; intrauterine insemination (IUI) 12.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FH, IVF, &amp; IUI 2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In diagnostic phase or using combination of treatments 20.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment Outcome ***</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy not achieved</td>
<td>34.1</td>
<td></td>
</tr>
<tr>
<td>Pregnancy achieved</td>
<td>29.7</td>
<td></td>
</tr>
<tr>
<td>Pregnancy achieved but not able to carry to term</td>
<td>15.7</td>
<td></td>
</tr>
<tr>
<td>No pregnancy but treatment not complete</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>Pregnancy achieved using donor eggs</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Other outcome</td>
<td>4.8</td>
<td></td>
</tr>
</tbody>
</table>

### Reason for Not Pursuing Treatment****

<table>
<thead>
<tr>
<th>Reason for Not Pursuing Treatment****</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial burden</td>
<td>30.4</td>
</tr>
<tr>
<td>Emotional burden</td>
<td>8.7</td>
</tr>
<tr>
<td>Health risks</td>
<td>4.3</td>
</tr>
<tr>
<td>Treatment not necessary</td>
<td>17.4</td>
</tr>
<tr>
<td>Untreatable/Unknown Cause</td>
<td>13.0</td>
</tr>
<tr>
<td>Giving it more time</td>
<td>8.7</td>
</tr>
<tr>
<td>Other</td>
<td>17.2</td>
</tr>
</tbody>
</table>

**Note.**  *Percentage for the total sample. **Percentage for those in the history of fertility problems group.***Percentage for those who pursued treatment. ****Percentage for those who did not pursue fertility treatment.
An independent-samples $t$ test was conducted to evaluate whether resilience levels differed between individuals with a *history of fertility problems* and those with *no history of fertility problems*. All participants completed the resilience measure ($N = 322$). The test was significant, $t(320) = -5.863, p = .000$. As hypothesized, individuals in the *history of fertility problems* group ($M = 3.18, SD = 0.81$) on average had lower scores on the resilience measure than those in the *no history of fertility problems* group ($M = 3.70, SD = .68$). The 95% confidence interval for the difference in means ranged from -0.70 to -0.35 (see Figure 1). It can be concluded that resilience levels were significantly lower for individuals with a *history of fertility problems* than resilience levels for those with *no history of fertility problems*.

![Box Plot](image.png)

*Figure 2. Box Plot Demonstrating Mean Differences in Resilience Level with 95% Confidence Intervals (Grouped By Fertility Status)*

As noted, for the purpose of analysis, items from the Brief COPE measure were categorized as either Active Toward, Active Away, or Negative so that an average score
could be summed for each participant in these three categories. These scores were then added together to obtain average group scores (i.e., mean Active-Toward, Active-Away, and Negative coping scores for the fertility problems group; mean Active Toward, Active Away, and Negative coping scores for the no fertility problems group). Eight items were labeled as Active-Toward coping strategies, which included positive reframing, planning, active coping, and instrumental support. Ten items were labeled as Active-Away coping strategies, which included acceptance, humor, self-distraction, religion, and emotional support. Ten items were labeled as Negative coping strategies, which included venting, self-blame, substance use, denial, and behavioral disengagement. Independent-samples $t$ tests were conducted to evaluate whether individuals with a history of fertility problems were more or less likely than those with no history of fertility problems to engage in Active-Toward, Active-Away, or Negative coping strategies. Four participants were excluded from this analysis due to missing data on this measure ($N = 318$). The tests for all three coping sub-groups were insignificant (Active-Toward, $t(316) = -.713$, $p = .477$; Active Away, $t(316) = 1.663$, $p = .097$; Negative, $t(316) = 1.961$, $p = .051$). It can be concluded that individuals with a history of fertility problems were not more or less likely to engage in Active-Toward, Active-Away and Negative coping strategies than individuals with no history of fertility problems.

An independent-samples $t$ test was conducted to evaluate whether distress levels differed between individuals with a history of fertility problems and those with no history of fertility problems. Six participants were excluded from this analysis due to missing data on this measure ($N = 316$). The test was significant, $t(314) = 5.001$, $p = .000$. As hypothesized, individuals in the fertility problems group ($M = 14.67$, $SD = 6.76$) on
average had higher scores on the distress measure than individuals in the no fertility problems group ($M = 10.99$, $SD = 5.28$). The 95% confidence interval for the difference in means ranged from 2.23 to 5.13 (see Figure 3). It can be concluded that distress levels were significantly higher for individuals with a history of fertility problems than distress levels for individuals with no history of fertility problems.

Figure 3. Box Plot Demonstrating Differences in Distress Level (Grouped By Fertility Status)

Post-hoc tests were conducted to determine if significant relationships existed between resilience level, coping strategies, and distress level. Specifically, Pearson product-moment correlations were computed between the following variables: Brief Resilience Scale (BRS) score, Brief COPE Active Toward, Brief COPE Active Away, Brief COPE Negative, and GHQ-12 score. Using the Bonferroni approach to control for Type I error across the 10 correlations a $p$ value of less than .008 ($0.05/6 = .008$) was required for significance. The results of the correlational analyses indicated that 8 out of
the ten correlations were statistically significant (see Table 3). The BRS was significantly correlated with every other measure. There was a significant positive relationship found between resilience scores and Active Toward scores, indicating that those with higher levels of resilience were more likely to utilize those coping strategies labeled as Active Toward, $r(316)=.269, p=.000$. The BRS was also positively correlated with Active Away scores, indicating that those with higher levels of resilience were more likely to utilize coping strategies labeled as Active Away, $r(316)=.182, p=.001$. BRS scores were found to have significant negative correlations with Negative coping ($r(316)=-.353, p=.000$) and GHQ scores ($r(316)=-.394, p=.000$), indicating that those with lower levels of resilience were more likely to utilize Negative coping strategies and were reported higher levels of distress. There was a significant positive relationship found between Active Toward scores and Active Away scores, indicating that those who utilized Active Toward coping strategies were also more likely to utilize Active Away coping strategies, $r(316)=.659, p=.000$. This was the strongest correlation found. Active Away coping scores were also found to be positively correlated with Negative coping scores, indicating that individuals that endorsed utilizing Active Away coping strategies were also more likely to utilize Negative coping strategies, $r(316)=.325, p=.000$. There was also a significant positive relationship found between Active Toward coping scores and Negative coping scores, indicating that individuals who endorsed using a lot of Active Toward coping strategies also endorsed using Negative coping strategies, $r(316)=.199, p=.000$. Finally, a significant positive correlation was found between GHQ scores and Negative coping scores, indicating that individuals with higher levels of
distress were more likely to endorse utilizing Negative coping strategies, \( r(314)=.443, p=.000 \). There were no significant relationships found between GHQ scores and the other two coping sub-scales (Active Toward and Active Away).

Table 3

*Correlations Among Mean BRS, Brief COPE, and GHQ-12 Scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resilience (BRS)</td>
<td>--</td>
<td>.269*</td>
<td>.182*</td>
<td>-.353*</td>
<td>-.394*</td>
</tr>
<tr>
<td>2. Active-Toward (Brief COPE)</td>
<td>--</td>
<td>--</td>
<td>.659*</td>
<td>.199*</td>
<td>-.063</td>
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<tr>
<td>3. Active Away (Brief COPE)</td>
<td>--</td>
<td>--</td>
<td>.325*</td>
<td>.028</td>
<td></td>
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<tr>
<td>4. Negative (Brief COPE)</td>
<td>--</td>
<td>--</td>
<td></td>
<td>.443*</td>
<td></td>
</tr>
<tr>
<td>5. Psychological Distress (GHQ-12)</td>
<td>--</td>
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* < .008 (Bonferroni correction)
Discussion

The purpose of this study was to examine resilience levels in a community sample of men and women with and without histories of fertility problems. Resilience has been found to be lower in individuals suffering from various medical conditions (Karoly & Ruelman, 2006; Farber et al., 2000; Yi-Frazier et al., 2010); however, there is currently a dearth of data related to how the experience of fertility problems may influence, or be influenced by, an individual’s level of resilience. Given that a significant negative association has been found between resilience and distress level, and the fact that fertility problems have a significant positive relationship with distress, further clarification of the relationship between resilience and infertility appeared very important to the investigator (Sexton et al., 2010; Beutel et al., 2009; Brkovich & Fisher, 1998). Confirming that resilience levels are lower in individuals with a history of fertility problems compared to those without a history adds to previous evidence suggesting such a relationship and emphasizes the need to offer support to individuals throughout their experience of fertility problems, possibly supporting the use of a resilience measure as a screening tool in a clinical setting. Further, many studies have found significant relationships between resilience, how people cope with the stress, and one’s level of psychological distress (Karoly & Ruelman, 2006; Yi-Frazier et al., 2010; Sexton et al., 2010). For comparative purposes, the current study included measures of coping strategies (Brief COPE; Carver, 1997) and psychological distress (GHQ; Goldberg et al., 1997). The intention of the current study was to survey a community sample of the general population, rather than limiting recruitment solely to those individuals pursuing medical treatment for their fertility problems. The purpose of this was to gather data from a broader range of
individuals with fertility problems (i.e., not just those who choose to pursue treatment and/or can afford treatment) and to include individuals whose fertility problems do not fit the criteria for medically-defined infertility (e.g., miscarriages or a problem lasting less than 12 months) and whose experience with fertility problems was in the past (i.e., if someone is pursuing treatment, the problem is current). Though this was the intention, a majority of our respondents endorsed having pursued treatment (88.5%), reported that their problem had lasted longer than 12 months (81.3%), and indicated that the problem was current (75%). Furthermore, the obtained sample was very homogenous, primarily comprised of White (90.4%), heterosexual (97.2%), mid-to-high SES (80.1% with at least a Bachelor’s degree; 54% > $70,000 annual income) women (94.1%). It was also the intention to include a representative sample of men in the study given that previous infertility research has largely neglected this population. However, the obtained number of male participants was very low (5.9%). It would be careless and naïve to conclude that the low representation of non-White, non-heterosexual, low-SES, non-female participants is a result of these populations not being significantly affected by fertility problems. To the contrary, many of these populations that repeatedly are omitted from research, likely due to inadequate sampling and recruitment methods. For example, the current study primarily utilized online methods to recruit participants and then required the use a computer to complete the online survey. This alone could prevent many low-SES individuals from participating in the study who do not have easy access to a computer and/or the internet. It will be important for future research to develop and utilize recruitment methods that adequately target populations that thus far have been underrepresented in infertility research.
The primary hypothesis for this study was that average resilience levels for those in the history of fertility problems would be lower compared to individuals with no history of fertility problems. This hypothesis was confirmed and is consistent with previous research where women pursuing fertility treatment were found to report lower levels of resilience than the general population (Sexton et al., 2010). What is it that contributes to this difference? Thus far there is no evidence to suggest that people who encounter fertility problems start out with lower resilience levels (i.e., that this is a risk factor for developing fertility problems). There has not been a lot of research specifically exploring the relationship between resilience and fertility problems but there have been other studies conducted on these topics separately that shed light on how they may influence one another.

It is no surprise that the experience of infertility and other reproductive problems is a very stressful one. Individuals who encounter this are faced with the possibility of never being able to have a biological child and the grief associated with that. In addition to that stress, pursuing treatment has its own set of stresses that include financial, emotional, and physical repercussions. It is not hard to imagine that the usual resources these individuals utilized to deal with everyday stresses may either be inadequate or become depleted over time, thus affecting how they perceive their ability to “bounce back easily” from the stress of infertility.

Resilience has also been found to be associated with other factors, such as one’s ability to express their emotional reactions and whether their world-view changed as a result of the stressor (Butler et al., 2009). Though most of the participants reported having an adequate level of social support, there are many facets to social support that
can vary from individual to individual, some resulting in a supportive outcome and others adding (likely unintentionally) more stress. Given that families and communities help define the infertility experience it is very possible for family and friends’ supportive efforts to actually make the situation more stressful (Ridenour et al., 2009). For example, a friend’s method of being supportive may involve being positive and encouraging the person dealing with the fertility problem to do the same. If this results in the person feeling unable to express non-positive emotional reactions to the experience, this could have a negative impact. Butler et al. (2009) found that resilient individuals tended to be those who allowed themselves, and were allowed by others in their environment, to express their emotional reactions openly. It could be that this topic in particular – infertility and other fertility problems – is one that many people who are offering social support struggle to know how to talk about, especially if they have not experienced it themselves. It could be that the participants in this study with a history of fertility problems, though they reported having an adequate level of social support, may still have difficulties in expressing their emotions, which could contribute to a lowered level of resilience over time. Secondly, Butler et al. (2009) also found that individuals with lower levels of resilience had suffered a change in their worldview following the onset of the stressor. Given that many adults possess the desire to have children and presumably assume this will occur without difficulty, individuals faced with fertility problems are confronted with the difficult task of trying to change their expectations in this area and adjusting to the possibility of a future either without children or with non-biological children. It can also be hypothesized that individuals facing fertility problems could suffer a damaged worldview in that they may have previously viewed their life as fairly
predictable and safe; the unexpected occurrence of fertility problems likely would challenge such a worldview drastically.

It has also been proposed that resilience is affected by factors such as positive and negative emotions as well as one’s perceived level of personal control over the outcome of a situation. Cohn et al. (2009) found that daily positive emotions predicted growth in ego resilience, which was defined as “a fairly stable personality trait that reflects an individual’s ability to adapt to changing environments” (p. 362). The authors proposed that ego resilience is a trait that helps people generate positive emotions, which in turn leads to a more open outlook and new resources. They also noted, however, that little is known regarding whether chronic stress may deplete the effects of positive emotions as resources are used up to cope with the stress and negative emotions increase. Ong, Bergeman, Bisconti, and Wallace (2006) found a similar relationship between positive emotions and resilience among a sample of recently bereaved widows, where daily positive emotions were found to moderate stress reactivity and mediate stress recovery. The authors explain that positive emotions may have this moderating effect because, though positive and negative emotions operate fairly independently during ordinary circumstances, an inverse relationship between them appears during times of stress. Thus, when positive emotions are present during stressful events they have the power to diminish negative emotions. The authors also point to other research that highlights the role that positive emotions may play in undoing or lessening the autonomic arousal generated by negative emotions, thus facilitating adaptive recovery to stressful events. Before relating how this area of research may contribute to our understanding of why
resilience levels are lower among individuals with a history of fertility problems, it is important to discuss the influence of personal control, as it seems these likely are related.

As noted, perceived personal control has been suggested to be a possible resilience factor. Diehl and Hay (2010) reported that greater personal control was associated with lower reactivity to stress. The authors indicated that participants reported more negative affect both on days when they experienced more stress than usual and when they reported less control than usual. Additionally, a stronger association was found between daily stress and negative emotion on days when individuals reported low control compared to high control. Though the current study did not include a measure of perceived personal control, it makes sense that this factor would contribute greatly to the experience of infertility. It can be hypothesized that the specific stressor of infertility might be one over which individuals feel low personal control. When considering the current sample, it seems particularly salient given that most of those with fertility problems reported seeking treatment and over 60% of those reported being unable to get pregnant or successfully carry to term. In this way, problems with fertility may be a stressor that is associated with a particularly low sense of personal control, which in turn results in these individuals reacting to daily stresses with more negative emotions (i.e., lower resilience). Given that fertility problems and their treatment are often chronic and ongoing, it may be that individuals’ perceived level of personal control lowers as a function of time as treatments fail and/or fewer options are available to them. With this decrease in perceived personal control, negative emotion increases and resilience level goes down. This would be consistent with the previously mentioned research that indicated that positive emotions assist resilient people to recover effectively from daily
stresses (Ong et al., 2006). It could be that as the fertility problems become chronic, positive emotions diminish and are unable to offset the effects of negative emotions, which then lowers resilience in that they are unable to recover effectively from daily stresses.

In terms of this first hypothesis, there are several limitations in our ability to generalize these findings or treat them as definitive. First, the present study did not obtain particular data from the participants that now seems to be particularly relevant when researching resilience; for example, questions regarding whether changes in worldview occurred and measures of positive/negative emotions as well as perceptions of personal control. Having not included these measures in the original questionnaire, we are limited in our ability to make definitive conclusions about the obtained results.

Another limitation is related to the study design in that it was cross-sectional. One of the proposed explanations for why participants with a history of fertility problems reported lower levels of resilience was related to the stressor being chronic and ongoing. With a cross-sectional sample it is more difficult to make conclusions that are related to the passage of time. Though one could compare participants who report being in the early stage of infertility (e.g., newly diagnosed) with those who have, for example, been in treatment for several years, it is preferable to conduct a longitudinal study where participants are followed over time (ideally starting pre-diagnosis) so as to avoid the influence of confounding variables associated with a cross-sectional design (e.g., cohort effects). Cohort effects could be a particularly important factor when studying infertility and its treatment given the fact that many treatments options are fairly new and were not available to people experiencing infertility even ten years ago.
Finally, a major limitation is related to the homogeneity of the sample. Participants were largely White (90.4%), female (94.1%), and middle-to-high socioeconomic status (based on income and education). The goal of the present study was to survey a broader community sample, rather than just women currently pursuing fertility treatment (as many other studies have done). Additionally, participants in our sample with a history of fertility problems reported these problems were current (75%) and that they had (or currently were) pursuing treatment (88.5%). The initial hope was to obtain a more heterogeneous sample in terms of current and past fertility problems experience as well as a larger representation of individuals who did not pursue treatment. McQuillan et al. (2003) found that only 37% of their community sample of women reported pursuing medical treatment for their fertility problems. However, this could be related to the fact that they surveyed a larger proportion of participants not currently experiencing fertility problems (i.e., experience was in the past), a population that likely had fewer treatment options when they were making decisions about how to address their fertility problems.

Despite these limitations, the current study does raise questions that would be valuable to address in future research endeavors. This study was primarily concerned with examining between group differences in terms of resilience, but it would be very informative to also look at within group comparisons. For example, are there differences in resilience level as a function of whether individuals pursued fertility treatment? Or, does resilience level fluctuate as a function of treatment duration (e.g., decrease over time)? One could also examine whether resilience level differed between those with current fertility problems versus those with past fertility problems or, similarly, between
those with children versus those without children. It would also be interesting to examine whether resilience level differed between those who reported high social support versus those that reported low social support. Finally, given the homogeneity of the current sample, it would be very important to survey a more diverse population. For example, would individuals of lower socioeconomic status (SES) report lower perceived personal control over the situation (e.g., not being able to afford treatment) and thus show even lower levels of resilience compared to those of higher SES?

It was also hypothesized that participants with a history of fertility problems would report significantly higher levels of psychological distress than those with no history of fertility problems. This hypothesis was confirmed and is consistent with previous research that found the experience of infertility and fertility problems to be associated with increased levels of distress (Griel, 1997; Brkovich & Fisher, 1998; Cwikel et al., 2004; Berg & Wilson, 1991). Several factors may have contributed to this outcome with this particular sample. As noted before, a large majority of those participants who endorsed a history of fertility problems indicated that these problems were current (75%) and that they currently were pursuing, or had pursued in the past, fertility treatment (88%). This is important given that previous research has shown that long-term distress was only found in those individuals who ultimately never became parents, whether it was to biological, adopted, or step-children (McQuillan et al., 2003). For the current sample, 42% of those with a history of fertility problems reported currently having children, indicating that a majority of these respondents were currently not parents. Though only 25% of the group with no history of fertility problems reported having children, the other 75% are presumably childless either because they have not
attempted to start a family yet or have chosen not to have children, neither of which is found to be associated with increased distress.

This between-group difference in level of psychological distress could also reflect the reciprocal relationship between stress and infertility that has been proposed in previous research. There has been much debate regarding whether psychological distress is a risk factor for or a consequence of infertility, or both. Though evidence thus far has been inconclusive, there is support for proposing a reciprocal, bi-directional relationship. Cwikel et al. (2003) conducted a review of the literature and concluded that there is some evidence suggesting that psychological variables such as job-strain, distress, and psychosomatic symptoms may predict fertility status. The authors also reported that there is some evidence to suggest that psychological distress is caused by the experience of infertility, though there are inconsistencies related to when the distress is most severe and how long it lasts. Finally, the authors indicated that support for a reciprocal relationship does exist, citing one study where depressed women in their first cycle of IVF were less likely to achieve pregnancy than non-depressed women and where depression was most prevalent among repeat cycle women (25%) and relatively prevalent among first cycle women (15%), compared to community norms (12%), clearly showing the reciprocal relationship between the psychological distress of infertility and IVF outcome (Thiering et al., 1993). Cwikel et al. (2003) also cited another study where the prevalence of mild-moderate depression increased substantially following failure of an IVF treatment and where those with a predisposition toward anxiety and pre-IVF levels of depression were predictive of poor psychological reactions to IVF-failure, again supporting a reciprocal relationship (Newton et al., 1999). So, while the exact nature of
how infertility interacts with distress remains somewhat unclear, it is undeniable that an important relationship exists, particularly in the context of fertility treatment.

Further support for the experience of fertility problems being associated with increased psychological distress can be found in research that examined people’s reasons for dropping out of fertility treatment. Olivius et al. (2004) surveyed individuals who had pursued IVF treatment and found that 54% of the sample chose to discontinue treatment even though it was free in Sweden. Participants cited “psychological burden” (26%) and “poor prognosis” (25%) most commonly as their reasons for discontinuing treatment. The present study did not include a question related to treatment drop-out, but did ask participants who did not pursue treatment their reason for doing so. Results indicated that most individuals did not pursue treatment due to “financial burden” (30.4%), but 8.7% did cite “emotional burden” as a primary reason. As noted above, there is inconclusive evidence regarding stages of treatment and the trajectory of distress (e.g., some found a dose-response pattern, others found U-shaped patterns). Berg & Wilson (1991) developed a stage model for infertility treatment where distress is proposed to increase during initial stage (first 12 months), decreases during the second stage (second year of treatment), and then increases again in year three and beyond. For the current study, it appears that many participants were in stages one and three, with 18.7% endorsing a duration of less than 12 months and 21.6% endorsing a duration of greater than 24 months (duration of problem, not treatment). However, 48.6% reported that their problem was “definitive (i.e., problem never resolved).” The intention was for this option to be selected by participants who were no longer pursuing treatment or actively addressing the problem (i.e., problem occurred in the past). However, it is likely that the
phrasing was confusing and participants in early stages of the process may have selected it due to their problem currently not being resolved (see Appendix A, item 14). Despite this uncertainty, we can be sure that at least 40% of the sample was either in the first or third stage of their experience. The first stage is proposed to be associated with greater levels of distress as individuals adjust to initial diagnostic and possibly treatment processes (Berg & Wilson, 1991). This distress is suggested to subside in the second stage as people adjust to treatment and feel hopeful that viable options are still available to them. In the third stage, distress is proposed to increase again after procedures presumably have failed and chronic stress begins to affect marital resources. It is also proposed that couple may begin to grieve the inability to have a child at this stage.

Other factors that have been found to influence this elevation in psychological distress during the experience of fertility problems include marital adjustment, treatment length, sexual satisfaction/frequency, marital communication, and attribution of responsibility (Berg & Wilson, 1995). The experience of fertility problems itself is associated with distress, but disruptions or impairment in any of these other areas can exacerbate the distress when added on top of it. The developers of the Infertility Resilience Model (IRM) also emphasized this point, proposing that the stress of infertility interacts with individual perceptions, resources and coping strategies, as well as external factors and interactions within the couple, which then influence adaptation and/or resilience (Ridenour et al., 2009). With so many factors playing a role in determining the degree of distress individuals may experience while coping with infertility, it is no surprise that conclusive evidence regarding cause-effect, or even reciprocal, relationships has been hard to come by. For example, Ridenour et al. (2009) point out that some
factors can be protective for some individuals but a source of strain for others (e.g.,
family/community influence, religion, socioeconomic issues, medically-based issues such
as diagnosis and proximity of treatment). However, there is no arguing that the
experience of fertility problems is associated with a higher degree of distress and this was
evident in the current study.

Again, there are limitations related to the cross-sectional design of the study.
With regards to psychological distress, we have no way to confirm if individuals’ pre-
infertility distress levels were lower. As mentioned above, a reciprocal relationship
between infertility and psychological distress has been proposed and it would be very
important information to know if participants with a history of fertility problems started
out with higher levels of distress compared to participants with no history of fertility
problems. Another limitation is related to the fact that we only obtained data for the
individual (mostly the female partner) rather than data related to the couple. Previous
research has indicated that marital adjustment and communication can have a significant
impact on overall distress level and adjustment to (or recovery from) the stressor (Berg &
Wilson, 1995; Ridenour et al., 2009). Though the current study did inquire about
perceived level of social support, this was only one question and did not require
participants to indicate from whom they were receiving support (i.e. it would be
informative to know whether the participant viewed their partner as supportive or not).
Another possible limitation of the current study may be related to the fact that a broader
definition of “fertility problems” was used. This was done as a means of being more
inclusive and not excluding individuals simply because they did not meet the narrow
definition of “infertility.” However, doing so may mean that we missed important
differences between these individual sub-groups. For example, miscarriages are not typically defined as “fertility problem” given that these individuals’ challenge is not technically related to a fertility dysfunction (e.g., functions related to eggs, sperm, ovaries, etc.). It is likely that the stresses associated with miscarriages could vary significantly from those associated with being unable to get pregnant.

There are a number of directions one could go to further clarify the relationship found between fertility problems and psychological distress. It would be helpful to examine within-group differences among the participants with a history of fertility problems. For example, one could look at whether there are differences in distress level between those with current fertility problems and those past fertility problems. It would also be helpful to assess whether distress level fluctuates as a function of the duration of the fertility problem. Past research has generated inconclusive findings regarding the typical trajectory of distress so an analysis of this sort could help shed light on this particular aspect of infertility and its treatment. It also seems important for researchers conducting such research to make the distinction between duration of the fertility problem versus duration of medical treatment for the problem. It is possible that different trajectories exist for those who pursue treatment and those who do not and, moreover, it is important to acknowledge the fact that distress does not start and stop when treatment begins and ends. One could also look at differences in distress level between those with children and those without. Finally, as noted above, there may be important differences between the sub-groups that were included in the “fertility problems” category (i.e., medically-defined infertility, fertility problems lasting less than 12 months, miscarriages). Exploring these groups further, perhaps examining whether groups differ significantly in
terms of distress level, resilience level, or perhaps coping strategies, would be very helpful in learning how best to assist these individuals through the process.

It was also hypothesized that resilience would have a significant negative relationship with distress level for the entire sample. This hypothesis was confirmed, with higher scores on the Brief Resilience Scale (BRS) generally associated with lower scores on the General Health Questionnaire (GHQ-12) and vice versa (r=-.394), and is consistent with findings from previous research (Beutel et al., 2009; Farber et al., 2000; Sexton et al., 2010; Wagnild, 2009; Connor & Davidson, 2003). Reasons for this association, while initially seeming fairly obvious, may in fact be quite multifaceted. As noted in the introduction, resilience as a construct has been defined in a variety of ways (e.g., a personality trait, an adaptive process, an outcome) and, depending on how you define it, a variety of factors can be proposed to influence it. In the case of the Brief Resilience Scale, where resilience is defined as one’s perceived ability to “bounce back” from stressful experiences, it can be assumed that one’s perception of their own ability to recover from stress has some effect on the degree to which stressful events influence one’s psychological well-being. However, the issue remains complicated given the multitude of factors that can influence whether or not one feels capable of “bouncing back” easily from stress – for example, personality factors, level of social support, prior mental health status, severity of stressors, and coping strategies. It should also be mentioned that resilience levels were found to be higher in general for the participants with no history of fertility problems. Thus, it could be proposed that those with higher resilience were simply experiencing lower levels of stress (i.e., no infertility) and thus reported lower levels of psychological distress. The association could also reflect the
impact of chronic stress; in other words, as a stressor endures, individual feel less able to “bounce back” and resilience (as measured by the BRS) goes down.

In order to further clarify this association between resilience and psychological distress it would be helpful to examine this relationship within each group – would we still find a significant relationship between these variables within the history of fertility problems group when their mean level of resilience was found to be lower overall? One limitation of the current study is that there was no measure of perceived level of stress. For example, if there were individuals in the no history of fertility problems group who perceived themselves to currently be experiencing high stress, but who scored high on resilience and low on psychological distress, this would offer further support for proposing that it is the experience of fertility problems itself, not just general stress, that influences group differences in resilience level and psychological distress. Similarly, if there were individuals in the history of fertility problems group that reported low perceived stress, but still scored low on resilience and high on psychological distress. Another important area to explore going forward is related to duration of treatment (or duration of the problem) and measuring whether the negative relationship between resilience and distress holds constant. It would be interesting to know if resilience adjusts predictably with level of distress or if it is a more stable construct.

Lastly, it was hypothesized that participants utilizing positive coping strategies (Active Toward and Active Away) would report higher levels of resilience on average and participants utilizing negative coping strategies would report lower levels of resilience. This final hypothesis was also confirmed; resilience was found to have a significant positive relationship with positive coping strategies (Active Toward, \( r = .269 \),
& Active Away, \( r = .182 \) and negatively associated with negative coping strategies (Negative, \( r = -.353 \)). This finding is consistent with previous reports that have found similar relationships between resilience and coping (Bonanno et al., 2002; Yi-Frazier et al., 2010; Sexton et al., 2010; Karoly & Ruehlman, 2006; Ridenour et al., 2009).

Interestingly, there were no significant group differences in coping strategies; for example, those with a history of fertility problems were not found to be more likely to use negative coping strategies. This suggests that resilience may have more influence over determining which types of coping strategies an individual uses than the particular stressor does. In other words, participants who reported being able to recover easily from stress were more likely endorse using more positive coping strategies (i.e., Active Toward and Active Away) and those with lower resilience scores were more likely to utilize negative coping strategies, regardless of whether they had a history of fertility problems or not. However, it is possible that group differences in coping strategy might be found if resilience levels in history of fertility problems group were low enough. For example, if it is determined in future research that the first stage of the fertility problem experience (or treatment) is most associated with high levels of distress, a sample of individuals from this population alone may produce lower resilience levels (given the negative association found between distress and resilience) and a greater tendency to engage in negative coping strategies. Further, it would be beneficial to examine gender differences in utilization of coping strategies. With a larger sample of men, it would be possible to analyze whether there are differences in utilization of particular coping strategies. Past research has shown that men were more likely to use self-controlling coping, distancing, and planful problem solving (Ridenour et al., 2009).
In summary, resilience (defined as one’s perceived ability to “bounce back”) was found to be significantly lower and distress was found to be significantly higher in the history of fertility problems group compared to participants in the no history of fertility problems group. A significant negative relationship was also found between resilience and distress for the entire sample and significant relationships were found between resilience level and coping strategies (e.g., positive relationship between resilience and positive coping strategies; negative relationship between resilience and negative coping strategies). These findings are consistent with previous literature. However, there was no significant difference in coping strategies between the two groups. As noted above, there are many directions that future research can take with this field of study. However, if these were to be prioritized in terms of clinical utility, further exploration of within-group differences might be most helpful. We know that individuals with a history of fertility problems endorse both lower resilience and higher levels of distress. However, much more clarification is needed regarding when in this process resilience is lowest and when distress is highest, ideally examined using a longitudinal study design. With such information, clinicians and other health professionals can better identify those individuals who may particularly benefit from supportive services.

That said, it is equally important for research to also examine the current status of supportive services (e.g., how many people with fertility problems are referred for services, how many pursue services, what type of services/interventions are provided, do individuals with fertility problems perceived these to be helpful and/or adequate) and to conduct treatment outcome studies to examine the usefulness of these interventions.
References


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### Appendix A: SurveyMonkey.com Questionnaire Items

1. **Current age:**

2. **Zip Code:**

3. **Sex:**
   - □ Male
   - □ Female
   - □ Transgender

4. **Sexual Orientation:**
   - □ Heterosexual
   - □ Homosexual
   - □ Bisexual
   - □ Other (please specify): ___________

5. **Race:**
   - □ White
   - □ Black
   - □ Asian
   - □ Latino or Hispanic
   - □ Mixed Race (please specify): __________

6. **Gross Household Yearly Income:**
   - □ Less than $10,000
   - □ $10-30,000
   - □ $30-50,000
   - □ $50-70,000
   - □ $70-100,000
   - □ Greater than $100,000

7. **Education Level:**
   - □ Less than 12th grade
   - □ High school Diploma
   - □ Some College
   - □ Bachelor’s Degree
   - □ Master’s Degree
   - □ Doctoral Degree
   - □ Other (please specify): ________________________
8. **Relationship Status:**
- Single
- Married
- Partnered
- Divorced
- Widowed

9. **In general, I feel as though I have an adequate level of social support:**
- Strongly Agree
- Agree
- Somewhat Agree
- Somewhat Disagree
- Disagree
- Strongly Disagree

10. **Have you and/or your partner ever experienced fertility problems (i.e. extended period of difficulty achieving and/or sustaining a pregnancy, including miscarriages)?**
- Yes
- No

11. **Please indicate the nature/origin of the fertility problem (click all that apply):**
- Problem attributed to male partner (male-factor infertility)
- Problem attributed to female partner (female-factor infertility)
- Problem attributed to both partners
- Miscarriages
- Unknown cause
- Other (please specify): ________________________

12. **Are you currently experiencing fertility problems?**
- Yes
- No

13. **Did your fertility problems last less than 12 months?**
- Yes
- No
14. **What was the duration of your fertility problem?**

- [ ] 12-24 months
- [ ] 2-3 years
- [ ] 3-5 years
- [ ] 5-7 years
- [ ] Definitive (i.e. problem never resolved)

15. **Did you pursue fertility treatment?**

- [ ] Yes
- [ ] No

16. **How many months/years ago did the problem begin?**

- [ ] Less than six months
- [ ] 6 months – 11 months
- [ ] 12-18 months
- [ ] 19-24 months
- [ ] 24+ months

17. **What type of treatment did you pursue? (Please click all that apply)**

- [ ] I did not pursue treatment
- [ ] Fertility hormones
- [ ] In Vitro Fertilization (IVF)
- [ ] Third-party Egg Donor
- [ ] Surrogate
- [ ] Other (please specify): ________________________

18. **What was the treatment outcome (click all that apply)?**

- [ ] Pregnancy not achieved
- [ ] Pregnancy achieved but not able to carry to term
- [ ] Self or partner achieved pregnancy
- [ ] Pregnancy achieved using donor eggs
- [ ] Pregnancy achieved using donor sperm
- [ ] Pregnancy achieved using surrogate
- [ ] Other (please specify): ________________________
19. What was your reason for not pursuing treatment?
- Financial burden
- Emotional burden
- Health risks
- Other (please specify): _______________________

20. Do you have children now (click all that apply)?
- No
- Yes, I have one or more biological children
- Yes, I have one or more children through the use of donor eggs and/or sperm
- Yes, I have one or more adopted children
- Yes, I have one or more step-children

Please indicate how much you disagree or agree with each of the following statements:

21. I tend to bounce back quickly after hard times.
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

22. I have a hard time making it through stressful events
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

23. It does not take me long to recover from a stressful event.
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

24. It is hard for me to snap back when something bad happens.
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

25. I usually come through difficult times with little trouble.
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

26. I tend to take a long time to get over set-backs in my life.
- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
These items deal with ways you typically cope with stressful life events. Do not answer on the basis of whether it seems to work or not, just whether or not you do it. Make your answers as true for you as you can.

27. I turn to work or other activities to take my mind off things.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

28. I concentrate my efforts on doing something about the situation I’m in.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

29. I say to myself, “This isn’t real.”
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

30. I use alcohol or other drugs to make myself feel better.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

31. I get emotional support from others.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

32. I give up trying to deal with it.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

33. I take action to try to make the situation better.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

34. I refuse to believe it has happened.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

35. I say things to let my unpleasant feelings escape.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot

36. I get help and advice from other people.
- [ ] I don’t do this at all
- [ ] I do this a little bit
- [ ] I do this a medium amount
- [ ] I do this a lot
37. I use alcohol or other drugs to help me get through it.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

38. I try to see it in a different light, to make it seem more positive.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

39. I criticize myself.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

40. I try to come up with a strategy about what to do.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

41. I get comfort and understanding from someone.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

42. I give up the attempt to cope.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

43. I look for something good in what is happening.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

44. I make jokes about it.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

45. I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>

46. I accept the reality of the fact that it has happened.

<table>
<thead>
<tr>
<th>I don’t do this at all</th>
<th>I do this a little bit</th>
<th>I do this a medium amount</th>
<th>I do this a lot</th>
</tr>
</thead>
</table>
47. I express my negative feelings.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

48. I try to find comfort in my religion or spiritual beliefs.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

49. I try to get advice or help from other people about what to do.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

50. I learn to live with it.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

51. I think hard about what steps to take.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

52. I blame myself for things that happened.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

53. I pray or meditate.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

54. I make fun of the situation.

- I don’t do this at all
- I do this a little bit
- I do this a medium amount
- I do this a lot

*We would like to know how your health has been in general over the past few weeks. Please select the answer that most closely applies to you. Remember that we want to know about present and recent complaints, not those you had in the past.*

55. Have you recently been able to concentrate on whatever you are doing?

- Better than usual
- Same as usual
- Less than usual
- Much less than usual

56. Have you recently lost much sleep over worry?

- Not at all
- No more than usual
- Somewhat more than usual
- Much more than usual
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>57. Have you recently felt that you are playing a useful part in things?</td>
<td>□ More so than usual □ Same as usual □ Less useful than usual □ Much less useful</td>
</tr>
<tr>
<td>58. Have you recently felt capable of making decisions about things?</td>
<td>□ More so than usual □ Same as usual □ Less so than usual □ Much less capable</td>
</tr>
<tr>
<td>59. Have you recently felt constantly under strain?</td>
<td>□ Not at all □ No more than usual □ Somewhat more than usual □ Much more than usual</td>
</tr>
<tr>
<td>60. Have you recently felt you couldn’t overcome your difficulties?</td>
<td>□ Not at all □ No more than usual □ Somewhat more than usual □ Much more than usual</td>
</tr>
<tr>
<td>61. Have you recently been able to enjoy your normal day-to-day activities?</td>
<td>□ More so than usual □ Same as usual □ Less so than usual □ Much less than usual</td>
</tr>
<tr>
<td>62. Have you recently been able to face up to your problems?</td>
<td>□ More so than usual □ Same as usual □ Less able than usual □ Much less able</td>
</tr>
<tr>
<td>63. Have you recently been feeling unhappy and depressed?</td>
<td>□ Not at all □ No more than usual □ Somewhat more than usual □ Much more than usual</td>
</tr>
<tr>
<td>64. Have you recently been losing confidence in yourself?</td>
<td>□ Not at all □ No more than usual □ Somewhat more than usual □ Much more than usual</td>
</tr>
<tr>
<td>65. Have you recently been thinking of yourself as a worthless person?</td>
<td>□ Not at all □ No more than usual □ Somewhat more than usual □ Much more than usual</td>
</tr>
<tr>
<td>66. Have you recently been feeling reasonably happy, all things considered?</td>
<td>□ More so than usual □ About the same as usual □ Less so than usual □ Much less than usual</td>
</tr>
</tbody>
</table>
If you would like to receive a summary of the results after the study is completed, please click “Yes” to be directed to a separate survey where you can provide your name and email or mailing address. This information (name and address) will not be connected in any way to your study questionnaire responses. By clicking “No” you will be exited out of the survey now.

☐ Yes, I would like to receive a summary of the results.

☐ No, thank you.